



Solutions

TEST REPORT

Test Report No.: UL-RPT-RP-14424979-616

Applicant * : Balluff GmbH
Model No. * : BF-IDC02
ISED ID * : IC: 20739-BFIDC02
FCC ID * : 2AGZY-BFIDC02
Technology * : RFID – 70 kHz
Test Standard(s) : **FCC Parts 15.209 &**
Innovation, Science and Economic Development Canada
RSS-210 Issue 10, December 2019
RSS-Gen Issue 5, April 2018 | Amendment 2 (February 2021)

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 1.1 with immediate effect**
Test Report No. UL-RPT-RP-14424979-616 Version 2.0, Issue Date 03 AUGUST 2023 replaces
Test Report No. UL-RPT-RP-14424979-616 Version 1.1, Issue Date 10 JULY 2023, which is no longer valid.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: 03 August 2023

Approved by: Rachid, Acharkaoui
Title: Operations Manager
Date: 03 August 2023



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.

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Table of Contents

1. Customer Information *	4
1.1. Applicant Information	4
1.2. Manufacturer Information	4
2. Summary of Testing	5
2.1. General Information	5
Applied Standards	5
Location	5
Date Information	5
2.2. Summary of Test Results	6
2.3. Methods and Procedures	6
2.4. Deviations from the Test Specification	6
3. Equipment Under Test (EUT)	7
3.1. Identification of Equipment Under Test (EUT) *	7
3.2. Description of EUT *	7
3.3. Modifications Incorporated in the EUT	7
3.4. Additional Information Related to Testing *	8
3.5. Support Equipment	8
A. Support Equipment (In-house)	8
B. Support Equipment (Manufacturer supplied)	8
4. Operation and Monitoring of the EUT during Testing	9
4.1. Operating Modes	9
4.2. Configuration and Peripherals	9
5. Measurements, Examinations and Derived Results	10
5.1. General Comments	10
5.2. Test Results	11
5.2.1. Transmitter 99% Emission Bandwidth	11
5.2.2. Transmitter Fundamental Field Strength	14
5.2.3. Transmitter Radiated Emissions	17
6. Measurement Uncertainty	24
7. Used equipment	25
8. Open-Area-Test Site comparison	26
9. Report Revision History	30

1. Customer Information *

1.1. Applicant Information

Company Name:	Balluff GmbH
Company Address:	Schurwaldstrasse 9, 73765 Neuhausen a.d.F., Germany
Contact Person:	Thomas Lo Faro-Heil
Contact E-Mail Address:	thomas.lofaro@balluff.de
Contact Phone No.:	+49 7158 173-8139

1.2. Manufacturer Information

Company Name:	Balluff GmbH
Company Address:	Schurwaldstrasse 9, 73765 Neuhausen a.d.F., Germany
Contact Person:	Thomas Lo Faro-Heil
Contact E-Mail Address:	thomas.lofaro@balluff.de
Contact Phone No.:	+49 7158 173-8139

2. Summary of Testing

2.1. General Information

Applied Standards

Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.209
Specification Reference:	RSS-210 Issue 10, December 2019
Specification Title:	Licence-Exempt Radio Apparatus: Category I Equipment
Specification Reference:	RSS-Gen Issue 5, April 2019 Amendment 2: February 2021
Specification Title:	General Requirements for Compliance of Radio Apparatus

Location

Location of Testing:	UL International Germany GmbH Hedelfinger Strasse. 61, 70327 Stuttgart, GERMANY
Registration Number:	399704

Date Information

Order Date:	19 July 2022
EUT Arrived:	28 November 2022
Test Dates:	30 November 2022 to 20 December 2022
EUT Returned:	-/-

2.2. Summary of Test Results

Applied Clauses	Compliance Test Description	Test Result			
		C	N.C	N.P	N.A
FCC Part 15.207 & ISED RSS-Gen 8.8	Transmitter AC Conducted Emissions ⁽¹⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FCC Part 15.209(a) ISED RSS-Gen 6.12, 8.9 & RSS-210 Section 7.2	Transmitter Fundamental Field Strength	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISED RSS-Gen 6.7	Transmitter 99% Emission Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FCC Part 15.209 (a) & ISED RSS-Gen 6.13 & 8.9	Transmitter Radiated Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C: COMPLIED N.C.: NOT COMPLIED N.P.: NOT PERFORMED N.A.: NOT APPLICABLE					
Decision rule: If the decision rule is not included in the applied customer specification or testing standard, the binary statement for simple acceptance, as defined in ILAC G8: 2019 Section 4.2.1, is applied as the decision rule for a pass/ fail statement. If the measured value is on the limit, the result is defined as a pass. In this case the risk of a false positive is 50%. For further information regarding risk assessment refer to ILAC G8: 2019.					

Note(s):

1. The EUT is powered by a mobile handheld which is in-turn battery powered.

2.3. Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	KDB 414788 D01 Radiated Test Site v01
Title:	TEST SITES FOR RADIATED EMISSION MEASUREMENTS

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) *

FCC

Brand Name:	Balluff
Model Name or Number:	BF-IDC02
Test Sample Serial Number:	CW Sample (Radiated Test Sample)
Hardware Version Number:	1.0
Firmware Version Number:	1.0
FCC ID:	2AGZY-BFIDC02

ISED

Brand Name:	Balluff
PMN:	BF-IDC02
Test Sample Serial Number:	CW Sample (Radiated Test Sample)
HVIN:	BIS C-830-4-011-A
FVIN:	N/A
ISED Certification Number:	IC: 20739-BFIDC02

3.2. Description of EUT *

The equipment under test was an adapter between a mobile handheld and RFID heads which supporting LF RFID 70 kHz.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing *

Technology Tested:	LF RFID	
Type of Unit:	Transmitter	
Operating Frequency Range:	70 kHz	
Tested Data Rate(s) & Modulation(s):	125 kbps	ASK
Tested Antenna(s):	BIS007R	BIS007K
Declared Antenna Gain:	Not stated	Not stated
Antenna Type:	BIS C-325/05-S4	BIS C-323/05-S4
Antenna Details:	Inductive coil antenna	Inductive coil antenna
Transmit Channels Tested:	Channel ID	Frequency(kHz)
	Single	70
Power Supply Requirement(s):	5V DC via a mobile handheld	

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	AC Adaptor	Not stated	Not stated	Not stated
2	Industrial Handheld Emulator	Balluff	BIS V-8xx Series	Not stated
3	Antenna	Balluff	BIS007R	Not stated
4	Antenna	Balluff	BIS007K	Not stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- ☒ Constantly transmitting at full power with a modulated carrier in RFID test mode.

4.2. Configuration and Peripherals

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

- The applicant or manufacturer supplied test setup instructions "BIS_M_830_Test_Manual.pdf" issued on 23.11.2022 was used to configure the EUT.

EUT Power Supply:

- For testing purpose the EUT was powered with 5V DC via the mobile handheld which is in-turn powered by 15V DC via an AC/DC Adaptor. The adaptor was connected to 120V AC mains.

Test Mode Activation:

- The EUT starts signalling after power on.

Radiated Measurements:

- The EUT radiated sample with Stitched antenna was used for radiated spurious emission & radiated band edge measurements.
- Before starting final radiated spurious emission measurements "worst case verification" with the EUT in Standing-position & Laying-position was performed by Lab.
- The EUT in Standing-position with BIS007K antenna and Laying-position with BIS007R antenna were 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 at 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 V11.30.00 Software 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 99% Emission Bandwidth

Test Summary:

Test Engineer:	Sercan Usta	Test Date:	20 December 2022
Test Sample Serial Number:	CW Sample (Radiated Test Sample)		
Test Site Identification	SR 1/2		

ISED Reference:	RSS-Gen 6.7
Test Method Used:	RSS-Gen 6.7 deviations in accordance with notes below

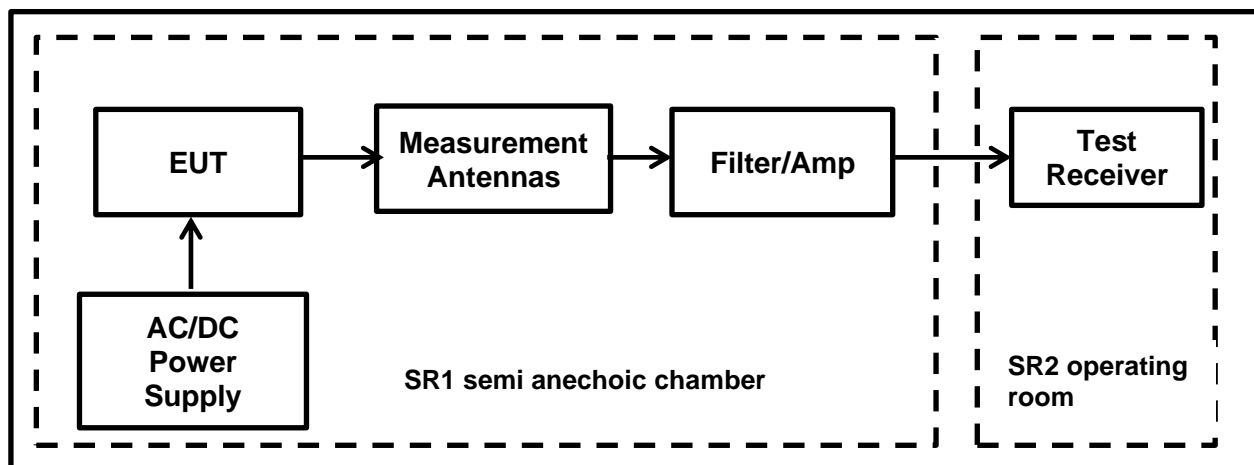
Environmental Conditions:

Temperature (°C):	21.4
Relative Humidity (%):	45.7

Notes:

- Following reasonable deviations to test method ANSI C63.10 Section 6.9.2 were made:
 - o Larger value of RBW (>1% to 5% of the OBW) than those mentioned in ANSI C63.10 Section 6.9.2 (shall be in the range of 1% to 5%)

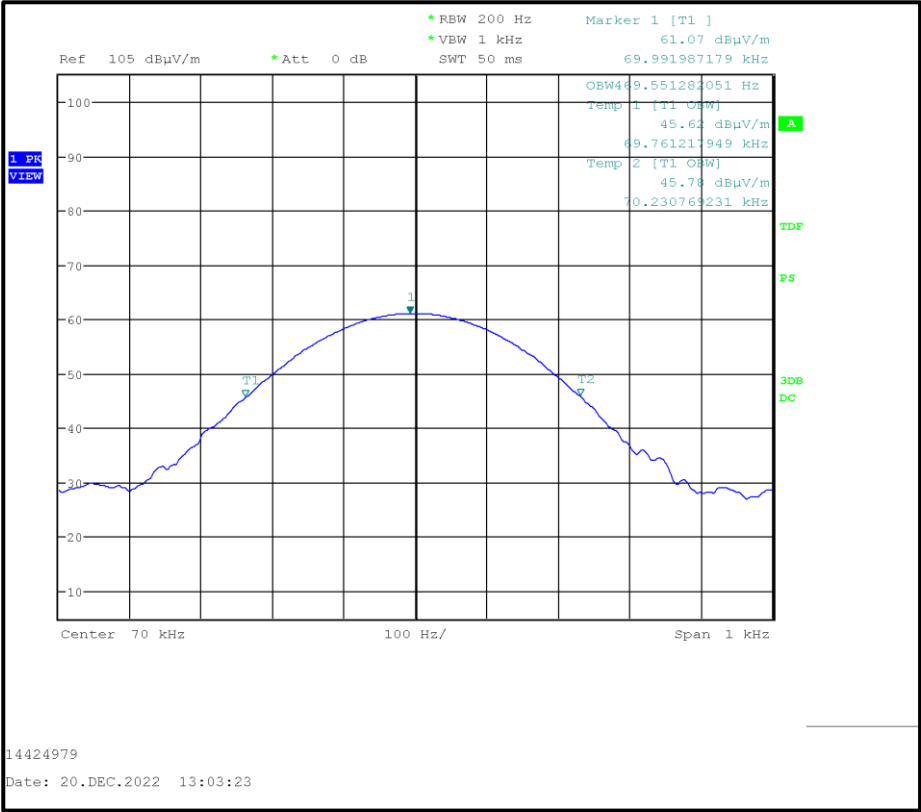
Test Setup:



Transmitter 99%Bandwidth (continued)

Results: RFID Mode / BIS007R Antenna

Channel	99% Emission Bandwidth (kHz)
Single	469.55

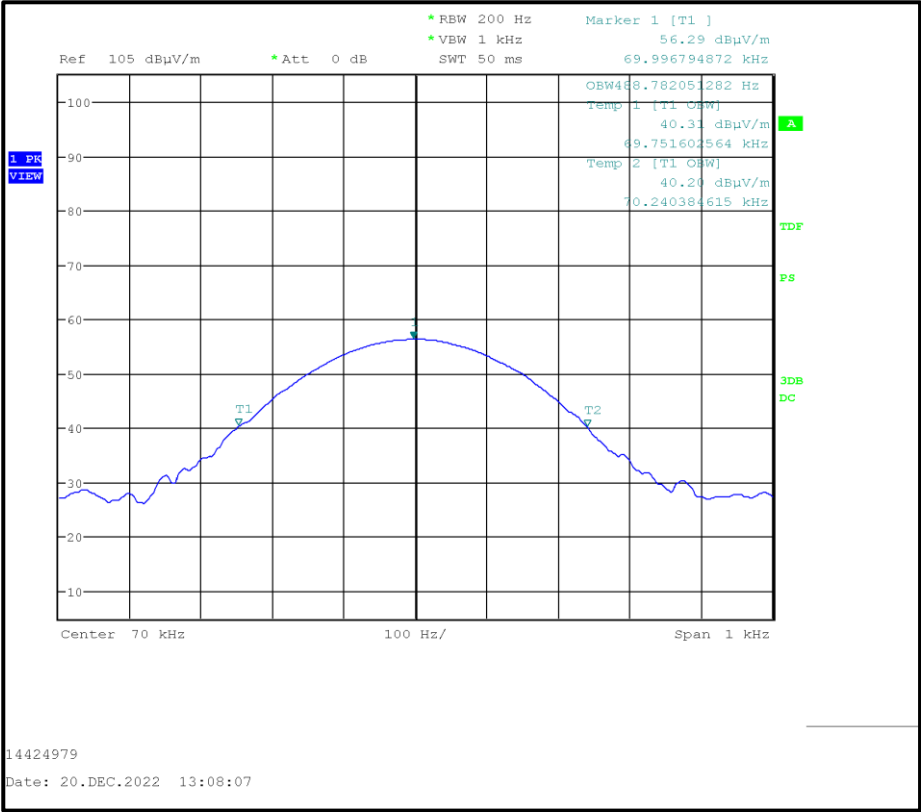


Result: Pass

Transmitter 99%Bandwidth (continued)

Results: RFID Mode / BIS007K Antenna

Channel	99% Emission Bandwidth (kHz)
Single	488.78



Result: Pass

5.2.2. Transmitter Fundamental Field Strength**Test Summary:**

Test Engineer:	Sercan Usta	Test Date:	20 December 2022
Test Sample Serial Number:	CW Sample (Radiated Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Part 15.209(d)
ISED Reference:	RSS-Gen Sections 6.12, 8.9 & RSS-210 Section 7.2
Test Method Used:	ANSI C63.10 Section 6.4

Environmental Conditions:

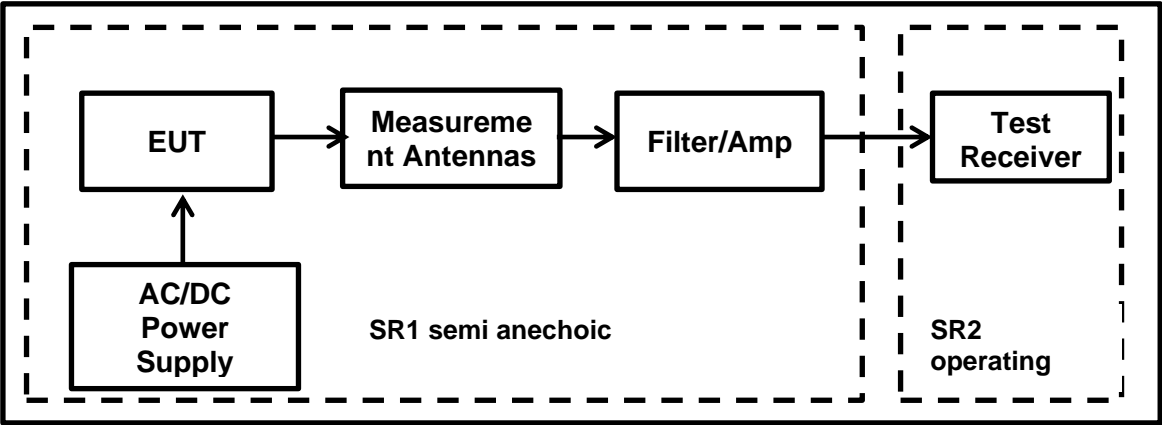
Temperature (°C):	21.4
Relative Humidity (%):	45.7

Note(s):

1. The limit is specified at a test distance of 300 metres. However, as specified in ANSI C63.10 clause 6.4.3, measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance using the method 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 by 40dB/decade.
2. As allowed by ANSI C63.10 clause 5.2 an alternative test site that can demonstrate equivalence to an open area test site may be used. Therefore, instead of an OATS a Semi Anechoic Chamber was used where evidence was shown that the behaviour is the same. A maximum deviation of -1.66 dB for 70 kHz was observed. This deviation is also taken into account to the result.
3. Pre-scan measurements were performed using a spectrum analyzer with a peak detector and measurement bandwidth of 200 Hz. The fundamental field strength was maximized by rotating the measurement antenna and EUT. The spectrum analyzer was then switched to test receiver mode and the final measurement on the maximized level was performed.
4. The measurement was performed at a measurement distance of 3 m where field strength of X dBuV/m was measured. This value was later extrapolated to a distance of 300 m by subtracting 80 dB from the result.
5. 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 377Ω. For example, the measurement frequency X kHz resulted in a level of Y dBμV/m, which is equivalent to $Y - 51.5 = Z$ dBμA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to the 15.209(a) limit.
6. A transducer factor was used on the spectrum analyser during measurement. This factor includes correction between the fixed gain of the magnetic loop antenna and the calibration values. It also includes the value of the RF cable used to connect the antenna to the spectrum analyser which was incorporated into the annual calibration of the magnetic loop antenna.

Transmitter Fundamental Field Strength (continued)

Test Setup:



Transmitter Fundamental Field Strength (continued)**Results: RFID Mode / BIS007R Antenna**

Frequency (kHz)	Measurement Antenna Polarization	Measured Level at 3 m (dB μ V/m)	Extrapolated Level at 300 m (dB μ V/m)	Deviation from OATS to SAC	Corrected Level at 300 m (dB μ V/m) with deviation added	Limit at 300 m (dB μ V/m)	Margin (dB)	Result
69.99	90° to EUT	61.07	-18.93	-1.66	-20.59	30.71	-51.30	Pass

Results: RFID Mode / BIS007K Antenna

Frequency (kHz)	Measurement Antenna Polarization	Measured Level at 3 m (dB μ V/m)	Extrapolated Level at 300 m (dB μ V/m)	Deviation from OATS to SAC	Corrected Level at 300 m (dB μ V/m) with deviation added	Limit at 300 m (dB μ V/m)	Margin (dB)	Result
69.99	90° to EUT	56.29	-23.71	-1.66	-25.37	30.71	-56.08	Pass

5.2.3. Transmitter Radiated Emissions**Test Summary:**

Test Engineer:	Sercan Usta	Test Date:	30 November 2022
Test Sample Serial Number:	CW Sample (Radiated Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.209 (a)
ISED Reference:	RSS-Gen Sections 6.13 & 8.9
Test Method Used:	ANSI C63.10 Sections 11.11 and 11.12 ANSI C63.10:2013 Sections 6.3 and 6.4
Frequency Range	9 kHz to 30 MHz

Environmental Conditions:

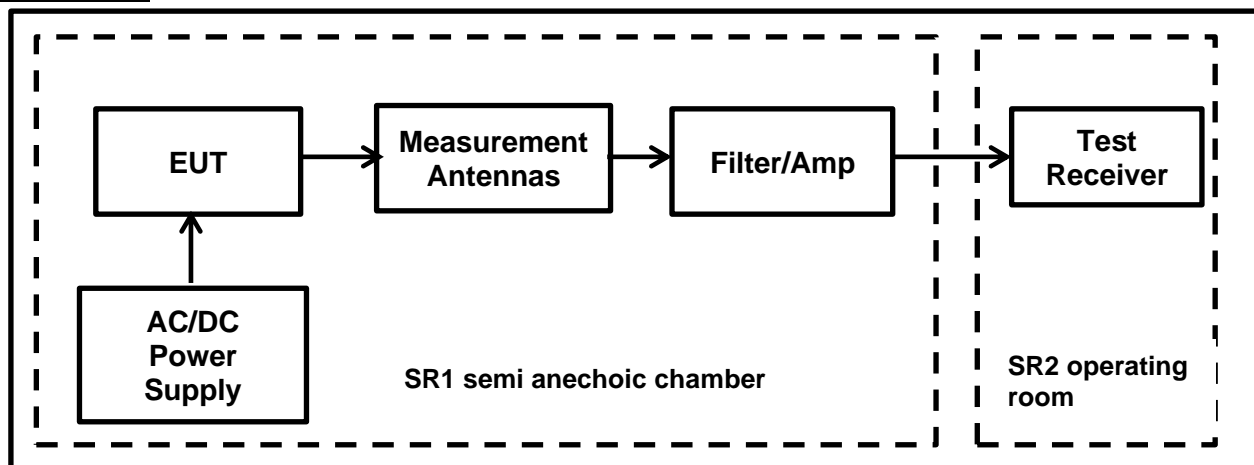
Temperature (°C):	22.2
Relative Humidity (%):	44.1

Notes:

1. In accordance with FCC KDB 414788 D01 Radiated Test Site & ANSI C63.10 clause 5.2 an alternative test site that can demonstrate equivalence to an 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).
2. 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. Therefore, measurements were performed at measurement distance of 3m.
3. Therefore, the limit values are extrapolated to a measurement distance of 3 m.
 - 9 kHz- 490 kHz: limits extrapolated from 300 m to 3 m by adding 80 dB at 40 dB /decade.
 - 490 kHz-1705 kHz: limits extrapolated from 30 m to 3 m by adding 40 dB at 40 dB /decade.
4. 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.
5. 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 377Ω. For example, the measurement frequency X kHz resulted in a level of Y dBμV/m, which is equivalent to $Y - 51.5 = Z$ dBμA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to the 15.209(a) limit.
6. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
7. All other emissions shown on the pre-scan plots were investigated and found to be below system noise floor.

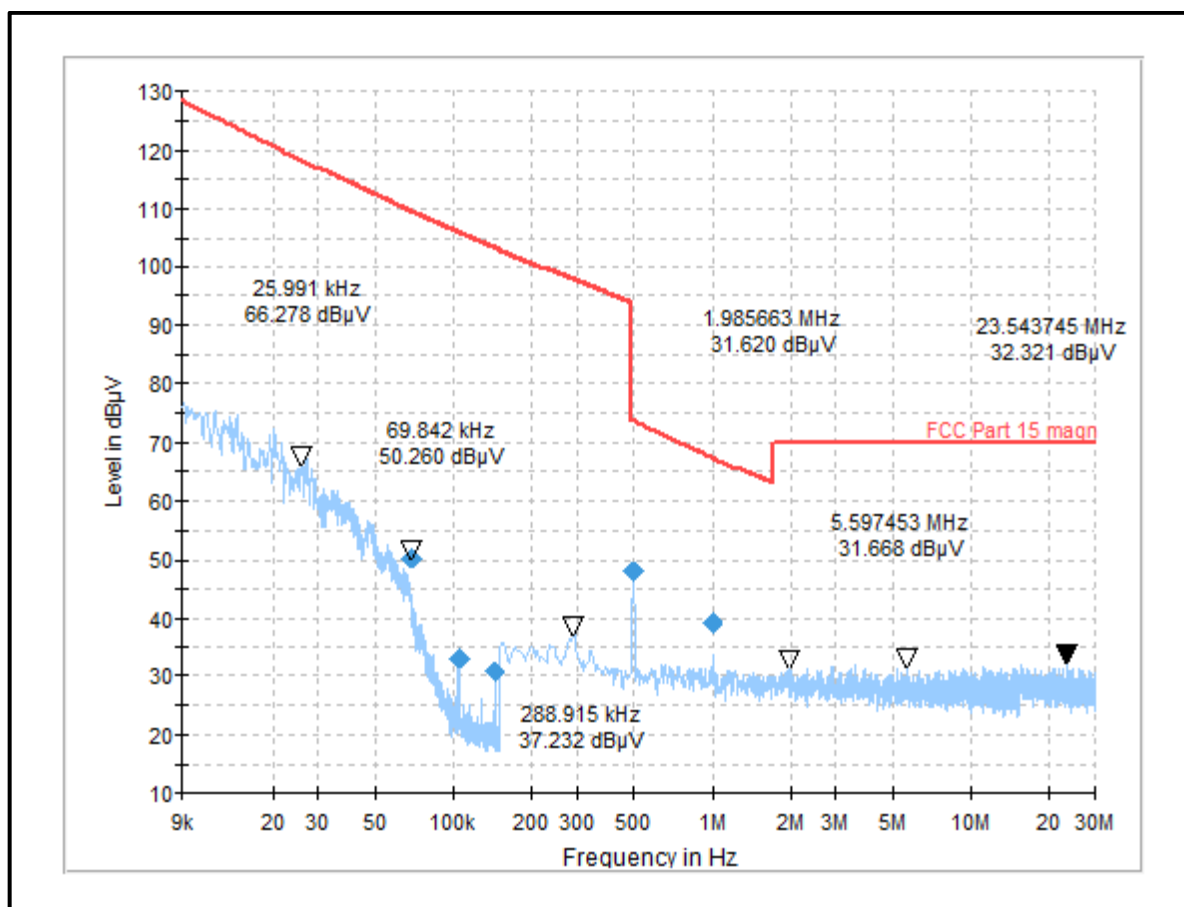
Transmitter Radiated Emissions (continued)**Notes:**

8. Pre-scans were performed, and markers placed on the highest measured levels. The test receiver was set to:
- Frequency range: 9 kHz-150 kHz: RBW: 1 kHz /VBW: 3 kHz
 - Frequency range: 150 kHz – 30 MHz: RBW: 10 kHz /VBW: 30 kHz
 - Detector: Max-Peak detector
 - Trace Mode: Max Hold

Test Setup:

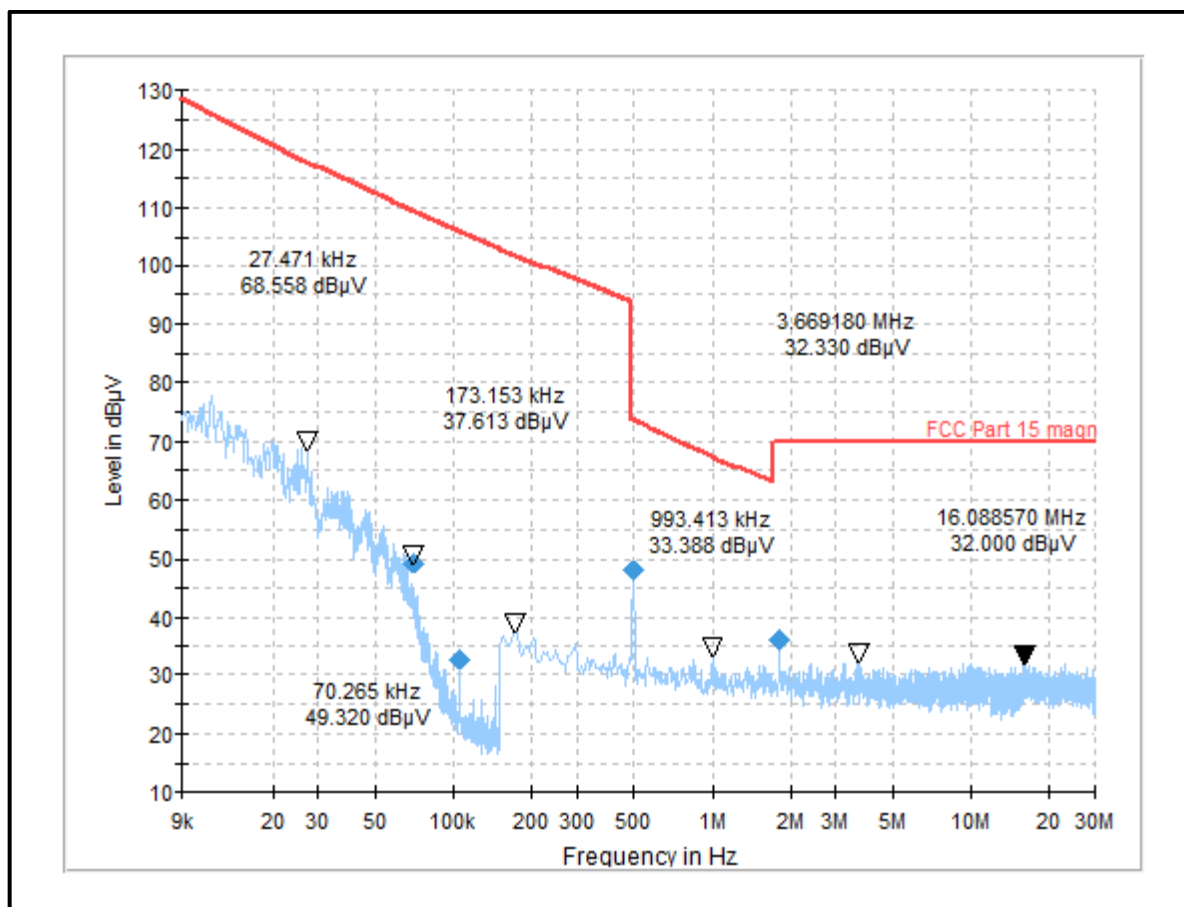
Transmitter Radiated Emissions (continued)**Results: RFID Mode / BIS007R Antenna**

Frequency (MHz)	Loop Antenna Orientation	MaxPeak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
0.069842	90° to EUT	50.26	109.35	59.09	Complied
0.104457	0° to EUT	33.05	105.94	72.89	Complied
0.144713	0° to EUT	30.84	103.26	72.42	Complied
0.497288	0° to EUT	47.75	73.66	25.91	Complied
0.996720	0° to EUT	39.09	67.42	28.33	Complied

Plot: 9 kHz – 30 MHz: RFID / BIS007R Antenna**Result: Pass**

Transmitter Radiated Emissions (continued)**Results: RFID Mode / BIS007K Antenna**

Frequency (MHz)	Loop Antenna Orientation	MaxPeak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
0.070265	90° to EUT	49.32	109.30	59.98	Complied
0.104598	0° to EUT	32.78	105.93	73.15	Complied
0.497288	0° to EUT	47.99	73.66	25.67	Complied
1.810365	90° to EUT	36.18	70.00	33.82	Complied

Plot: 9 kHz – 30 MHz: RFID / BIS007K Antenna**Result: Pass**

Transmitter Radiated Emissions (continued)**Test Summary:**

Test Engineer:	Sercan Usta	Test Date:	30 November 2022
Test Sample Serial Number:	CW Sample (Radiated Test Sample)		
Test Site Identification	SR 1/2		

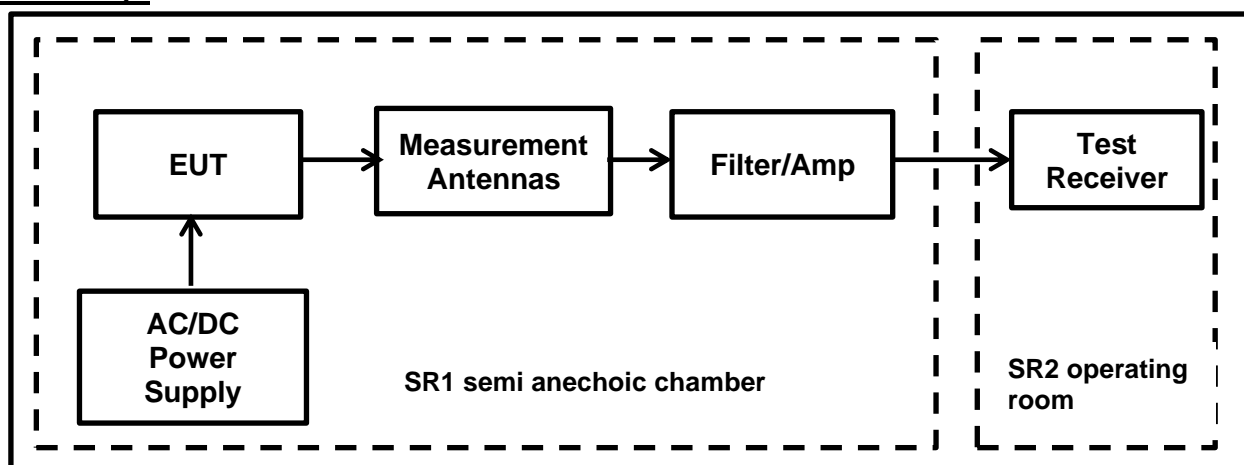
FCC Reference:	Parts 15.209 (a)
ISED Reference:	RSS-Gen Sections 6.13 & 8.9
Test Method Used:	ANSI C63.10 Sections 11.11 and 11.12 ANSI C63.10:2013 Sections 6.3 and 6.5
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	22.2
Relative Humidity (%):	44.1

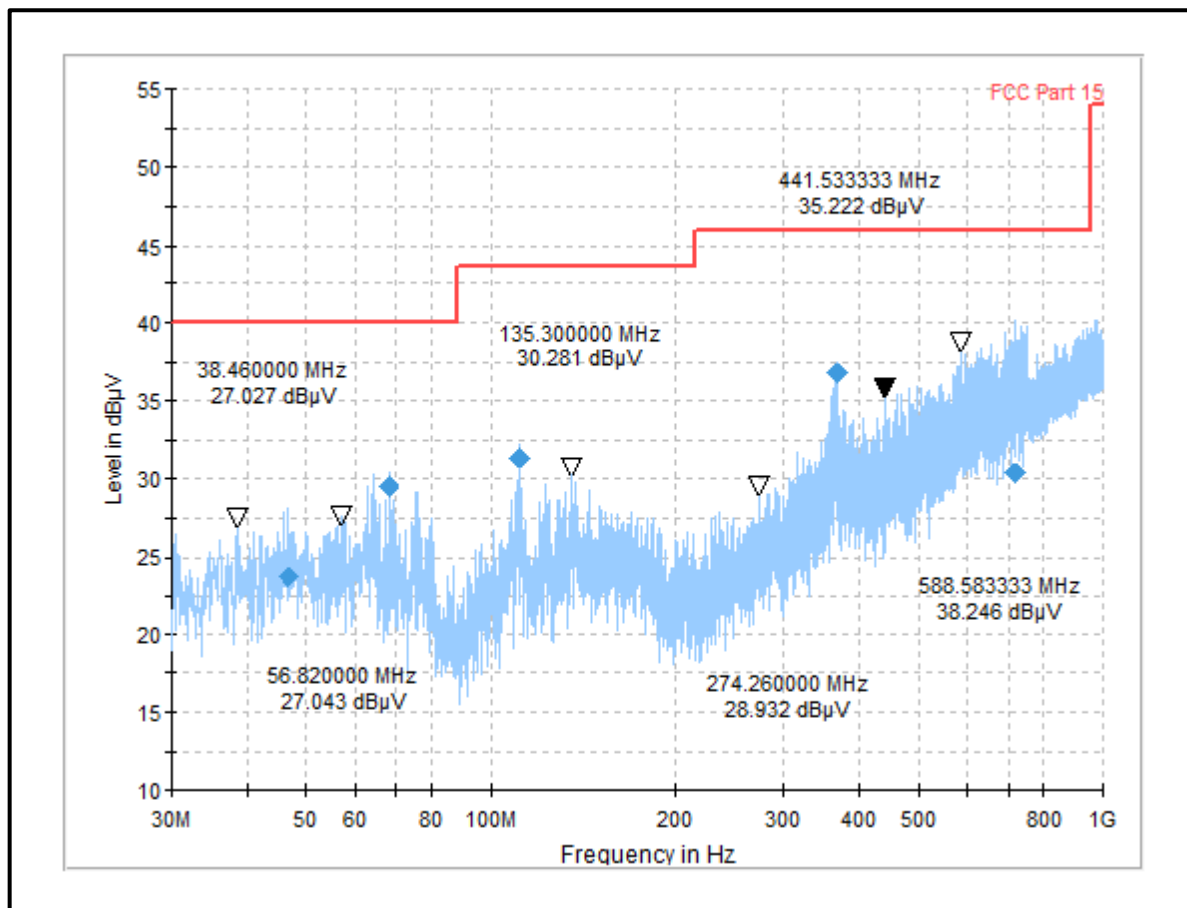
Note(s):

1. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. 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 metre to 4 metres.
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 final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
4. All other emissions shown on the pre-scan plots were investigated and found to be below system noise floor.

Test Setup:

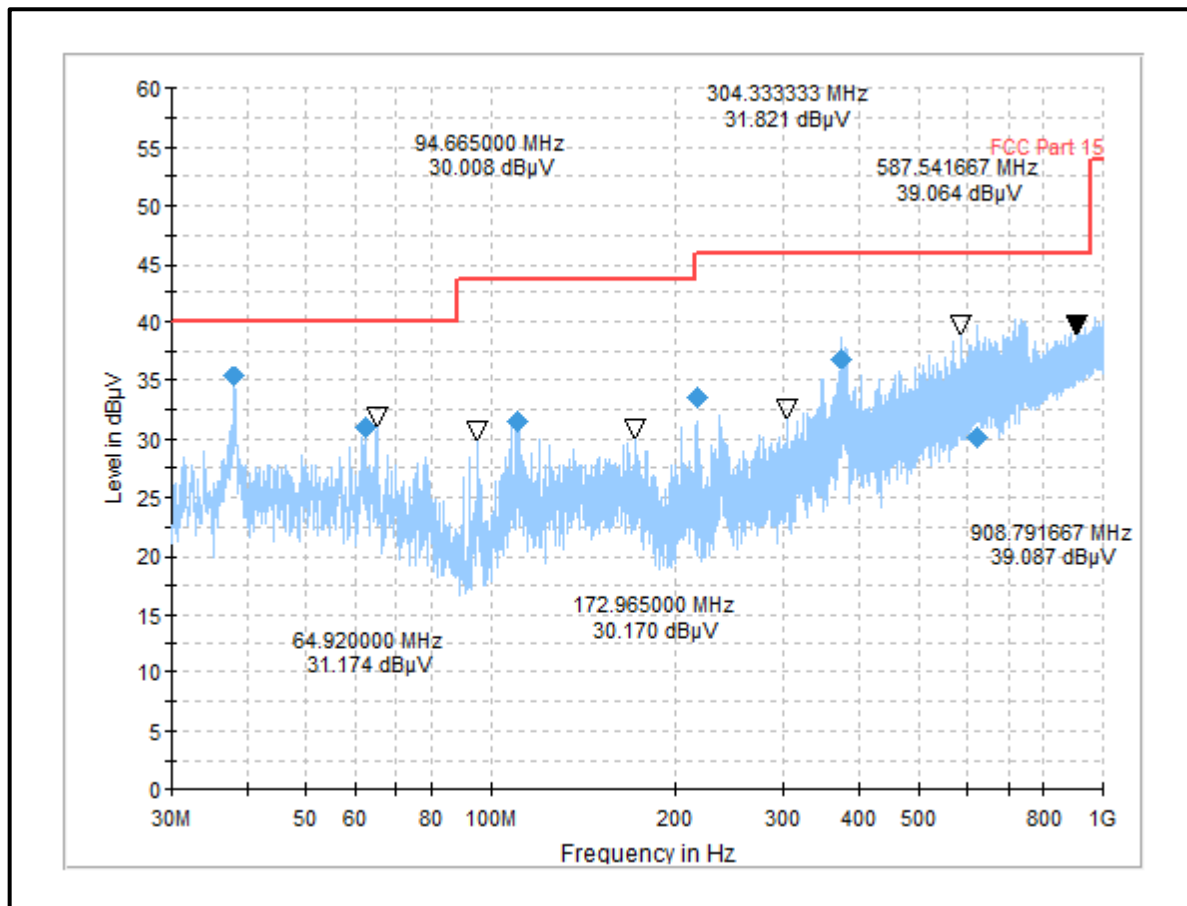
Transmitter Radiated Emissions (continued)**Results: RFID Mode / BIS007R Antenna**

Frequency (MHz)	Antenna Polarization	MaxPeak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
46.70	Vertical	23.74	40.00	16.26	Complied
68.21	Vertical	29.44	40.00	10.56	Complied
111.36	Vertical	31.37	43.50	12.13	Complied
368.37	Vertical	36.81	46.00	9.19	Complied
718.25	Horizontal	30.31	46.00	15.69	Complied

Plot: 30 MHz – 1 GHz: RFID / BIS007R Antenna**Result: Pass**

Transmitter Radiated Emissions (continued)**Results: RFID Mode / BIS007R Antenna**

Frequency (MHz)	Antenna Polarization	MaxPeak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
38.01	Vertical	35.28	40.00	4.72	Complied
62.13	Vertical	31.06	40.00	8.94	Complied
110.91	Vertical	31.59	43.50	11.91	Complied
216.17	Horizontal	33.47	46.00	12.53	Complied
374.53	Vertical	36.79	46.00	9.21	Complied
625.17	Vertical	30.15	46.00	15.85	Complied

Plot: 30 MHz – 1 GHz: RFID / BIS007R Antenna**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
99% Emission 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

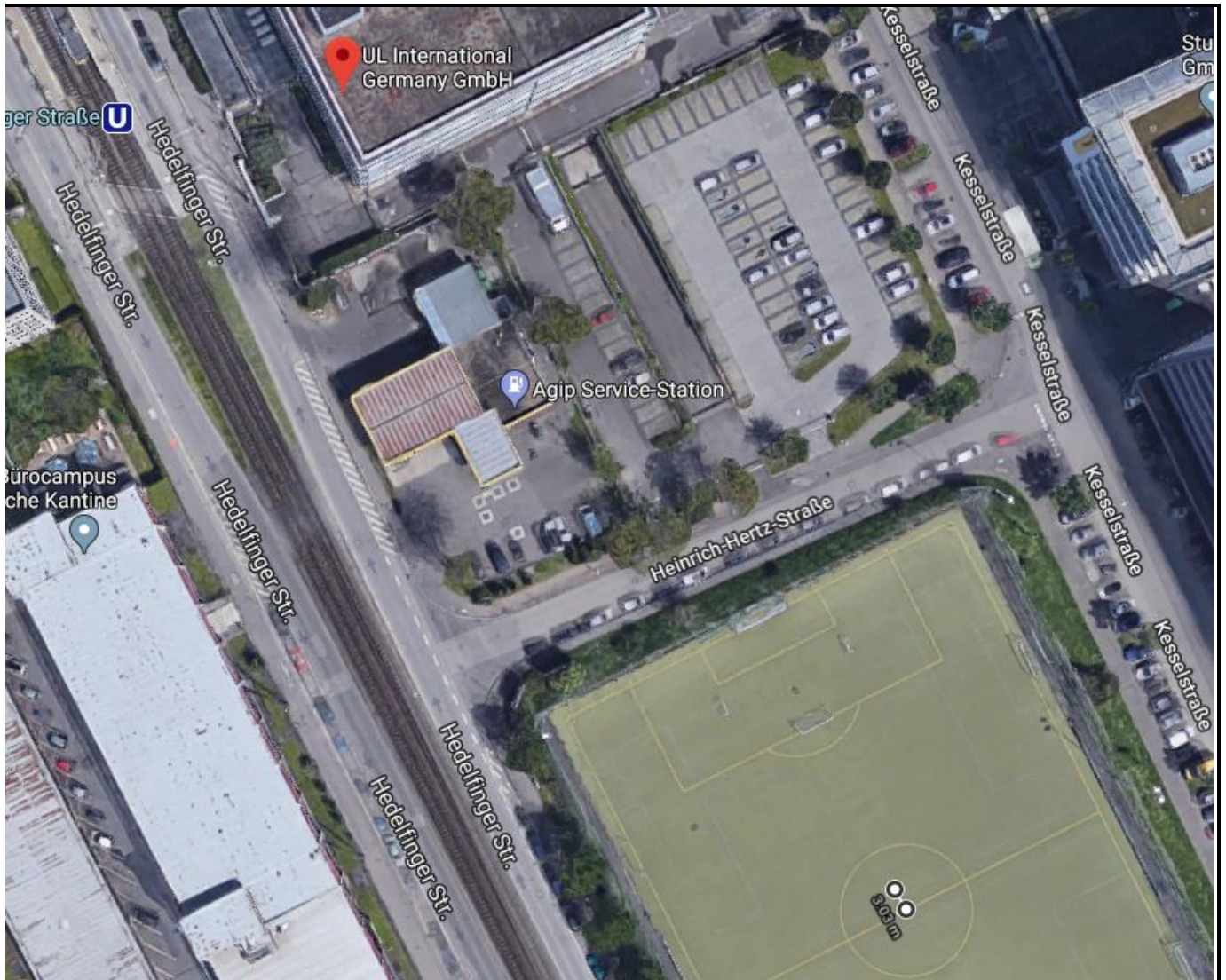
Test site: SR 1/2

ID	Manufacturer	Type	Model	Serial	Calibration Date	Cal. Cycle (months)
1	Rohde & Schwarz	Antenna, Loop	HFH2-Z2	831247/012	10/07/2020	36
377	BONN Elektronik	Amplifier, Low Noise Pre	BLMA 0118-1A	025294B	13/07/2022	12
460	Deisel	Turntable	DT 4250 S	n/a	n/a	n/a
452	Schwarzbeck	Antenna, Trilog Broadband	VULB 9168	9168-240	02/09/2020	36
496	Rohde & Schwarz	Antenna, log. - periodical	HL050	100297	05/08/2020	36
587	Maturo	antenna mast, tilting	TAM 4.0-E	011/7180311	n/a	n/a
588	Maturo	Controller	NCD	029/7180311	n/a	n/a
591	Rohde & Schwarz	Receiver	ESU 40	100244/040	13/07/2022	12
669	Rohde & Schwarz	EMI Test Receiver	ESW 44	103087	03/02/2022	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
1603665	Siemens Matsushita Components	semi-anechoic chamber SR1/ 2	-/-	B83117-A1421- T161	n/a	n/a

8. Open-Area-Test Site comparison

GPS coordinates

48.765746, 9.250684



Test Setup

The following listed equipment was used for the measurement:

Manufacturer	Type	Model	Frequency Range
Rohde & Schwarz	Receiver, EMI Test	SML03	9 kHz – 30 MHz
Rohde & Schwarz	Receiver, EMI Test	ESIB7	20 Hz – 7 GHz
Rohde & Schwarz	Antenna, Loop	HFH2-Z2	1 kHz – 30 MHz
ETS LINDGREN	Antenna, Loop	6512	1 kHz – 30 MHz
Huber and Suhner	RF Cable	-	-
Elspec	BNC Cable	-	-

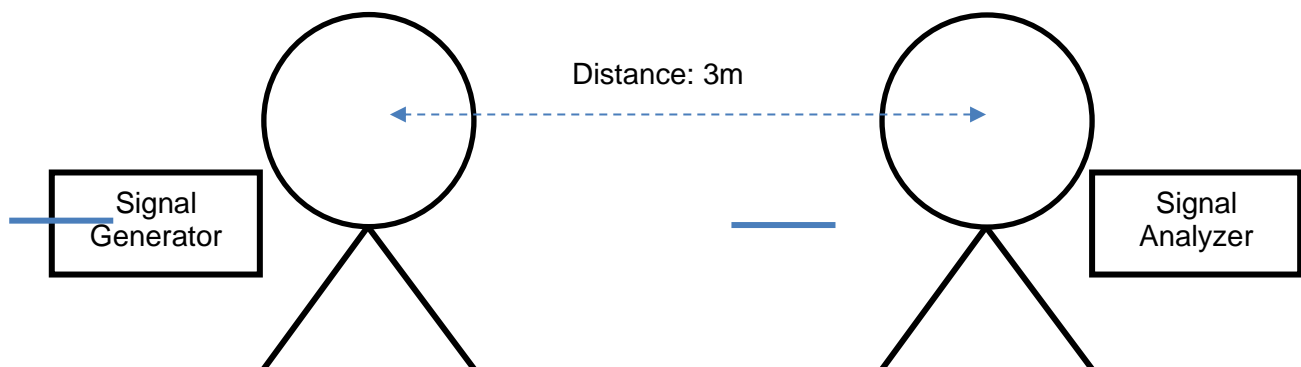
The transmit signal to the ETS Lindgren loop antenna is supplied by the SML signal generator.

The distance of the transmit and receive Antenna was 3m. No other distances can be achieved in SR1 so 10m and 30m distances are not possible. Due to this no comparison is possible.

The Results are valid for equipment which is not larger as the loop antenna which represents in the comparison the EUT.

If an EUT is bigger measurements on an OATS are needed.

The measurement was performed on the lowest frequency 9 kHz and was increased by 10 kHz Steps up to 100 kHz. Then the step size was 100 kHz up to 1000 kHz. From 1 MHz up to the last frequency of 30 MHz the step size was 1 MHz. The HFH2-Z2 loop antenna placed at 80 cm height was used as the receive antenna. The intercepted RF signal from this antenna was measured with the ESIB7 Test Receiver and the values were recorded accordingly.



Numeric values

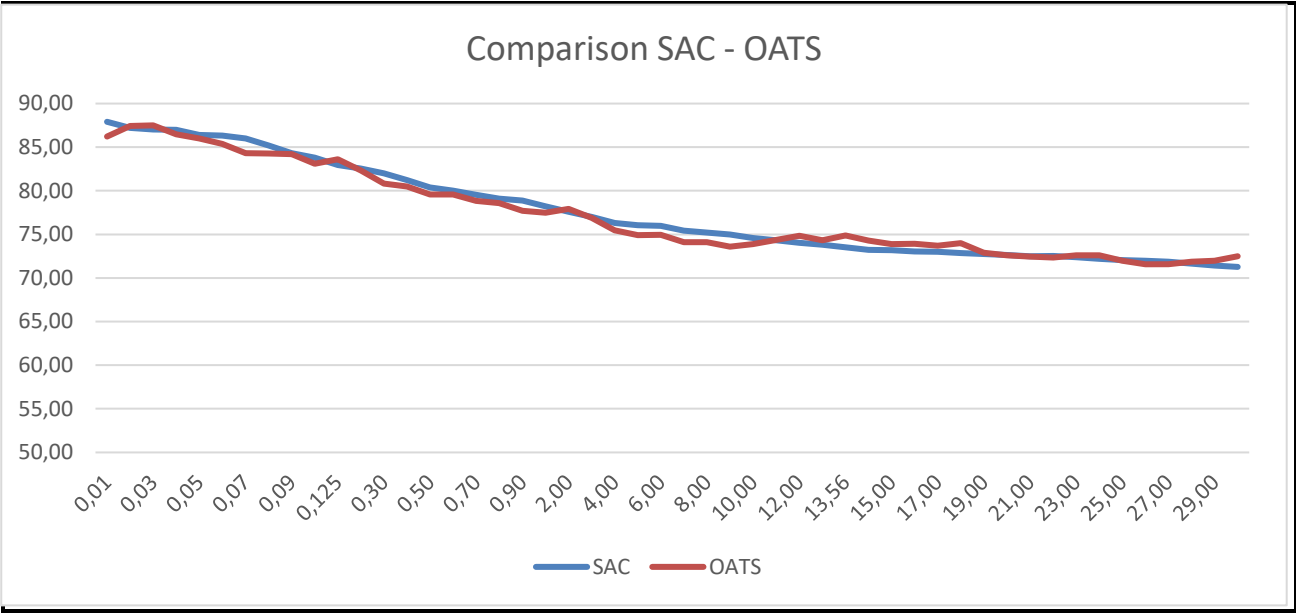
Frequency (MHz)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.125	0.20
SR1 Measured power (dBμV)	87.91	87.22	87.01	86.98	86.40	86.32	85.98	85.20	84.30	83.80	82.96	82.55
OATS Measured power (dBμV)	86.22	87.42	87.50	86.49	86.01	85.39	84.32	84.29	84.20	83.10	83.60	82.32
Delta (dB)	-1.69	0.20	0.49	-0.49	-0.39	-0.93	-1.66	-0.91	-0.10	-0.70	0.64	-0.23

Frequency (MHz)	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	2.00	3.00	4.00	5.00
SR1 Measured power (dBμV)	81.98	81.23	80.39	80.00	79.53	79.10	78.87	78.20	77.60	77.01	76.32	76.04
OATS Measured power (dBμV)	80.84	80.49	79.58	79.58	78.85	78.59	77.69	77.50	77.91	76.90	75.45	74.90
Delta (dB)	-1.14	-0.74	-0.81	-0.42	-0.68	-0.51	-1.18	-0.70	0.31	-0.11	-0.87	-1.14

Frequency (MHz)	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	13.56	14.00	15.00	16.00
SR1 Measured power (dBμV)	75.98	75.43	75.20	74.97	74.59	74.32	74.05	73.83	73.50	73.22	73.20	73.05
OATS Measured power (dBμV)	74.94	74.09	74.11	73.58	73.87	74.38	74.84	74.31	74.88	74.29	73.90	73.93
Delta (dB)	-1.04	-1.34	-1.09	-1.39	-0.72	0.06	0.79	0.48	1.38	1.07	0.70	0.88

Frequency (MHz)	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00
SR1 Measured power (dBμV)	73.00	72.86	72.74	72.64	72.50	72.52	72.39	72.20	72.04	71.97	71.86	71.64	71.41	71.27
OATS Measured power (dBμV)	73.70	73.98	72.90	72.60	72.45	72.34	72.59	72.59	71.97	71.59	71.58	71.88	71.98	72.49
Delta (dB)	0.70	1.12	0.16	-0.04	-0.05	-0.18	0.20	0.39	-0.07	-0.38	-0.28	0.24	0.57	1.22

Graph



Conclusion: Maximum difference is 1.69 dB @ 9 kHz

9. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	23	-	Initial Version
Test Report Version 2.0 supersede Version 1.1 with immediate effect Test Report No. UL-RPT-RP-14424979-616 Version 2.0, Issue Date 03 AUGUST 2023 replaces Test Report No. UL-RPT-RP-14424979-616 Version 1.1, Issue Date 10 JULY 2023, which is no longer valid.			
1.1	as below	as below	Current Version
	1 & 5	-	Standards info updated
	6	2.2	Summary of test updated
	6	2.3	Test methods & procedure updated
	7	3.1	EUT info updated
	8	3.4	Table updated
	8	3.5	Support equipment table updated
	9	4.2	EUT configuration updated
	12 & 13	5.2.1	Comments updated
	14 & 15	5.2.2	Transmitter Field strength chapter included & notes updated
	17	5.2.3	Notes updated
	25 - 28	8	Open-Are-Test Site comparison information included

--- END OF REPORT ---