



Solutions

TEST REPORT

Test Report No.: UL-RPT-RP-14951907-316

Applicant * : Balluff GmbH

Model No. / PMN * : BF-IDM35

FCC / ISSED ID * : FCC ID: 2AGZY-BFIDM35
IC: 20739-BFIDM35

HVIN * : BIS M-458-082-401-07-S4
BIS M-408-082-401-07-S4

Technology : RFID 13.56 MHz

Test Standard(s) : **FCC Parts 15.207, 15.209(a) & 15.225**
Innovation, Science and Economic Development Canada
Section B.6, Annex B, RSS-210 Issue 11 June 2024 & 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 1.2 supersede Version 1.1 with immediate effect**
Test Report No. UL-RPT-RP-14951907-316 Version 1.2, Issue Date 30 September 2025 replaces
Test Report No. UL-RPT-RP-14951907-316 Version 1.1, Issue Date 21 November 2024, which is no longer valid.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: 30 September 2025

Approved by: Rachid Acharkaoui
Title: Operations Manager
Date: 30 September 2025



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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1. Customer Information *

1.1.Applicant Information

Company Name:	Balluff GmbH
Company Address:	Schurwaldstraße 9, 73765 Neuhausen auf den Fildern, Germany
Contact Person:	Thomas Graf
Contact E-Mail Address:	thomas.graf@balluff.de
Contact Phone No.:	+49 7158 173-8417

1.2.Manufacturer Information

Company Name:	Balluff GmbH
Company Address:	Schurwaldstraße 9, 73765 Neuhausen auf den Fildern, Germany
Contact Person:	Thomas Graf
Contact E-Mail Address:	thomas.graf@balluff.de
Contact Phone No.:	+49 7158 173-8417

2. Summary of Testing

2.1. General Information

Applied Standards

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
Specification Reference:	RSS-Gen Issue 5, April 2018, Amendment 2 (February 2021)
Specification Title:	General Requirements for Compliance of Radio Apparatus
Specification Reference:	RSS-210 Issue 11 June 25, 2024
Specification Title:	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment Annex B-Devices operating in frequency bands for any application B.6 Band 13.110-14.010 MHz

Location

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

Date information

Order Date:	30 August 2023
EUT arrived:	08 April 2024
Test Dates:	09 April 2024 to 23 April 2024
EUT returned:	-/-

2.2. Summary of Test Results

FCC Clause	ISED Clause	Measurement	Complied	Did not comply	Not performed	Not applicable
Part 15.207	RSS-Gen 8.8	Transmitter AC Conducted Emissions	☒	☐	☐	☐
Part 15.215(c)	-/-	Transmitter 20 dB Bandwidth	☒	☐	☐	☐
-/-	RSS-Gen 6.7	Transmitter 99% Emission Bandwidth	☒	☐	☐	☐
Part 15.225 (a)(b)(c)(d)	RSS-Gen 6.12 / RSS-210 B6	Transmitter Fundamental Field Strength & Spectrum Mask	☒	☐	☐	☐
Part 15.209(a)/ 15.225(d)	RSS-Gen 6.13 / RSS-210 B6	Transmitter Radiated Emissions	☒	☐	☐	☐
Part 15.225(e)	RSS-Gen 6.11 / RSS-210 B6	Transmitter Frequency Stability (Temperature & Voltage Variation)	☒	☐	☐	☐

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.

2.3. Methods and Procedures

Reference:	ANSI C63.10-2020 (FCC) / ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024 (ISED)
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	FCC KDB 174176 D01 Line Conducted FAQ v01r01 June 3, 2015
Title:	AC Power-Line Conducted Emissions Frequently Asked Questions
Reference:	Notice 2020 - DRS0023
Title:	Guidance on magnetic field strength radiated emission measurements (9 kHz – 30 MHz)

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) *

Brand Name:	BALLUFF
Model Name / PMN:	BF-IDM35
Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)
Hardware Version Number:	1.0
Firmware Version Number:	1.3.2
HVIN:	BIS M-458-082-401-07-S4
FVIN:	-/-
FCC ID:	2AGZY-BFIDM35
ISED Certification No.:	IC: 20739-BFIDM35

Brand Name:	BALLUFF
Model Name / PMN:	BF-IDM35
Serial Number:	BIS01HJ (Radiated Test Sample BF-IDM35 Ant. B)
Hardware Version Number:	1.0
Firmware Version Number:	1.3.2
HVIN:	BIS M-408-082-401-07-S4
FVIN:	-/-
FCC ID:	2AGZY-BFIDM35
ISED Certification No.:	IC: 20739-BFIDM35

3.2. Description of EUT *

The equipment under test was a RFID Read-/Write Head with Model name: BF-IDM35 with RFID 13.56MHz technology.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing *

Tested Technology:	RFID 13.56 MHz	
Category of Equipment:	Transceiver	
Channel Spacing:	Single channel device	
Transmit Frequency Range:	13.56 MHz	
Power supply Requirement(s):	24V DC via AC/DC power supply through BNI USB	
Modulation:	ASK	
Tested Temperature Range:	Minimum	-20 °C
	Maximum	+50 °C
Antenna Used: BF-IDM35	BIS M-458-082-401-07-S4	Ant. A (Electrically small multi-turn ferrite loop / Peak Gain: -54.52 dBi)
	BIS M-408-082-401-07-S4	Ant. B BIS M-408 ANT (Planar Inductive Coil Printed Antenna / Peak Gain: -66.3dBi)

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	USB IO-Link Master	BALLUFF	BNI USB-901-013-A501	-/-
2	AC/DC power supply	Sunny	SYS1541-2424	-/-

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 in RFID-13.56 MHz test mode.

4.2. Configuration and Peripherals

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

- The EUT was configured by default to transmit a continuous modulated carrier with maximum power at 13.56 MHz as soon as it is powered on.

EUT Power supply:

- The EUT was powered with 120V 60 Hz via the AC/DC power supply through the USB Master controller.

Test Mode Activations:

- The RFID 13.56 MHz test mode was activated by default as soon as the device is powered up.

AC Conducted Measurements:

- For AC conducted line emissions measurement the EUT was powered with 120VAC / 60 Hz and also 240 VAC / 60 Hz via the AC/DC Power supply as it is in the range of the supply being used for testing.
- The Toyo EMI Software EP5/CE Ver 4.0.1. was used for these measurements.

Radiated Measurements:

- The radiated samples with integrated antenna were used for the radiated 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 with Ant.A antenna (BIS01HK BIS M-458-082-401-07-S4) in laying position was found to be the worst case therefore this report includes relevant results.
- The EUT with Ant.B antenna (BIS01HJ BIS M-408-082-401-07-S4) 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 AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Muhammad Faiq Khan	Test Date:	9 April 2024
Test Sample Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)		
Test Site Identification	SR 7/8		

FCC Reference:	Part 15.207
ISED Reference:	RSS-Gen 8.8
Test Method Used:	ANSI C63.10 Section 6.2 / FCC KDB 174176 RSS-Gen 8.8 and notes below

Environmental Conditions:

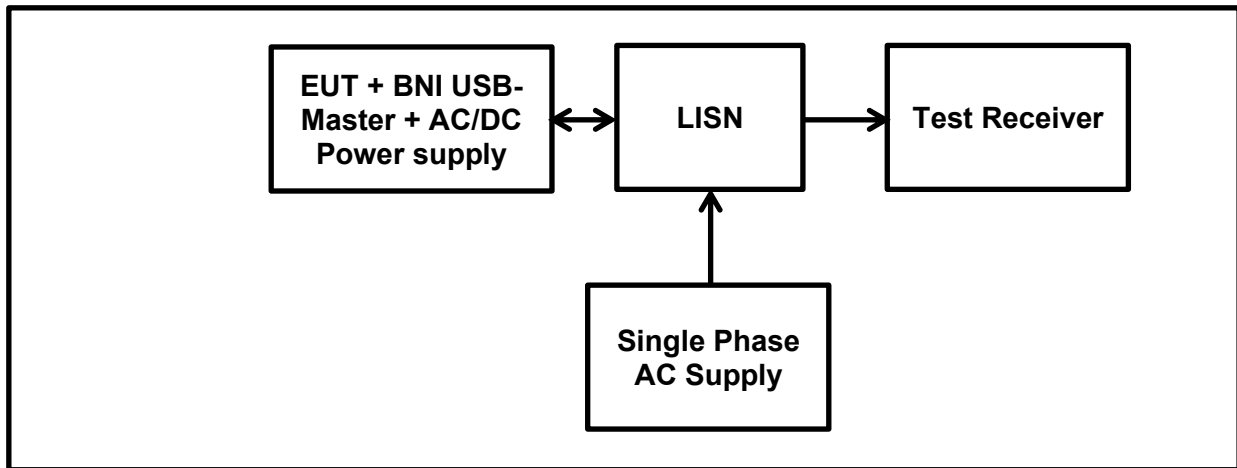
Temperature (°C):	23.1
Relative Humidity (%):	44.8

Settings of the Instrument

Detector	Quasi Peak/ Average
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Note(s):

1. The EUT was powered with 120VAC / 60 Hz and also 240 VAC / 60 Hz as it is in the range of the used power supply.
2. Measurements were performed only with EUT with Antenna A (BIS M-458-082-401-07-S4) as it was found out to be the worst-case w.r.t field strength.
3. Pre-scans were performed, and markers placed on the highest live and neutral measured levels. Final measurements were performed on the marker frequencies and the results entered into tables below.
4. The final measured value, for the given emission, in the table below incorporates the cable loss.
5. All other emissions shown on the pre-scan plot were investigated. Only the highest 6 emissions have been reported in the tables below in accordance with ANSI C63.10 section 6.2.5.
6. Measurements were performed in shielded room (SR7/ 8 Asset Number 1603671). The EUT was placed at a height of 80 cm above the reference ground plane and in a distance of 40 cm from the vertical ground plane at the edge of the table.

Transmitter AC Conducted Spurious Emissions (continued)**Test setup:**

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 120 VAC 60 Hz / RFID Active**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15100	Live	49.40	65.90	16.50	Complied
0.16006	Live	45.40	65.50	20.10	Complied
0.17683	Live	44.70	64.60	19.90	Complied
0.23710	Live	37.70	62.20	24.50	Carrier
13.56078	Live	49.20	60.00	10.80	Complied
27.11997	Live	26.80	60.00	33.20	Complied

Results: Live / Average / 120 VAC 60 Hz / RFID Active

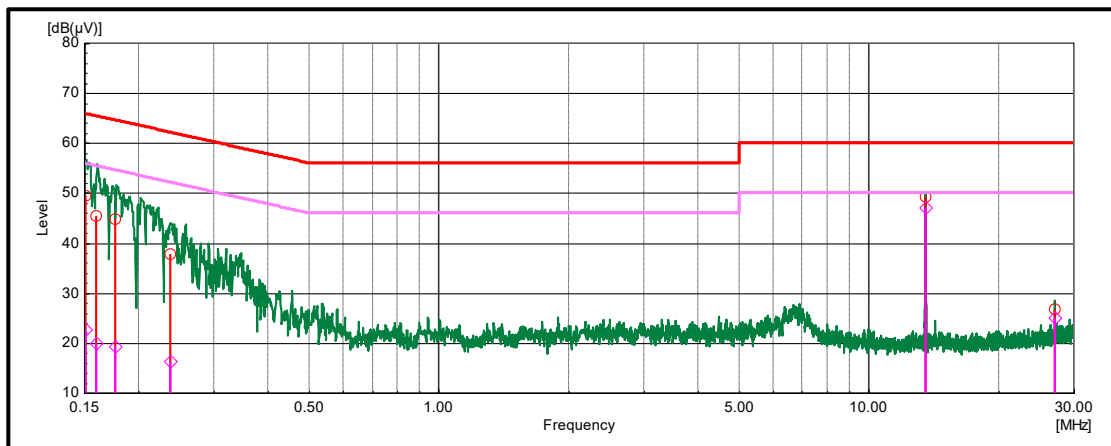
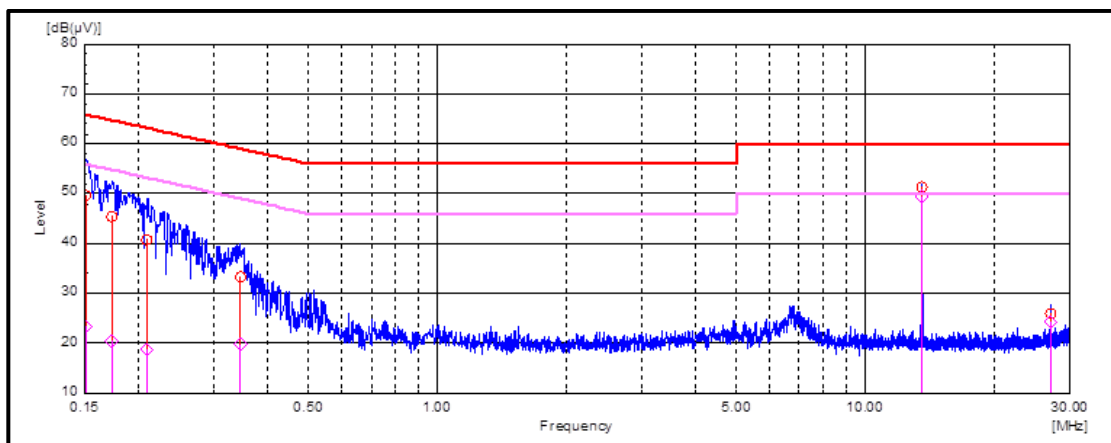
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15100	Live	22.80	55.90	33.10	Complied
0.16006	Live	19.90	55.50	35.60	Complied
0.17683	Live	19.40	54.60	35.20	Complied
0.23710	Live	16.40	52.20	35.80	Complied
13.56078	Live	47.10	50.00	2.90	Carrier
27.11997	Live	25.00	50.00	25.00	Complied

Results: Neutral / Quasi Peak / 120 VAC 60 Hz / RFID Active

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15125	Neutral	49.60	65.90	16.30	Complied
0.17355	Neutral	45.40	64.80	19.50	Complied
0.21002	Neutral	40.70	63.20	22.50	Complied
0.34693	Neutral	33.30	59.00	25.70	Complied
13.56027	Neutral	51.50	60.00	8.50	Carrier
27.11787	Neutral	25.80	60.00	34.20	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Average / 120 VAC 60 Hz / RFID Active**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15125	Neutral	23.40	55.90	32.50	Complied
0.17355	Neutral	20.30	54.80	34.50	Complied
0.21002	Neutral	18.70	53.20	34.50	Complied
0.34693	Neutral	19.80	49.00	29.20	Complied
13.56027	Neutral	49.60	50.00	0.40	Carrier
27.11787	Neutral	24.10	50.00	25.90	Complied

Result: Pass**Plot: Live Line / 120 VAC 60 Hz / RFID Active****Plot: Neutral Line / 120 VAC 60 Hz / RFID Active**

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 240 VAC 60 Hz / RFID Active**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15174	Live	45.70	65.90	20.20	Complied
0.17318	Live	42.20	64.80	22.60	Complied
0.21589	Live	37.40	63.00	25.60	Complied
0.23355	Live	36.30	62.30	26.00	Complied
13.56037	Live	49.40	60.00	10.60	Carrier
27.12123	Live	25.90	60.00	34.10	Complied

Results: Live / Average / 240 VAC 60 Hz / RFID Active

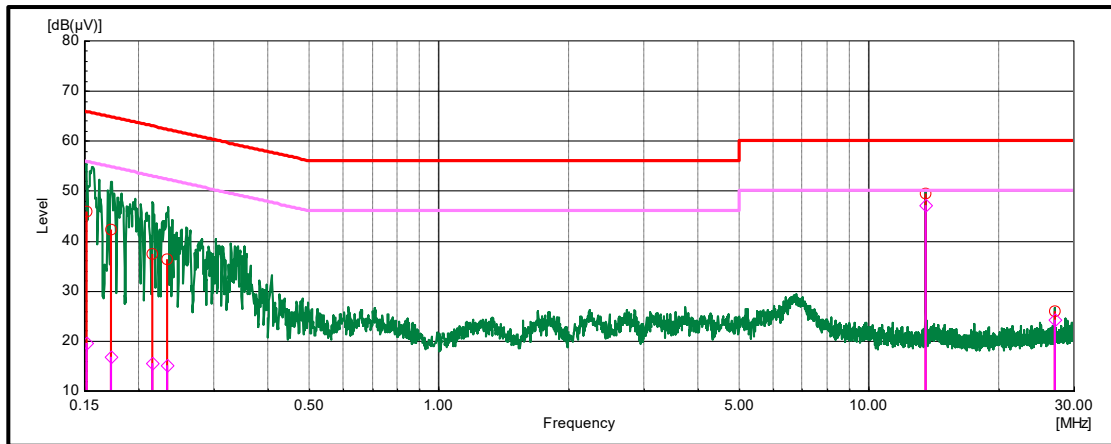
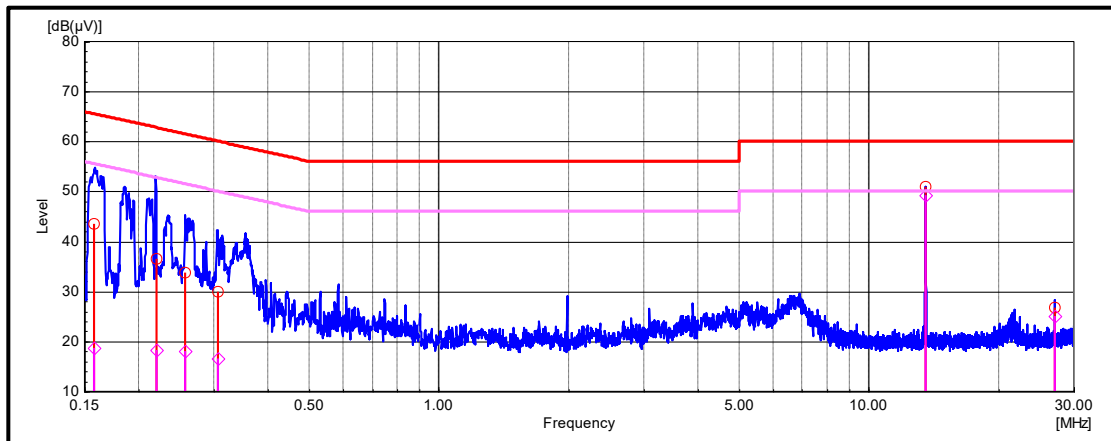
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15174	Live	19.60	55.90	36.30	Complied
0.17318	Live	16.70	54.80	38.10	Complied
0.21589	Live	15.60	53.00	37.40	Complied
0.23355	Live	15.00	52.30	37.30	Complied
13.56037	Live	47.20	50.00	2.80	Carrier
27.12123	Live	24.30	50.00	25.70	Complied

Results: Neutral / Quasi Peak / 240 VAC 60 Hz / RFID Active

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15827	Neutral	43.50	65.60	22.10	Complied
0.22058	Neutral	36.60	62.80	26.20	Complied
0.25710	Neutral	33.70	61.50	27.80	Complied
0.30595	Neutral	29.80	60.10	30.30	Complied
13.56088	Neutral	51.00	60.00	9.00	Carrier
27.12067	Neutral	26.80	60.00	33.20	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Average / 240 VAC 60 Hz / RFID Active**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15827	Neutral	18.70	55.60	36.90	Complied
0.22058	Neutral	18.30	52.80	34.50	Complied
0.25710	Neutral	18.00	51.50	33.50	Complied
0.30595	Neutral	16.60	50.10	33.50	Complied
13.56088	Neutral	49.20	50.00	0.80	Carrier
27.12067	Neutral	25.10	50.00	24.90	Complied

Result: Pass**Plot: Live Line / 240 VAC 60 Hz / RFID Active****Plot: Neutral Line / 240 VAC 60 Hz / RFID Active**

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.2. Transmitter 99 % Emission Bandwidth

Test Summary:

Test Engineer:	Muhammad Faiq Khan	Test Date:	18 April 2024
Test Sample Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)		
Test Sample Serial Number:	BIS01HJ (Radiated Test Sample BF-IDM35 Ant. B)		
Test Site Identification	SR 9		

ISED Reference:	RSS-Gen 6.7
Test Method Used:	RSS-Gen 6.7

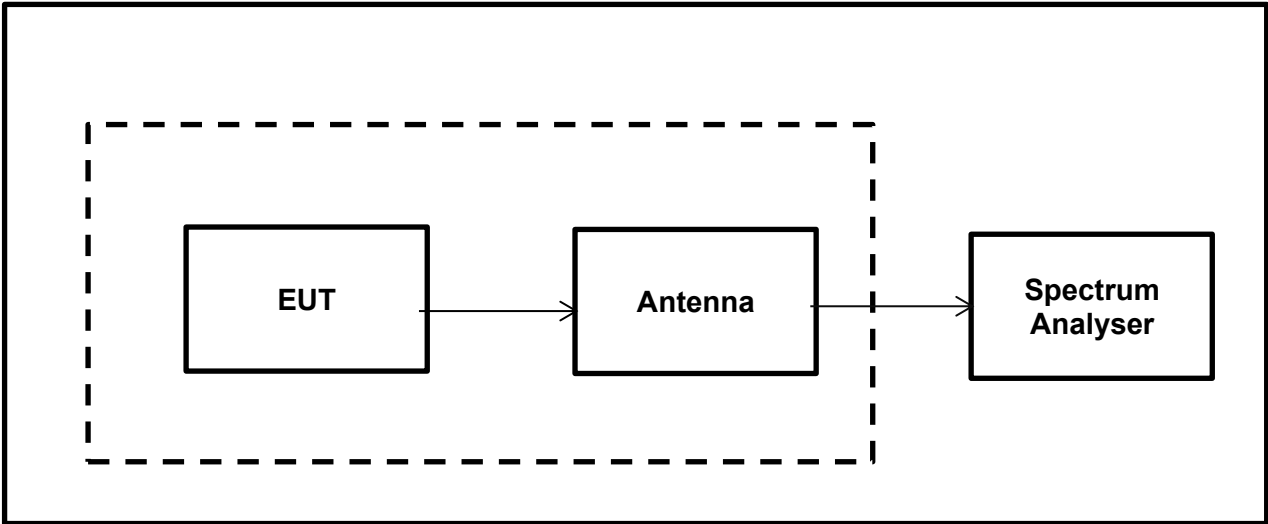
Environmental Conditions:

Temperature (°C):	20.7
Relative Humidity (%):	39.6

Settings of the Instrument

RBW/VBW	10 Hz / 30 Hz
Span	1.5 kHz
Sweep time	Auto
Detector	MaxPeak

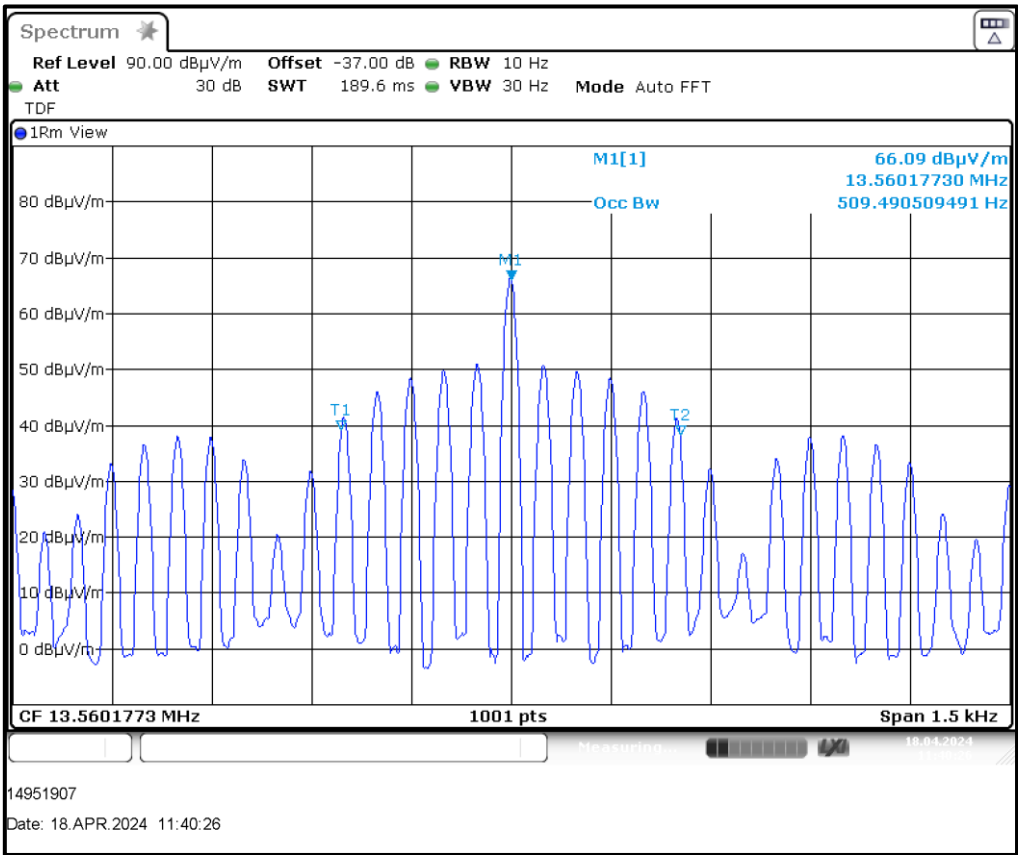
Test Setup:



Transmitter 99 % Emission Bandwidth (continued)

Results: RFID 13.56 MHz / BIS01HK

RFID Channel	99% Emission Bandwidth (Hz)
13.56 MHz	509.490

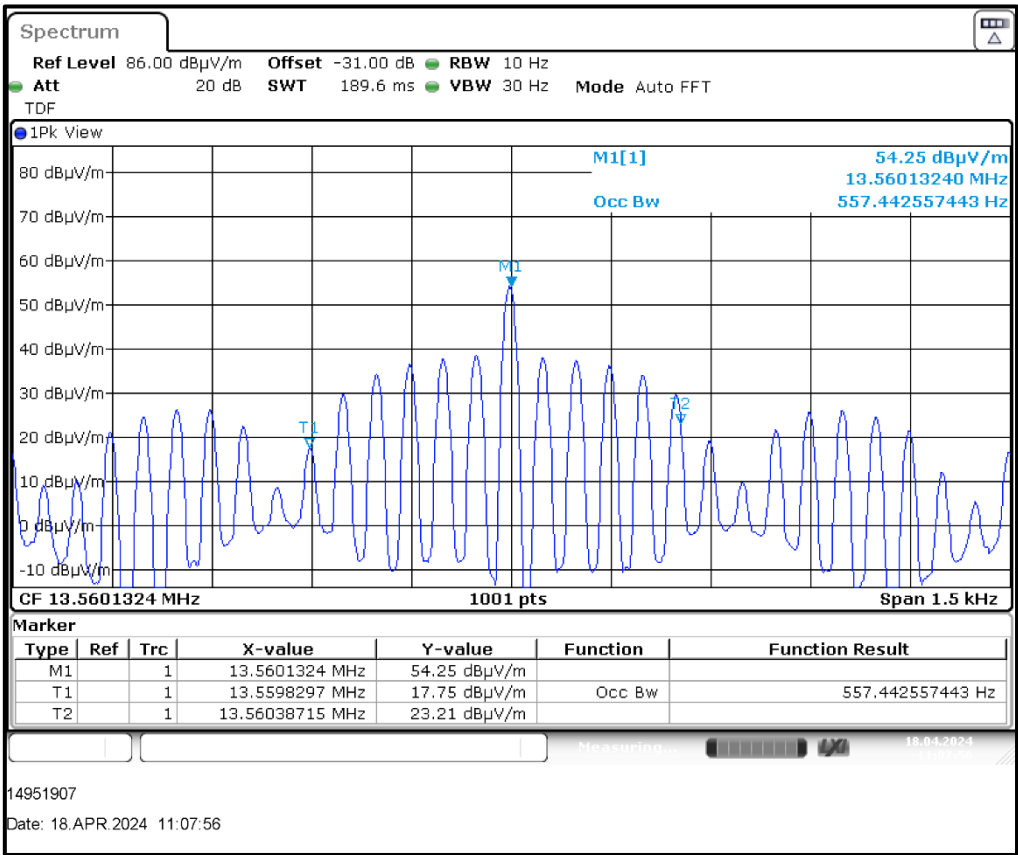


Result: Pass

Transmitter 99 % Emission Bandwidth (continued)

Results: RFID 13.56 MHz / BIS01HJ

RFID Channel	99% Emission Bandwidth (Hz)
13.56 MHz	557.442



Result: Pass

5.2.3. Transmitter 20 dB Bandwidth

Test Summary:

Test Engineer:	Muhammad Faiq Khan	Test Date:	18 April 2024
Test Sample Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)		
Test Sample Serial Number:	BIS01HJ (Radiated Test Sample BF-IDM35 Ant. B)		
Test Site Identification	SR 9		

FCC Reference:	Part 15.215(c)
Test Method Used:	ANSI C63.10 Section 6.9.2

Environmental Conditions:

Temperature (°C):	20.7
Relative Humidity (%):	39.6

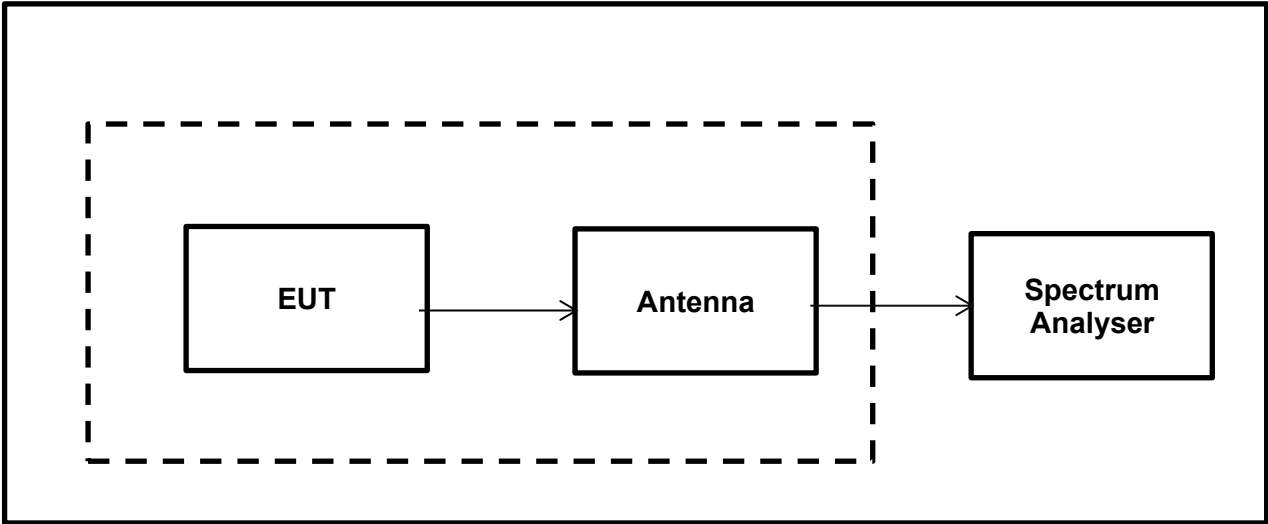
Settings of the Instrument:

RBW/VBW	10 Hz / 30 Hz
Span	1.5 kHz
Sweep time	Auto
Detector	MaxPeak

Notes:

- 1. The n dB down function of the spectrum analyzer was set to 20 dB.

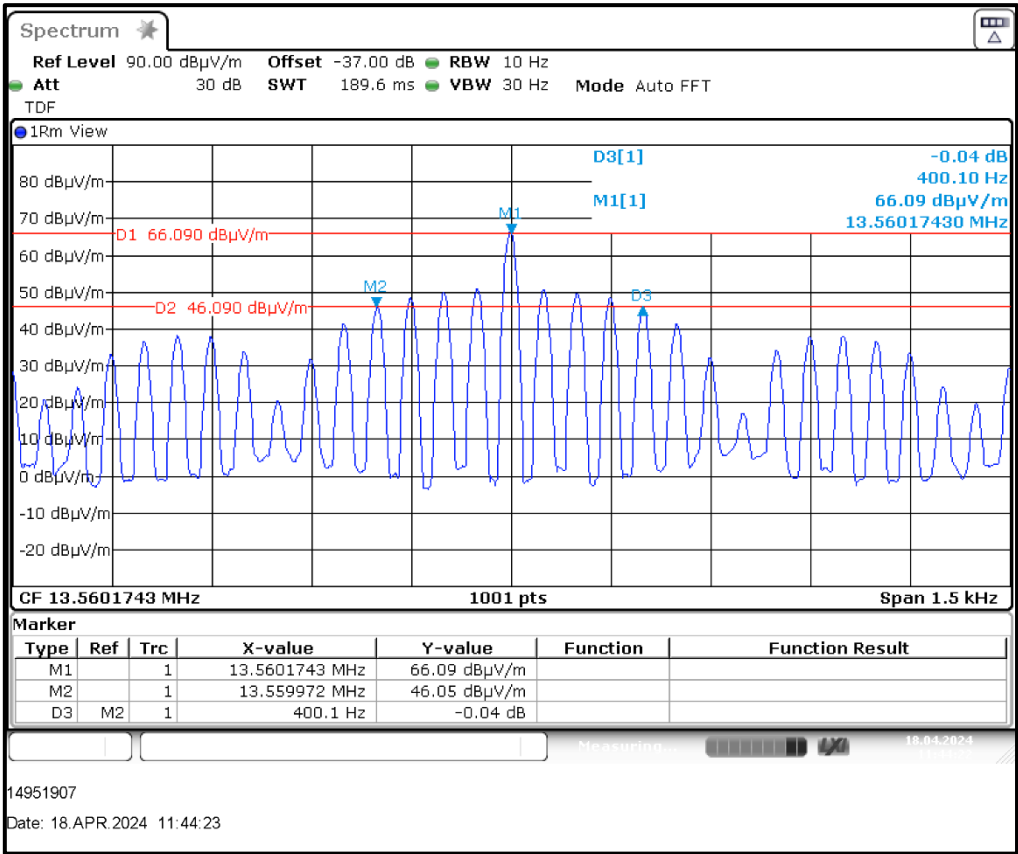
Test Setup:



Transmitter 20 dB Bandwidth (continued)

Results: RFID 13.56 MHz / BIS01HK

RFID Channel	20 dB Bandwidth (Hz)
13.56 MHz	400.10



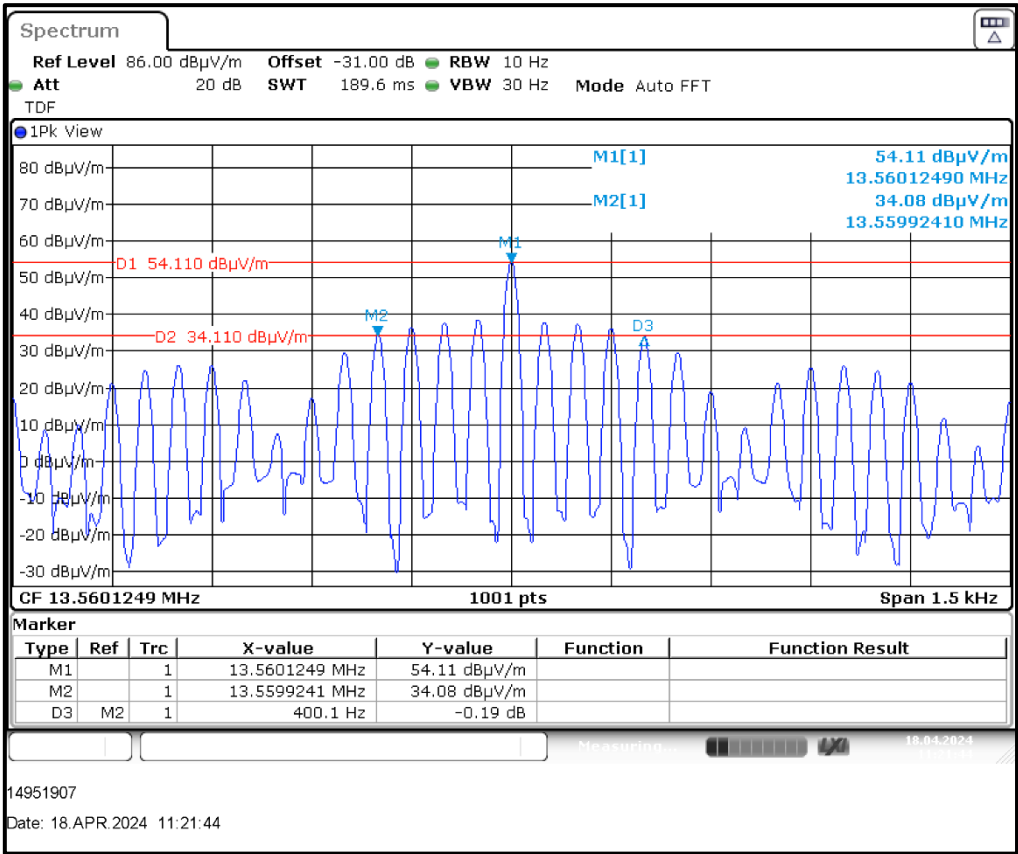
RFID 13.56 MHz

Result: Pass

Transmitter 20 dB Bandwidth (continued)

Results: RFID 13.56 MHz / BIS01HJ

RFID Channel	20 dB Bandwidth (Hz)
13.56 MHz	400.1



RFID 13.56 MHz

Result: Pass

5.2.4. Transmitter Fundamental Field Strength & Spectrum Mask**Test Summary:**

Test Engineer:	Muhammad Faiq Khan	Test Date:	16 April 2024
Test Sample Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)		
Test Sample Serial Number:	BIS01HJ (Radiated Test Sample BF-IDM35 Ant. B)		
Test Site Identification	SR 1/2		

FCC Reference:	Part 15.225(a)(b)(c)(d)
ISED Reference:	RSS-Gen 6.12 / RSS-210 B.6
Test Method Used:	ANSI C63.10 Section 6.4

Environmental Conditions:

Temperature (°C):	21.9
Relative Humidity (%):	34.0

Note(s):

1. The limit is specified at a test distance of 30 metres. However, as specified in 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 a measurement distance of 3 m.
2. 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 to which the delta of 1.38 dB at 13.56 MHz (as detailed in section 8. Open-Area-Test Site comparison of this report) was added.
3. FCC rule part 15.209(a) specifies limits at 300 m / 30 m in $\mu\text{V/m}$ but RSS GEN specifies limits at 300 m / 30 m in $\mu\text{A/m}$. 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, the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table). According to Notice 2020-DRS0023 converting the magnetic field strength into electrical field strength using the following equation while considering free space impedance of 377Ω results in a factor of 51.5 dB Ω .

$$AF^E [\text{dB}(\text{m}^{-1})] = AF^H [\text{dB}(\Omega^{-1}\text{m}^{-1})] + Z_0[\text{dB}\Omega]$$

For example, the measurement frequency X KHz resulted in a level of Y dB $\mu\text{V/m}$, which is equivalent to $Y - 51.5 = Z$ dB $\mu\text{A/m}$, 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.

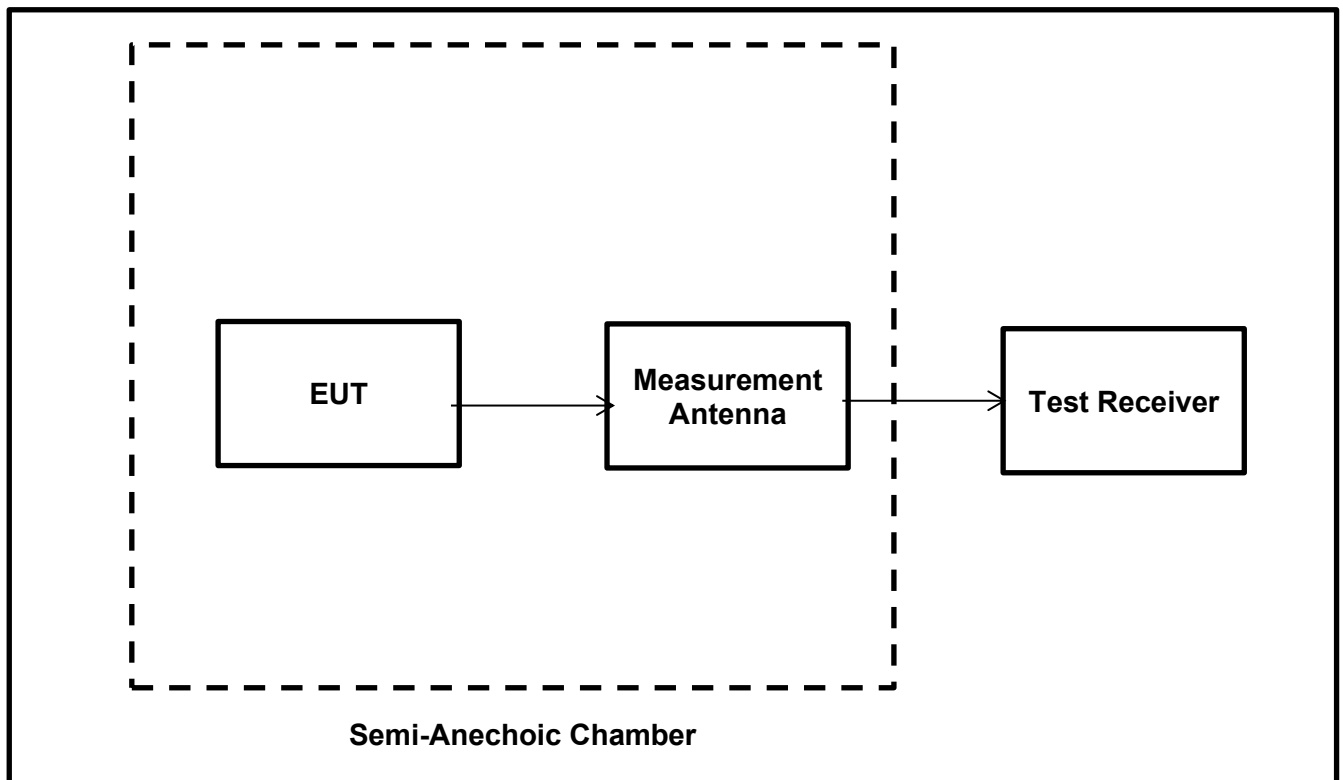
4. Pre-scan measurements were performed using a spectrum analyser with a peak detector and measurement bandwidth of 10 kHz. The fundamental field strength was maximized by rotating the measurement antenna and EUT. The spectrum analyser was then switched to test receiver mode and the final measurement on the maximized level was performed.
5. The measured values at 3 m were extrapolated to the required measurement distance of 30 m and compared the specified limit at this distances as follows:
 - 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 metres. Conversely, the limit line shown on the spectrum plot was extrapolated to 3 m from 30 m using the 40 dB/decade rule.

6. For the emissions appearing within the 13.110-14.010 MHz band, compliance with the spectrum mask is shown in accordance with FCC Part 15.225(a)(b)(c)(d) limits.
7. The emissions shown at frequencies approximately at 13.56 MHz on the plot represent EUT's fundamental field strength for RFID 13.56 MHz.
8. For the emissions appearing outside of the 13.110-14.010 MHz band, compliance with the spectrum mask is shown in accordance with FCC Part 15.225(d) referencing FCC Part 15.209 general radiated emission limits.
9. For the emissions appearing outside of the 13.110-14.010 MHz band, compliance with the spectrum mask is shown in accordance with RSS-210 B.6(a)(iv) referencing RSS-Gen general field strength limits.

Transmitter Fundamental Field Strength & Spectrum Mask(continued)

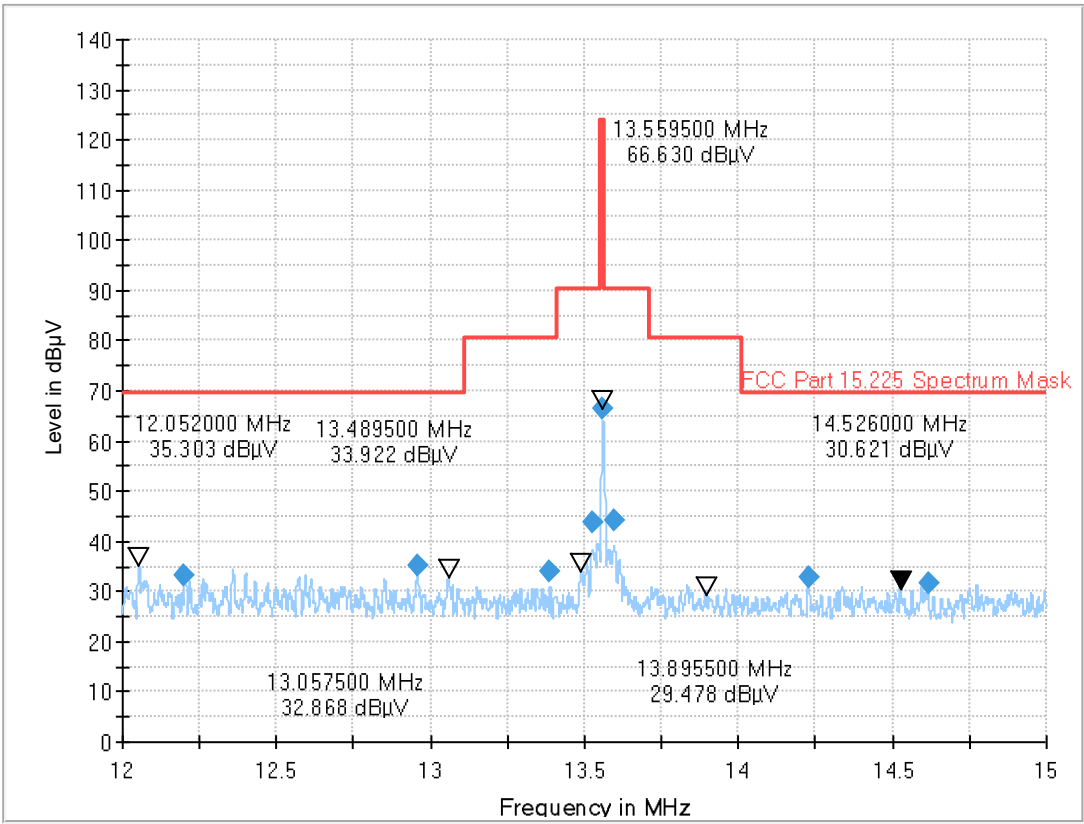
Test Setup:



Transmitter Fundamental Field Strength & Spectrum Mask (continued)**Results: RFID 13.56 MHz / BIS01HK**

Frequency Band (MHz)	Emission Frequency (MHz)	Loop Antenna Orientation	MaxPeak Level at 3 m including Deviation from OATS to SAC) (dBμV/m)	MaxPeak Emission Level extrapolated to 30 m (dBmV/m)	Limit at 30 m (dBμV/m)	Margin (dB)	Result
12.000 to 13.110	12.201	90° to EUT	34.04	-5.96	29.5	35.46	Complied
12.000 to 13.110	12.956	90° to EUT	35.81	-4.19	29.5	33.69	Complied
13.110 to 13.410	13.387	0° to EUT	35.54	-4.46	40.5	44.96	Complied
13.410 to 13.553	13.527	0° to EUT	45.01	5.01	50.5	45.49	Complied
13.553 to 13.567	13.559	0° to EUT	68.01	28.01	84	55.99	Complied
13.553 to 13.567	13.595	0° to EUT	45.65	5.65	50.5	44.85	Complied
14.010 to 15.000	14.228	90° to EUT	34.10	-5.9	29.5	35.40	Complied
14.010 to 15.000	14.615	90° to EUT	32.41	-7.59	29.5	37.09	Complied

Transmitter Fundamental Field Strength & Spectrum Mask (continued)
Plot: RFID 13.56 MHz / BIS01HK



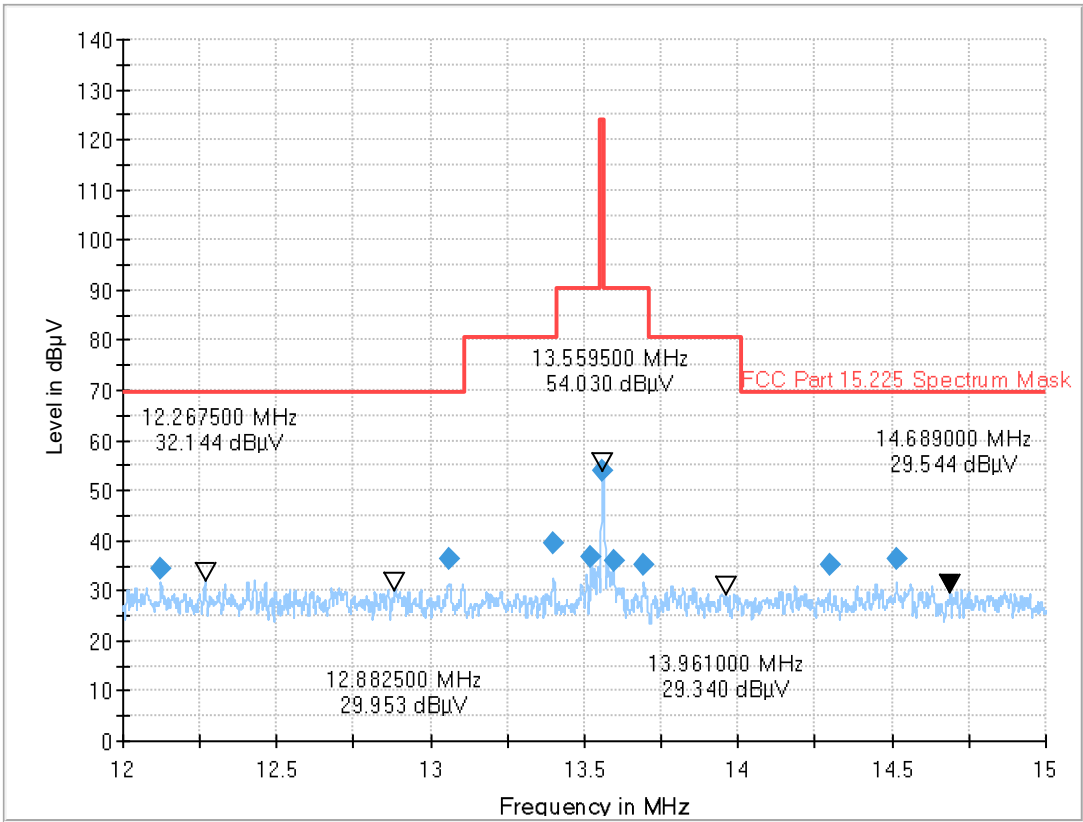
Fundamental field strength and spectrum mask / measured at 3 metres/ measured in a semi-anechoic chamber

Result: Pass

Transmitter Fundamental Field Strength & Spectrum Mask (continued)**Results: RFID 13.56 MHz / BIS01HJ**

Frequency Band (MHz)	Emission Frequency (MHz)	Loop Antenna Orientation	MaxPeak Level at 3 m including Deviation from OATS to SAC) (dBμV/m)	MaxPeak Emission Level extrapolated to 30 m (dBmV/m)	Limit at 30 m (dBμV/m)	Margin (dB)	Result
12.000 to 13.110	12.12250	0° to EUT	35.26	-4.74	29.5	34.24	Complied
12.000 to 13.110	13.05700	0° to EUT	36.98	-3.02	29.5	32.52	Complied
13.110 to 13.410	13.39850	0° to EUT	40.72	0.72	40.5	39.78	Complied
13.410 to 13.553	13.52100	0° to EUT	38.25	-1.75	50.5	52.25	Complied
13.553 to 13.567	13.55950	0° to EUT	55.41	15.41	84	68.59	Complied
13.553 to 13.567	13.59300	0° to EUT	37.42	-2.58	50.5	53.08	Complied
13.567 to 13.710	13.69400	0° to EUT	36.73	-3.27	50.5	53.77	Complied
14.010 to 15.000	14.29750	90° to EUT	36.37	-3.63	29.5	33.13	Complied
14.010 to 15.000	14.51400	90° to EUT	37.12	-2.88	29.5	32.38	Complied

Transmitter Fundamental Field Strength & Spectrum Mask (continued)
Plot: RFID 13.56 MHz / BIS01HJ



Fundamental field strength and spectrum mask / measured at 3 metres/ measured in a semi-anechoic chamber

Result: Pass

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

Test Engineer:	Muhammad Faiq Khan	Test Date:	23 April 2024
Test Sample Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)		
Test Sample Serial Number:	BIS01HJ (Radiated Test Sample BF-IDM35 Ant. B)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.225(d) & 15.209(a)
ISED Reference:	RSS-Gen 6.13 / RSS-210 B6
Test Method Used:	ANSI C63.10:2013 Sections 6.3, 6.4
Frequency Range:	9 kHz to 30 MHz

Environmental Conditions:

Temperature (°C):	22.7
Relative Humidity (%):	39.1

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 detailed in section 8. Open-Area-Test Site comparison of this report.
- FCC rule part 15.209(a) specifies limits at 300 m / 30 m in $\mu\text{V/m}$ but RSS GEN specifies limits at 300 m / 30 m in $\mu\text{A/m}$. 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, the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table). According to Notice 2020-DRS0023 converting the magnetic field strength into electrical field strength using the following equation while considering free space impedance of 377Ω results in a factor of 51.5 dB Ω .

$$AF^E [\text{dB}(\text{m}^{-1})] = AF^H [\text{dB}(\Omega^{-1}\text{m}^{-1})] + Z_0 [\text{dB}\Omega]$$

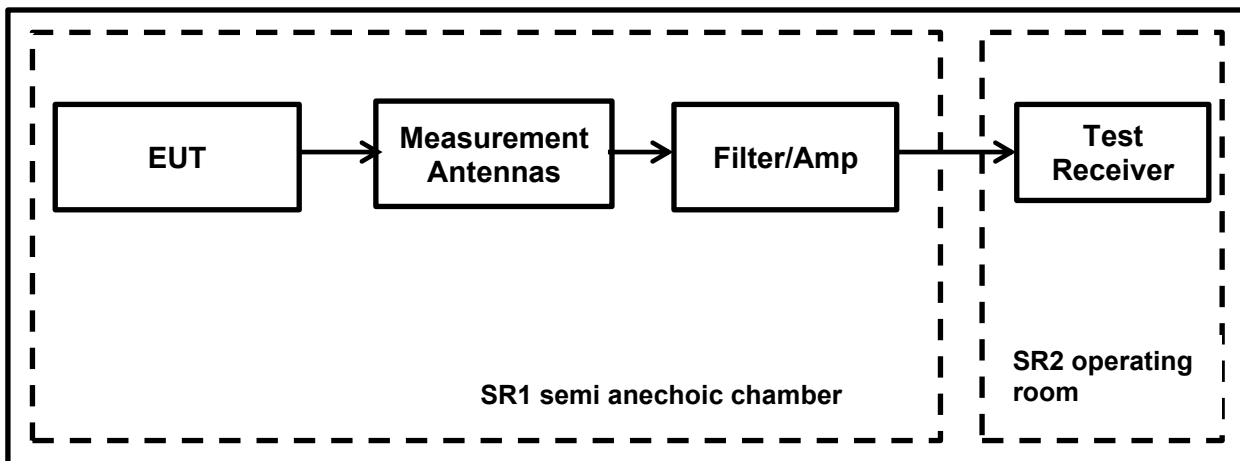
For example, the measurement frequency X KHz resulted in a level of Y dB $\mu\text{V/m}$, which is equivalent to $Y - 51.5 = Z$ dB $\mu\text{A/m}$, which has the same margin, W dB, to the corresponding RSS-GEN Section 8.9, Table 6 limit as it has to the 15.209(a) limit.

- The limits are specified at a test distances of 30 m & 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 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 a measurement distance of 3 m.
- 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.

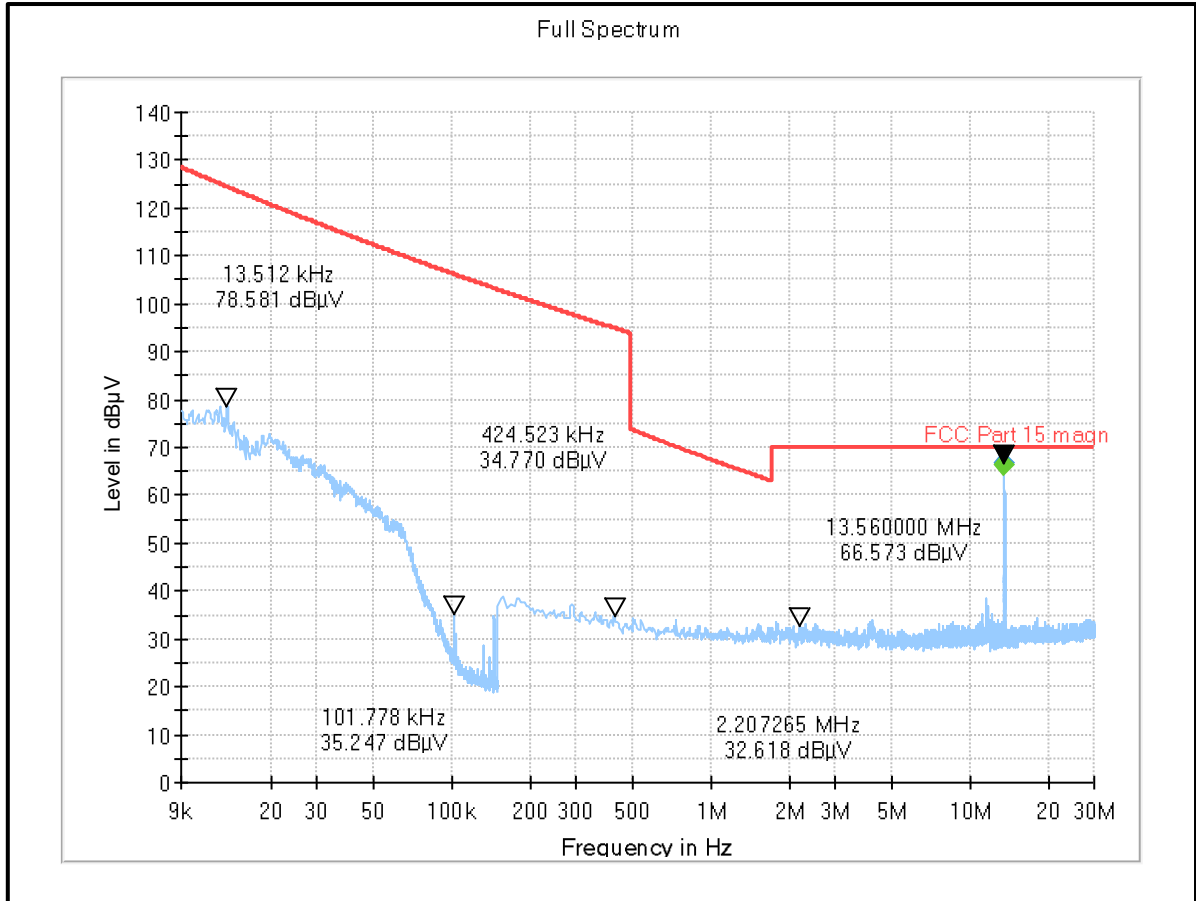
Transmitter Radiated Emissions (continued)**Note(s):**

6. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
7. Measurements below 30 MHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT placed on table 80 cm from ground plane in the centre of the chamber turntable. The measurement loop antenna height was at 1 m.
8. The emissions shown at frequencies approximately 13.56 MHz on the 9 kHz to 30 MHz plots are the EUT RFID 13.56 MHz fundamental for the tested channel.
9. 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: 300 Hz /VBW: 1 kHz
 - Frequency range: 150 kHz – 30 MHz: RBW: 10 kHz /VBW: 30 kHz
 - Detector: Peak detector
 - Trace Mode: Max Hold
10. Final measurements performed with Quasi-peak detector as per CISPR requirements.

Test Setup:

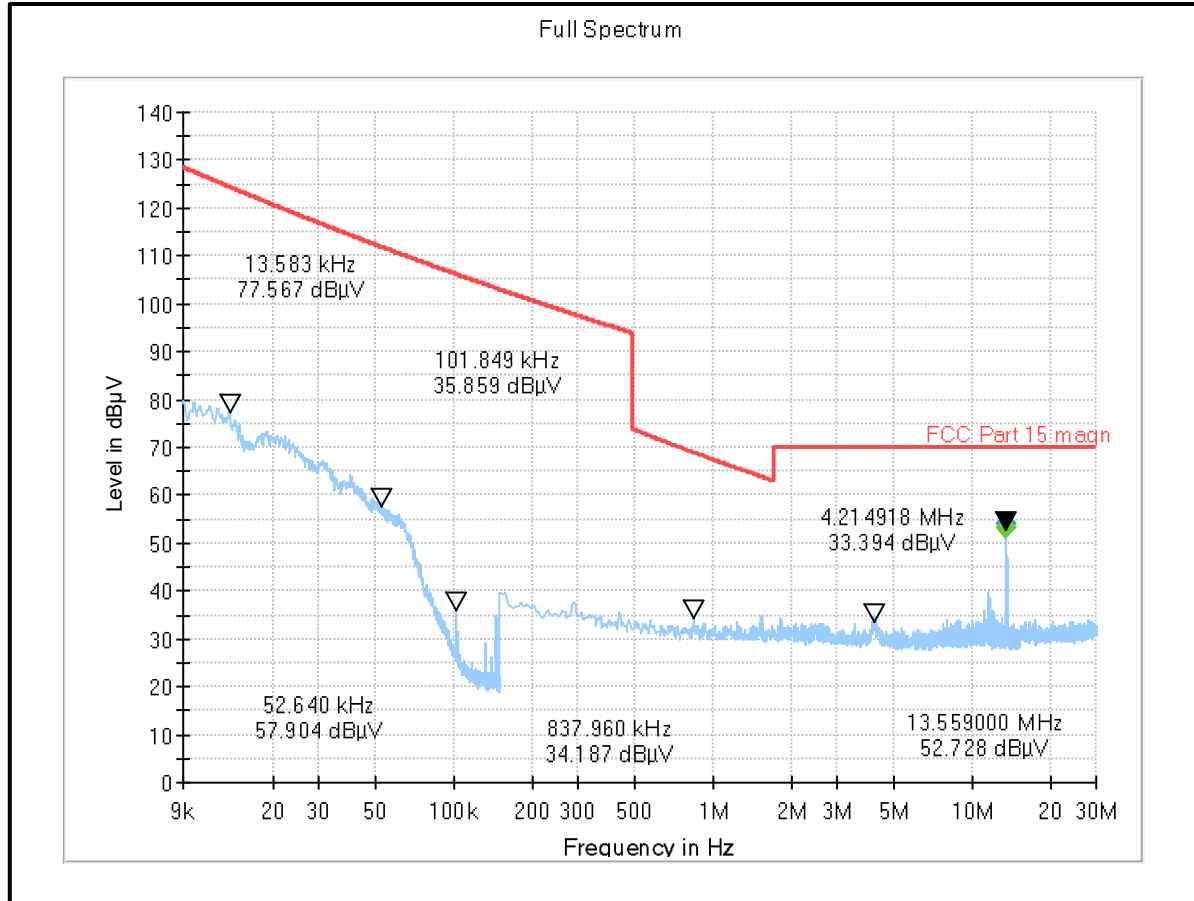
Transmitter Radiated Emissions (continued)**Results: RFID 13.56 MHz / BIS01HK**

Frequency (MHz)	Loop Antenna Orientation	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
No critical emissions were detected					

Plot: 9kHz – 30MHz – Active RFID**Result: Pass**

Transmitter Radiated Emissions (continued)**Results: RFID 13.56 MHz / BIS01HJ**

Frequency (MHz)	Loop Antenna Orientation	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
No critical emissions were detected					

Plot: 9kHz – 30MHz – Active RFID**Result: Pass**

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

Test Engineer:	Muhammad Faiq Khan	Test Date:	23 April 2024
Test Sample Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)		
Test Sample Serial Number:	BIS01HJ (Radiated Test Sample BF-IDM35 Ant. B)		
Test Site Identification	SR 1/2		

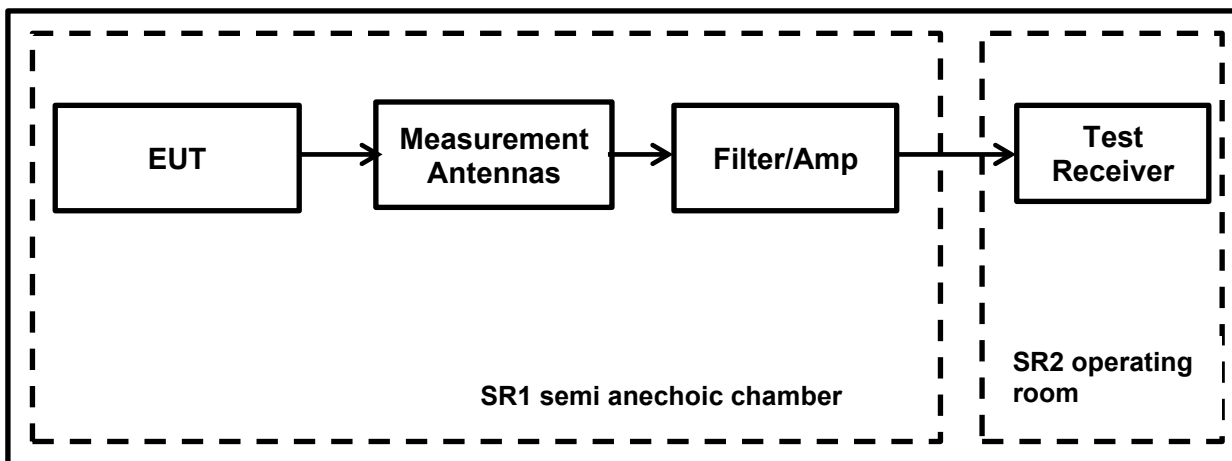
FCC Reference:	Parts 15.225(d) & 15.209(a)
ISED Reference:	RSS-Gen 6.13 / RSS-210 B6
Test Method Used:	ANSI C63.10:2013 Sections 6.3 and 6.5
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	22.7
Relative Humidity (%):	39.1

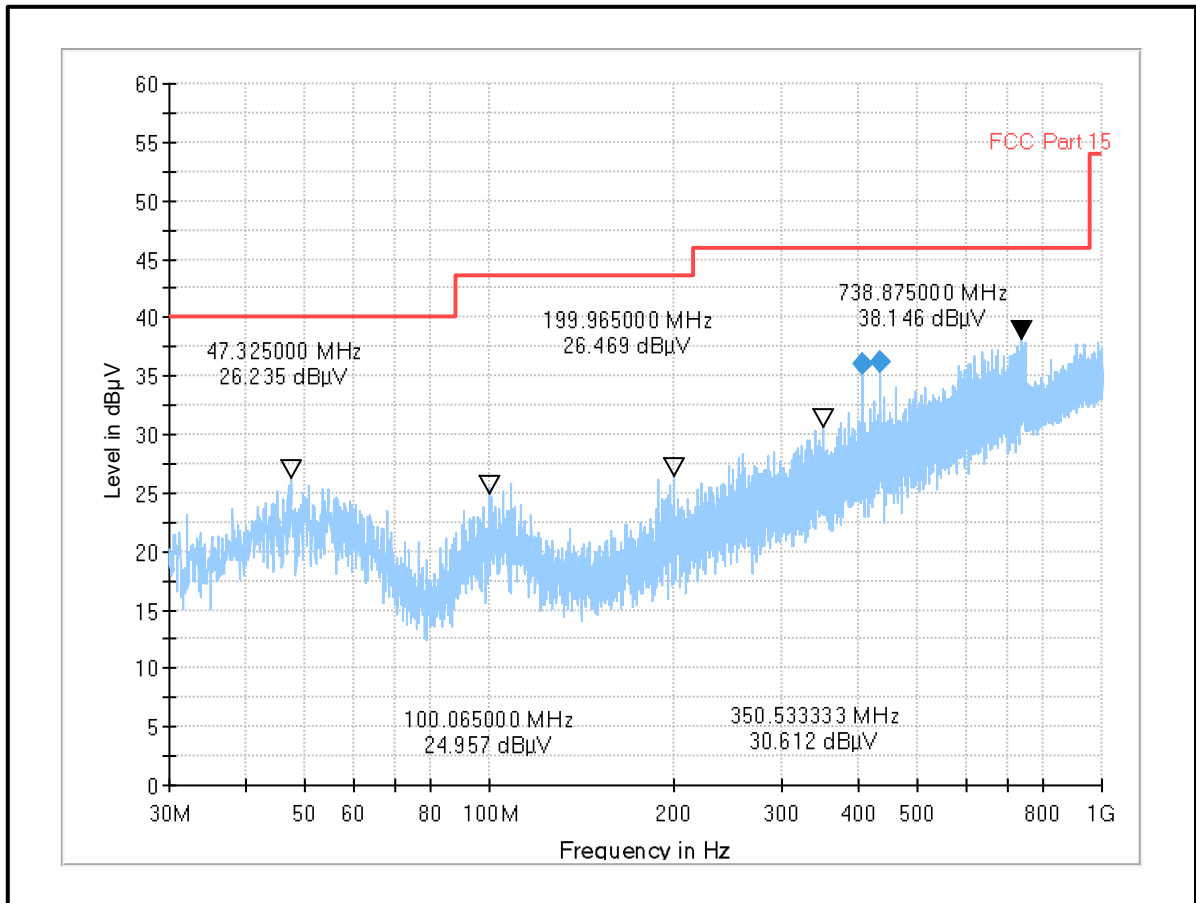
Note(s):

1. Measurements below 30 MHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT placed on table 80 cm from 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 final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
4. Final measurements were performed on the marker frequencies. The results entered in the table below incorporates the calibrated antenna factor and cable loss. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span big enough to see the whole emission.

Test Setup:

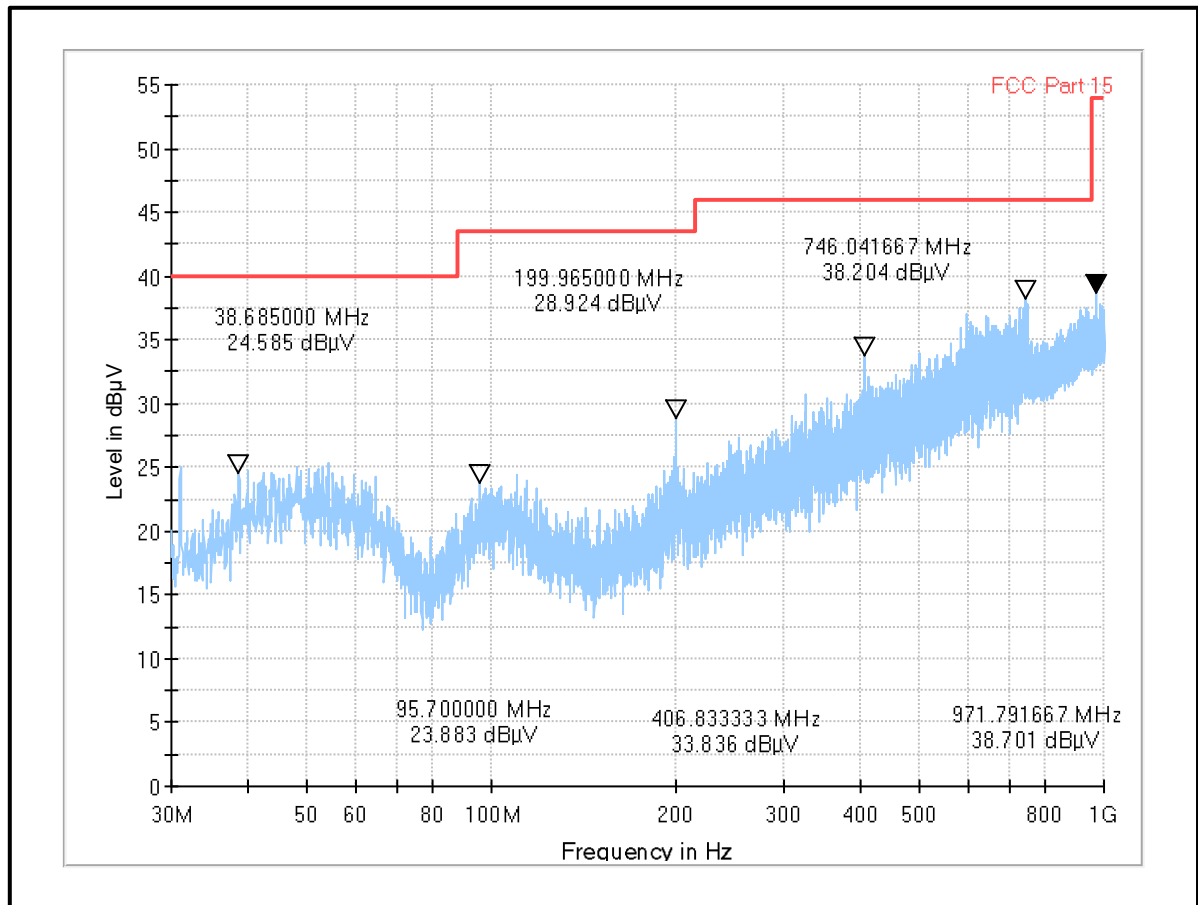
Transmitter Radiated Emissions (continued)**Results: RFID 13.56 MHz / BIS01HK**

Frequency (MHz)	Antenna Polarization	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
406.800	H	36.0	46	10.0	Complied
433.933	V	36.17	46	9.83	Complied

Plot: 30Mz – 1000MHz – Active RFID**Result: Pass**

Transmitter Radiated Emissions (continued)**Results: RFID 13.56 MHz / BIS01HJ**

Frequency (MHz)	Antenna Polarization	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
No critical emissions were detected					

Plot: 30Mz – 1000MHz – Active RFID**Result: Pass**

5.2.6. Transmitter Frequency Stability (Temperature & Voltage Variation)**Test Summary:**

Test Engineer:	Muhammad Faiq Khan	Test Date:	18-19 April 2024
Test Sample Serial Number:	BIS01HK (Radiated Test Sample BF-IDM35 Ant. A)		
Test Sample Serial Number:	BIS01HJ (Radiated Test Sample BF-IDM35 Ant. B)		
Test Site Identification	SR 9		

FCC Reference:	Part 15.225(e)
ISED Reference:	RSS-Gen 6.11 / RSS-210 B6
Test Method Used:	ANSI C63.10 Sections 6.8.1 and 6.8.2

Environmental Conditions:

Ambient Temperature (°C):	20.7
Ambient Relative Humidity (%):	39.6

Settings of the Instrument

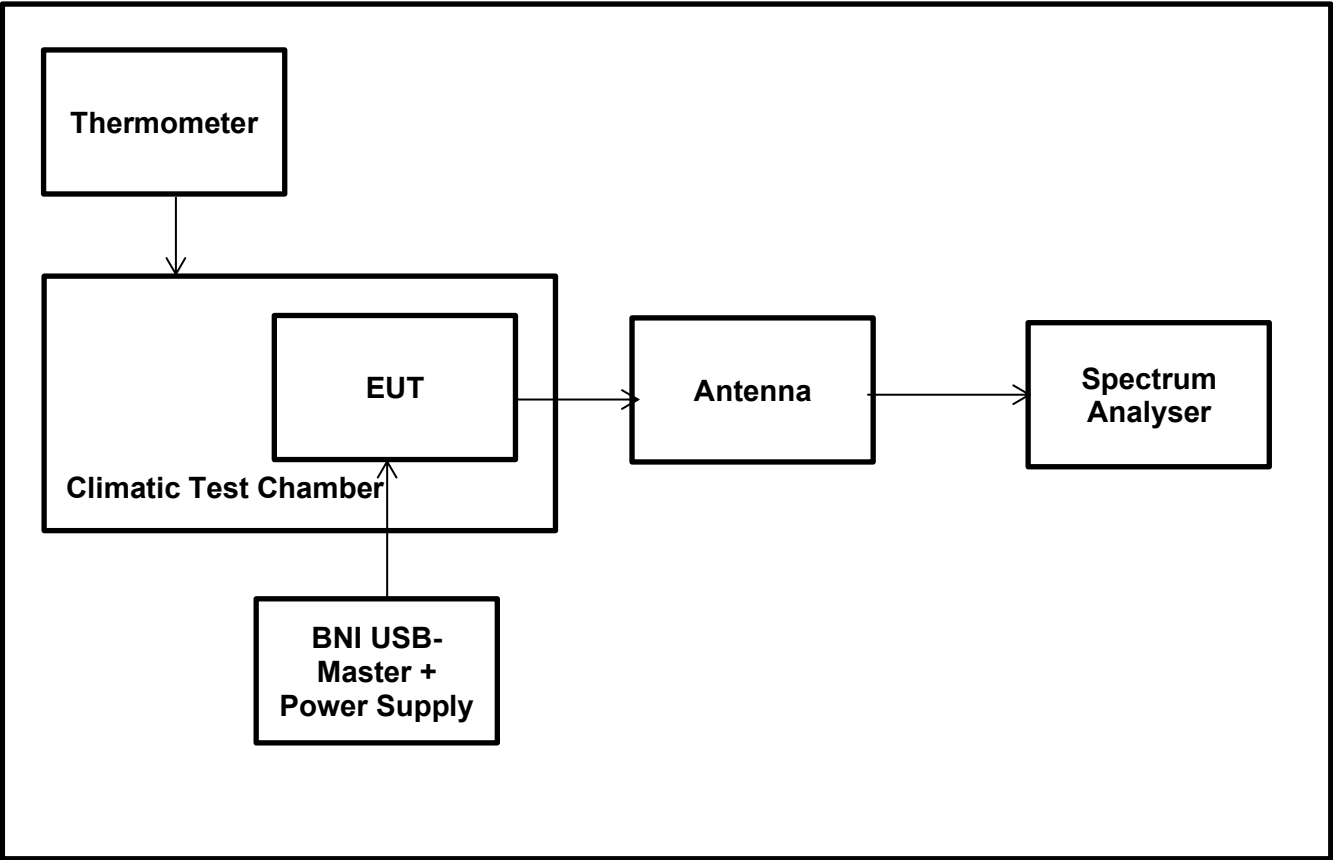
RBW/VBW	30 Hz/30 kHz
Span	3 kHz
Sweep Time	Auto
Sweep Mode	Single Sweep
Detector	Peak
Marker Function	Signal Count

Note(s):

1. The EUT was kept inside the environmental/climatic test chamber. The tests were performed with extreme temperature & extreme voltage variations.
2. The temperature variations were monitored throughout the tests using a calibrated digital thermometer. The voltage variations were monitored throughout the tests using a calibrated digital multimeter.
3. Voltage variations tests done with AC/DC power supply and with varying the input voltage.
4. For accurate measurement of frequency deviations, Signal Count / frequency counter function was activated on the spectrum analyser.
5. The applicant's declared operating frequency 13.560 MHz was used as reference frequency.
6. The difference between operating /reference frequency & measured frequency was reported as a frequency error.
7. The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ or 100 ppm of the operating frequency

Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)

Test Setup:



Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)**Results: RFID 13.56 MHz / BIS01HK / Temperature Variations**

Extreme Temperature (°C)	Time after EUT Power-up	Measured Frequency (MHz)	Frequency Error		Frequency Error Limits		Result
			%	ppm	%	ppm	
-20	at 0 minutes	13.560289400	0.002134218	21.34	± 0.01	± 100	Complied
	at 2 minutes	13.560289400	0.002134218	21.34	± 0.01	± 100	Complied
	at 5 minutes	13.560289400	0.002134218	21.34	± 0.01	± 100	Complied
	at 10 minutes	13.560283600	0.002091445	20.91	± 0.01	± 100	Complied
-10	at 0 minutes	13.560306800	0.002262537	22.63	± 0.01	± 100	Complied
	at 2 minutes	13.560306800	0.002262537	22.63	± 0.01	± 100	Complied
	at 5 minutes	13.560306800	0.002262537	22.63	± 0.01	± 100	Complied
	at 10 minutes	13.560306800	0.002262537	22.63	± 0.01	± 100	Complied
0	at 0 minutes	13.560306800	0.002262537	22.63	± 0.01	± 100	Complied
	at 2 minutes	13.560301000	0.002219764	22.20	± 0.01	± 100	Complied
	at 5 minutes	13.560295200	0.002176991	21.77	± 0.01	± 100	Complied
	at 10 minutes	13.560295200	0.002176991	21.77	± 0.01	± 100	Complied
+10	at 0 minutes	13.560277900	0.002049410	20.49	± 0.01	± 100	Complied
	at 2 minutes	13.560266300	0.001963864	19.64	± 0.01	± 100	Complied
	at 5 minutes	13.560260500	0.001921091	19.21	± 0.01	± 100	Complied
	at 10 minutes	13.560254700	0.001878319	18.78	± 0.01	± 100	Complied
+20	at 0 minutes	13.560214200	0.001579646	15.80	± 0.01	± 100	Complied
	at 2 minutes	13.560208400	0.001536873	15.37	± 0.01	± 100	Complied
	at 5 minutes	13.560202600	0.001494100	14.94	± 0.01	± 100	Complied
	at 10 minutes	13.560202600	0.001494100	14.94	± 0.01	± 100	Complied
+30	at 0 minutes	13.560179500	0.001323746	13.24	± 0.01	± 100	Complied
	at 2 minutes	13.560156300	0.001152655	11.53	± 0.01	± 100	Complied
	at 5 minutes	13.560150500	0.001109882	11.10	± 0.01	± 100	Complied
	at 10 minutes	13.560144700	0.001067109	10.67	± 0.01	± 100	Complied
+40	at 0 minutes	13.560127400	0.000939528	9.40	± 0.01	± 100	Complied
	at 2 minutes	13.560110000	0.000811209	8.11	± 0.01	± 100	Complied
	at 5 minutes	13.560098400	0.000725664	7.26	± 0.01	± 100	Complied
	at 10 minutes	13.560092600	0.000682891	6.83	± 0.01	± 100	Complied
+50	at 0 minutes	13.560063700	0.000469764	4.70	± 0.01	± 100	Complied
	at 2 minutes	13.560052100	0.000384218	3.84	± 0.01	± 100	Complied
	at 5 minutes	13.560052100	0.000384218	3.84	± 0.01	± 100	Complied
	at 10 minutes	13.560046300	0.000341445	3.41	± 0.01	± 100	Complied

Result: Pass

Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)**Results: RFID 13.56 MHz / BIS01HK/ Voltage Variations**

Extreme DC Voltage Conditions	Extreme AC Voltage (V)	Measured Frequency (MHz)	Frequency Error		Frequency Error Limits		Result
			%	ppm	%	ppm	
85% of Rated Primary Supply Voltage	102	13.560202600	0.001494	1.00	± 0.01	± 100	Complied
Rated Primary Supply Voltage	120	13.560196800	0.001451	1.00	± 0.01	± 100	Complied
115% of Rated Primary Supply Voltage	138	13.560191000	0.001409	1.00	± 0.01	± 100	Complied

Result: Pass

Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)**Results: RFID 13.56 MHz / BIS01HJ / Temperature Variations**

Extreme Temperature (°C)	Time after EUT Power-up	Measured Frequency (MHz)	Frequency Error		Frequency Error Limits		Result
			%	ppm	%	ppm	
-20	at 0 minutes	13.560301000	0.002219764	22.20	± 0.01	± 100	Complied
	at 2 minutes	13.560301000	0.002219764	22.20	± 0.01	± 100	Complied
	at 5 minutes	13.560301000	0.002219764	22.20	± 0.01	± 100	Complied
	at 10 minutes	13.560295200	0.002176991	21.77	± 0.01	± 100	Complied
-10	at 0 minutes	13.560301000	0.002219764	22.20	± 0.01	± 100	Complied
	at 2 minutes	13.560301000	0.002219764	22.20	± 0.01	± 100	Complied
	at 5 minutes	13.560301000	0.002219764	22.20	± 0.01	± 100	Complied
	at 10 minutes	13.560295200	0.002176991	21.77	± 0.01	± 100	Complied
0	at 0 minutes	13.560277900	0.002049410	20.49	± 0.01	± 100	Complied
	at 2 minutes	13.560272100	0.002006637	20.07	± 0.01	± 100	Complied
	at 5 minutes	13.560272100	0.002006637	20.07	± 0.01	± 100	Complied
	at 10 minutes	13.560272100	0.002006637	20.07	± 0.01	± 100	Complied
+10	at 0 minutes	13.560231500	0.001707227	17.07	± 0.01	± 100	Complied
	at 2 minutes	13.560220000	0.001622419	16.22	± 0.01	± 100	Complied
	at 5 minutes	13.560225800	0.001665192	16.65	± 0.01	± 100	Complied
	at 10 minutes	13.560225800	0.001665192	16.65	± 0.01	± 100	Complied
+20	at 0 minutes	13.560179500	0.001323746	13.24	± 0.01	± 100	Complied
	at 2 minutes	13.560167900	0.001238201	12.38	± 0.01	± 100	Complied
	at 5 minutes	13.560173700	0.001280973	12.81	± 0.01	± 100	Complied
	at 10 minutes	13.560173700	0.001280973	12.81	± 0.01	± 100	Complied
+30	at 0 minutes	13.560092600	0.000682891	6.83	± 0.01	± 100	Complied
	at 2 minutes	13.560092600	0.000682891	6.83	± 0.01	± 100	Complied
	at 5 minutes	13.560104200	0.000768437	7.68	± 0.01	± 100	Complied
	at 10 minutes	13.560110000	0.000811209	8.11	± 0.01	± 100	Complied
+40	at 0 minutes	13.560052100	0.000384218	3.84	± 0.01	± 100	Complied
	at 2 minutes	13.560052100	0.000384218	3.84	± 0.01	± 100	Complied
	at 5 minutes	13.560052100	0.000384218	3.84	± 0.01	± 100	Complied
	at 10 minutes	13.560057900	0.000426991	4.27	± 0.01	± 100	Complied
+50	at 0 minutes	13.560028900	0.000213127	2.13	± 0.01	± 100	Complied
	at 2 minutes	13.560023200	0.000171091	1.71	± 0.01	± 100	Complied
	at 5 minutes	13.560017400	0.000128319	1.28	± 0.01	± 100	Complied
	at 10 minutes	13.560017400	0.000128319	1.28	± 0.01	± 100	Complied

Result: Pass

Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)**Results: RFID 13.56 MHz / BIS01HJ/ Voltage Variations**

Extreme DC Voltage Conditions	Extreme AC Voltage (V)	Measured Frequency (MHz)	Frequency Error		Frequency Error Limits		Result
			%	ppm	%	ppm	
85% of Rated Primary Supply Voltage	102	13.5601795	0.001324	1.00	± 0.01	± 100	Complied
Rated Primary Supply Voltage	120	13.5601621	0.001195	1.00	± 0.01	± 100	Complied
115% of Rated Primary Supply Voltage	138	13.5601679	0.001238	1.00	± 0.01	± 100	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
AC Conducted Spurious Emissions	95%	± 2.49 dB
20 dB Bandwidth	95%	± 0.87 %
99% Emission Bandwidth	95%	± 0.87 %
Fundamental Field Strength	95%	± 3.10 dB
Radiated Spurious Emissions	95%	± 3.10 dB
Frequency Stability	95%	± 92 Hz

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
694	Rohde & Schwarz	Signal Analyzer	FSW 50	101847	09/05/2023	12
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 7/8

ID	Manufacturer	Type	Model	Serial No.	Calibration Date	Cal. Cycle
22	Rohde & Schwarz	Artificial Mains	ESH3-Z5	831767/014	18.07.2023	12
349	Rohde & Schwarz	Receiver, EMI Test	ESIB7	836697/009	18.07.2023	12

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
-/-	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
327	SPS	AC/DC power distribution system	PAS 5000	A2464 00/1 0200	lab verification	n/a

8. Open-Area-Test Site comparison

GPS coordinates

Latitude: 48.765746, Longitude: 9.250684



Open-Area-Test Site comparison (continued)

The following listed equipment was used for the measurement:

Manufacturer	Type	Model	Frequency Range
Rohde & Schwarz	Signal generator	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+SUHNER	RF Cable	-/-	-/-
Elspec	BNC Cable	-/-	-/-

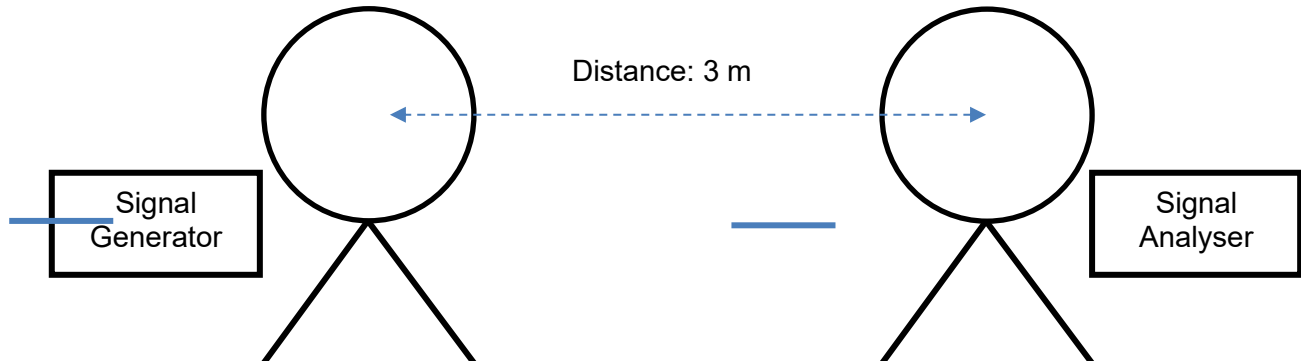
The transmit signal to the ETS Lindgren loop antenna is supplied by the SML signal generator.

The distance of the transmit and receive antenna was 3 m. No other distances can be achieved in SR1 so 10 m and 30 m 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.



Open-Area-Test Site comparison (continued)

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

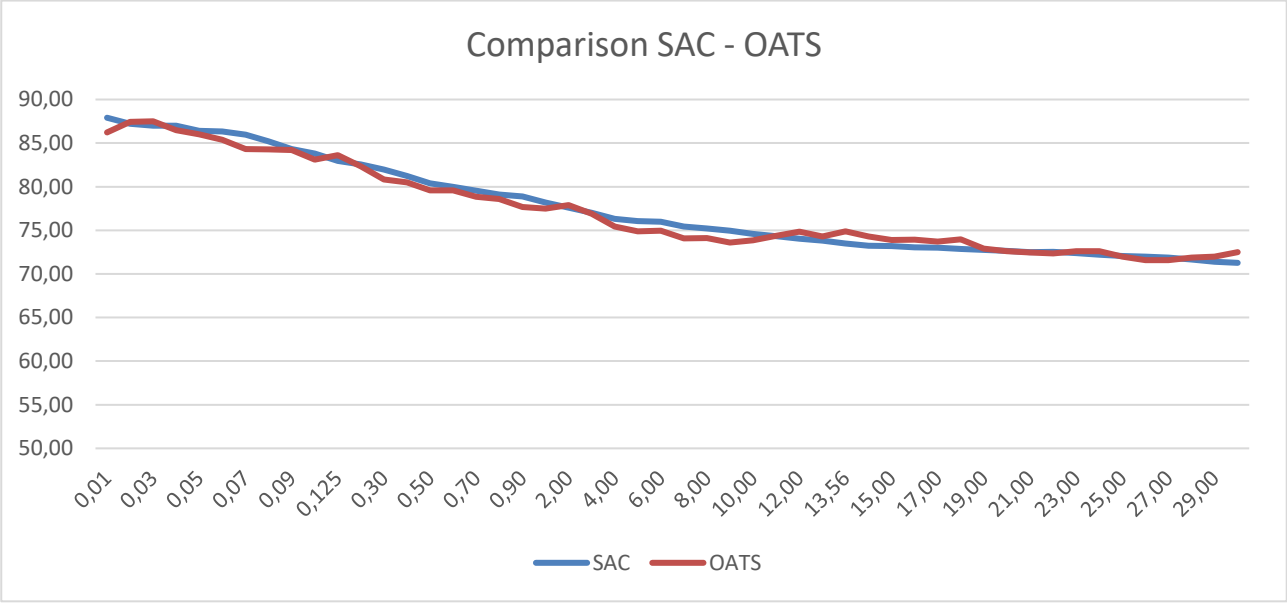
Frequency (MHz)	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	2.00	3.00	4.00	5.00
SR1 Measured power (dBμV)	81.98	81.23	80.39	80.00	79.53	79.10	78.87	78.20	77.60	77.01	76.32	76.04
OATS Measured power (dBμV)	80.84	80.49	79.58	79.58	78.85	78.59	77.69	77.50	77.91	76.90	75.45	74.90
Delta (dB)	-1.14	-0.74	-0.81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

Open-Area-Test Site comparison (continued)

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	-	-	Initial Version
1.1	Page No(s)	Clause	Details
	8	3.4	Antenna information updated
	23	5.2.4	Notes updated
	25, 27	5.2.4	Result table header updated
	29	5.2.5	Notes updated
	43	7	Equipment list updated
Test Report Version 1.2 supersede Version 1.1 with immediate effect Test Report No. UL-RPT-RP-14951907-316 Version 1.2, Issue Date 30 September 2025 replaces Test Report No. UL-RPT-RP-14951907-316 Version 1.1, Issue Date 21 November 2024, which is no longer valid.			
1.2	Page No(s)	Clause	Details
	6	2.3	Methods and procedure table updated

--- END OF TEST REPORT ---