



# TEST REPORT

**Test Report No. : UL-RPT-RP-12321316-616-FCC**

**Applicant** : enomatic SRL  
**Model No.** : E3\_A1  
**FCC ID** : 2AWPSE3A1  
**Technology** : NFC 13.56 MHz  
**Test Standard(s)** : FCC Parts 15.207, 15.209(a) & 15.225  
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-12321316-616-ISED Version 1.2, Issue Date 18 NOVEMBER 2020 replaces  
Test Report No. UL-RPT-RP-12321316-616-ISED Version 1.1, Issue Date 04 NOVEMBER 2020, which is no longer valid.
5. Result of the tested sample: **PASS**

Prepared by: Usta, Sercan  
Title: Laboratory Engineer  
Date: 18 November 2020

Approved by: Ajit, Phadtare  
Title: Lead Test Engineer  
Date: 18 November 2020



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**

|                                |                                                            |
|--------------------------------|------------------------------------------------------------|
| <b>Company Name:</b>           | enomatic SRL                                               |
| <b>Company Address:</b>        | Via di meleto 1/27 50022 Strada In Chianti, Firenze, Italy |
| <b>Contact Person:</b>         | Giacomo Gagli                                              |
| <b>Contact E-Mail Address:</b> | g.gagli@enomatic.it                                        |
| <b>Contact Phone No.:</b>      | +39 055 85 47 272 - 9418                                   |

### **1.2.Manufacturer Information**

|                                |                                                            |
|--------------------------------|------------------------------------------------------------|
| <b>Company Name:</b>           | enomatic SRL                                               |
| <b>Company Address:</b>        | Via di meleto 1/27 50022 Strada In Chianti, Firenze, Italy |
| <b>Contact Person:</b>         | Lorenzo Bencistà Falorni                                   |
| <b>Contact E-Mail Address:</b> | info@enomatic.it                                           |
| <b>Contact Phone No.:</b>      | +39 055 85 47 272                                          |

## **2. Summary of Testing**

### **2.1. General Information**

#### **Applied Standards**

|                                 |                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Specification Reference:</b> | 47CFR15.225                                                                                                                           |
| <b>Specification Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Radio Frequency Devices) - Section 15.225           |
| <b>Specification Reference:</b> | 47CFR15.207 and 47CFR15.209                                                                                                           |
| <b>Specification Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209 |

#### **Location**

|                                |                                                                                    |
|--------------------------------|------------------------------------------------------------------------------------|
| <b>Location of Testing:</b>    | UL International Germany GmbH<br>Hedelfinger Str. 61<br>70327 Stuttgart<br>Germany |
| <b>Test Firm Registration:</b> | 399704                                                                             |

#### **Date information**

|                      |                                    |
|----------------------|------------------------------------|
| <b>Order Date:</b>   | 18 May 2018                        |
| <b>EUT arrived:</b>  | 16 January 2020                    |
| <b>Test Dates:</b>   | 24 April 2020 to 22 September 2020 |
| <b>EUT returned:</b> | -/-                                |

**2.2. Summary of Test Results**

| Clause                     | Measurement                                                       | Complied                            | Did not comply           | Not performed            | Not applicable           |
|----------------------------|-------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|
| Part 15.207                | Transmitter AC Conducted Emissions                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Part 15.215(c)             | Transmitter 20 dB Bandwidth                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Part 15.225(a)(b)(c)(d)    | Transmitter Fundamental Field Strength                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Part 15.209(a) / 15.225(d) | Transmitter Radiated Emissions                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Part 15.225(e)             | Transmitter Frequency Stability (Temperature & Voltage Variation) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Note(s):****2.3. Methods and Procedures**

|                   |                                                                                                                                                                      |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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. |
| <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> | KDB 414788 D01 Radiated Test Site v01                                                                                                                                |
| <b>Title:</b>     | TEST SITES FOR RADIATED EMISSION MEASUREMENTS                                                                                                                        |
| <b>Reference:</b> | FCC KDB Publication Number 174176 Date: June 3, 2015                                                                                                                 |
| <b>Title:</b>     | AC Power-Line Conducted Emissions Frequently Asked Questions                                                                                                         |

**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>              | enomatic  |
| <b>Model Name or Number:</b>    | E3_A1     |
| <b>Serial Number:</b>           | B00351    |
| <b>Hardware Version Number:</b> | Rev.0     |
| <b>Firmware Version Number:</b> | N/A       |
| <b>Software Version Number:</b> | 0.1.0     |
| <b>FCC ID:</b>                  | 2AWPSE3A1 |

|                                 |                            |
|---------------------------------|----------------------------|
| <b>Brand Name:</b>              | enomatic                   |
| <b>Model Name or Number:</b>    | Mifare 1K                  |
| <b>Serial Number:</b>           | Not stated                 |
| <b>Hardware Version Number:</b> | Not Stated                 |
| <b>Firmware Version Number:</b> | Not Stated                 |
| <b>Additional Details:</b>      | Passive NFC-13.56 MHz Card |

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

The device under test was NFC module supporting operations on NFC 13.56 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>           | NFC 13.56 MHz                          |                     |
| <b>Type of Unit:</b>                | Transceiver                            |                     |
| <b>Supported NFC Mode(s):</b>       | NFC-A, NFC-B, NFC-F                    |                     |
| <b>Supported Data Rate(s):</b>      | 106 Kbps, 212 Kbps, 424 Kbps, 848 Kbps |                     |
| <b>Channel Spacing:</b>             | Single channel device                  |                     |
| <b>Transmit Frequency Range:</b>    | 13.56 MHz                              |                     |
| <b>Power Supply Requirement(s):</b> | Nominal                                | 5 V DC / 150 mA max |
| <b>Tested Temperature Range:</b>    | Minimum                                | -20 °C              |
|                                     | Maximum                                | +50 °C              |

**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    | Test Board                                          | enomatic   | E3_C1                | N/A           |
| 2    | EUT Flat Multicore Digital Communication Cable (3m) | HUNG FU    | Style 2651           | N/A           |
| 3    | AC Power Cable                                      | N/A        | N/A                  | N/A           |

## **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 13.56 MHz with maximum power in worst case mode: NFC-A- 848 Kbps\*

\* As per applicant's declaration the EUT will implement only NFC-A mode.

\*Multiple supported data rates (106 Kbps, 212 Kbps, 424 Kbps, 848 Kbps) were initially investigated to determine the above mentioned worst case data rate

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

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

#### **EUT Power Supply:**

- The EUT was powered via 5 V DC over a long communication cable (3m) from test board. The test board was powered via 120 VAC/60 Hz AC power supply.
- The AC conducted line emissions measurement were carried out with test board powered via 120 VAC /60 Hz & 240 VAC/60 Hz.

#### **Test Mode Activations:**

- The test modes were enabled via touch screen menu on test board.
- The NFC card was placed on the EUT.
- All measurements were performed in continuous transmitting modulated carrier at 13.56 MHz with maximum power in worst case mode: NFC-A- 848 Kbps\*.

#### **Radiated Measurements:**

- In accordance with ANSI C63.10 section 5.10.7, the EUT allows for the connection of external accessories, including external electrical control signals. Hence emission tests shall be performed with the EUT and accessories configured in a manner that tends to produce maximum emissions; therefore, all radiated tests were with EUT powered via AC/DC power adapter 120 VAC / 60 Hz.
- 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 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 80 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.
- EMC32 V10.1.0 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 AC Conducted Spurious Emissions

#### Test Summary:

|                            |                |            |              |
|----------------------------|----------------|------------|--------------|
| Test Engineer:             | Vladimir Eppel | Test Date: | 15 July 2020 |
| Test Sample Serial Number: | B00351         |            |              |
| Test Site Identification   | SR 7/8         |            |              |

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

#### Environmental Conditions:

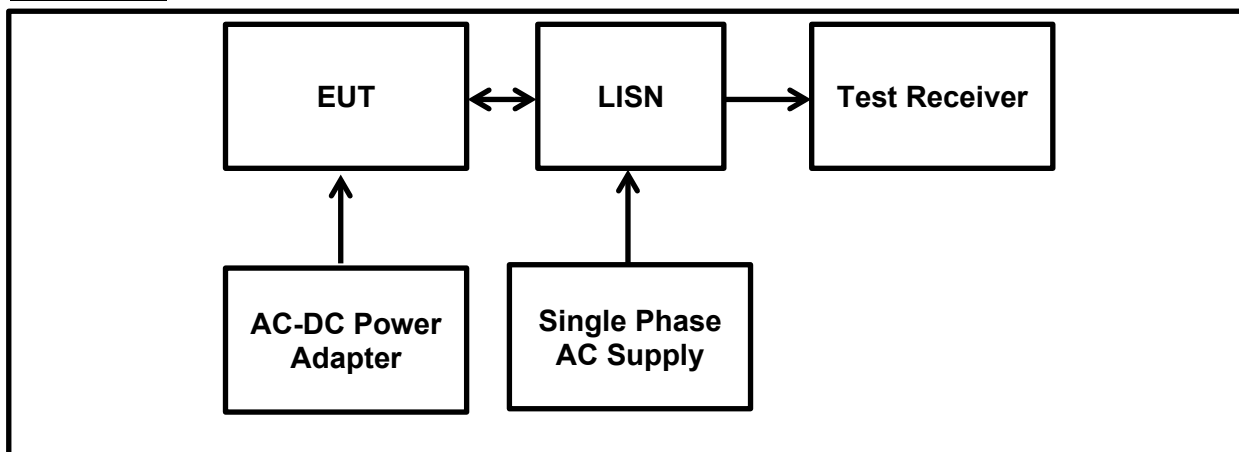
|                        |    |
|------------------------|----|
| Temperature (°C):      | 23 |
| Relative Humidity (%): | 41 |

#### Settings of the Instrument

|          |                          |
|----------|--------------------------|
| Detector | Quasi Peak/ Average Peak |
|----------|--------------------------|

#### Note(s):

- For AC conducted line emissions measurements the EUT was powered via 5 V DC using test board which was connected to 120 VAC / 60 Hz single phase supply via a LISN.
- In accordance with FCC KDB 174176 Q4, tests were performed with a 240 VAC 60 Hz single phase supply as this was within the voltage range marked on the 100-240 VAC~50/60 Hz power supply.
- The EUT was configured on NFC 13.56 MHz : Single Channel.
- 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 the tables below.
- The final measured value, for the given emission, in the table below incorporates the cable loss.
- 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.
- 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.
- Measurement software used: Toyo EMI Software; CE measurement software EP5/CE Ver 4.0.1.
- In order to eliminate NFC 13.56 MHz coupling effect on the AC line, 2 x Ferrites (Manufacturer: WE | Model: 74272722) were put on the AC power cable on 120 V AC tests.
- In order to eliminate NFC 13.56 MHz coupling effect on the AC line, 2 x Ferrites (Manufacturer: WE | Model: 74272722) were put on the AC power cable on 240 V AC tests.

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

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

| Frequency (MHz) | Line | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|------|--------------------|--------------------|-------------|----------|
| 0.1507          | Live | 41.00              | 66.00              | 25.00       | Complied |
| 0.1741          | Live | 47.00              | 64.80              | 17.80       | Complied |
| 0.2163          | Live | 51.90              | 63.00              | 11.10       | Complied |
| 0.2363          | Live | 50.60              | 62.20              | 11.60       | Complied |
| 0.2627          | Live | 46.30              | 61.30              | 15.00       | Complied |
| 0.2822          | Live | 45.90              | 60.80              | 14.90       | Complied |
| 0.4275          | Live | 40.60              | 57.30              | 16.70       | Complied |
| 0.4507          | Live | 39.40              | 56.90              | 17.50       | Complied |
| 3.6649          | Live | 31.60              | 56.00              | 24.40       | Complied |

**Results: Live / Average / 120 VAC 60 Hz**

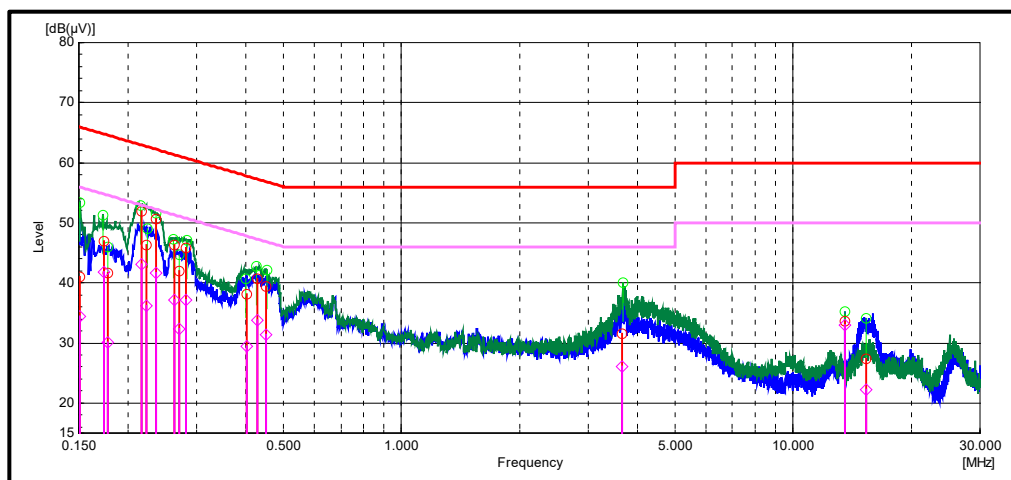
| Frequency (MHz) | Line | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|------|--------------------|--------------------|-------------|----------|
| 0.1507          | Live | 34.40              | 56.00              | 21.60       | Complied |
| 0.1741          | Live | 41.80              | 54.80              | 13.00       | Complied |
| 0.2163          | Live | 43.10              | 53.00              | 9.90        | Complied |
| 0.2363          | Live | 41.60              | 52.20              | 10.60       | Complied |
| 0.2627          | Live | 37.20              | 51.30              | 14.10       | Complied |
| 0.2822          | Live | 37.10              | 50.80              | 13.70       | Complied |
| 0.4275          | Live | 33.80              | 47.30              | 13.50       | Complied |
| 0.4507          | Live | 31.30              | 46.90              | 15.60       | Complied |
| 3.6649          | Live | 26.10              | 46.00              | 19.90       | Complied |

**Results: Neutral / Quasi Peak / 120 VAC 60 Hz**

| Frequency (MHz) | Line    | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|---------|--------------------|--------------------|-------------|----------|
| 0.1780          | Neutral | 41.60              | 64.60              | 23.00       | Complied |
| 0.2232          | Neutral | 46.30              | 62.70              | 16.40       | Complied |
| 0.2703          | Neutral | 42.00              | 61.10              | 19.10       | Complied |
| 0.4015          | Neutral | 38.00              | 57.80              | 19.80       | Complied |
| 13.5612         | Neutral | 33.70              | 60.00              | 26.30       | Complied |
| 15.3357         | Neutral | 27.40              | 60.00              | 32.60       | Complied |

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

| Frequency (MHz) | Line    | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|---------|--------------------|--------------------|-------------|----------|
| 0.1780          | Neutral | 30.00              | 54.60              | 24.60       | Complied |
| 0.2232          | Neutral | 36.20              | 52.70              | 16.50       | Complied |
| 0.2703          | Neutral | 32.40              | 51.10              | 18.70       | Complied |
| 0.4015          | Neutral | 29.40              | 47.80              | 18.40       | Complied |
| 13.5612         | Neutral | 32.90              | 50.00              | 17.10       | Complied |
| 15.3357         | Neutral | 22.30              | 50.00              | 27.70       | Complied |

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

*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**

| Frequency (MHz) | Line | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|------|--------------------|--------------------|-------------|----------|
| 0.1508          | Live | 41.80              | 66.00              | 24.20       | Complied |
| 0.2128          | Live | 49.90              | 63.10              | 13.20       | Complied |
| 0.2240          | Live | 49.70              | 62.70              | 13.00       | Complied |
| 0.2386          | Live | 48.50              | 62.10              | 13.60       | Complied |
| 0.2593          | Live | 45.40              | 61.50              | 16.10       | Complied |
| 0.2893          | Live | 42.10              | 60.50              | 18.40       | Complied |
| 0.4293          | Live | 38.50              | 57.30              | 18.80       | Complied |

**Results: Live / Average / 240 VAC 60 Hz**

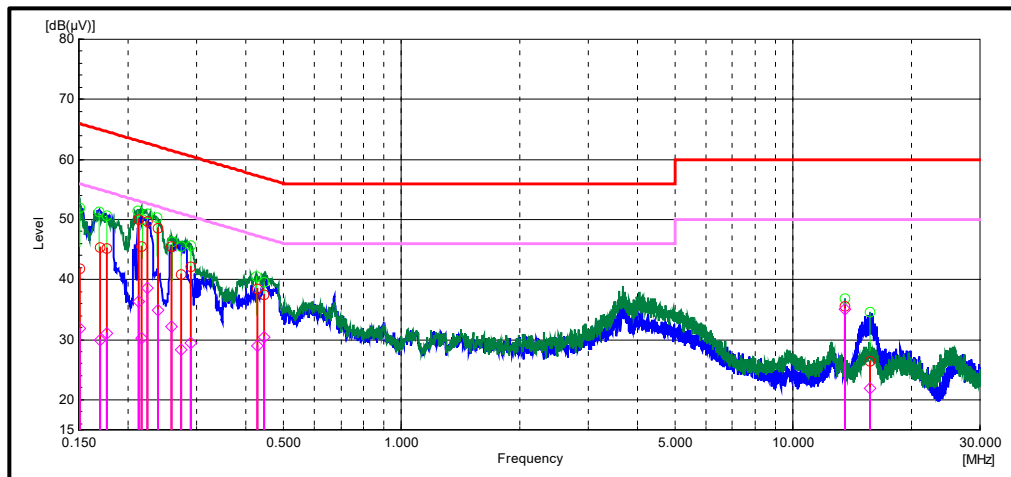
| Frequency (MHz) | Line | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|------|--------------------|--------------------|-------------|----------|
| 0.1508          | Live | 31.80              | 56.00              | 24.20       | Complied |
| 0.2128          | Live | 36.30              | 53.10              | 16.80       | Complied |
| 0.2240          | Live | 38.60              | 52.70              | 14.10       | Complied |
| 0.2386          | Live | 34.90              | 52.10              | 17.20       | Complied |
| 0.2593          | Live | 32.20              | 51.50              | 19.30       | Complied |
| 0.2893          | Live | 29.40              | 50.50              | 21.10       | Complied |
| 0.4293          | Live | 28.90              | 47.30              | 18.40       | Complied |

**Results: Neutral / Quasi Peak / 240 VAC 60 Hz**

| Frequency (MHz) | Line    | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|---------|--------------------|--------------------|-------------|----------|
| 0.1698          | Neutral | 45.40              | 65.00              | 19.60       | Complied |
| 0.1772          | Neutral | 45.20              | 64.60              | 19.40       | Complied |
| 0.2174          | Neutral | 45.50              | 62.90              | 17.40       | Complied |
| 0.2739          | Neutral | 40.90              | 61.00              | 20.10       | Complied |
| 0.4467          | Neutral | 37.50              | 56.90              | 19.40       | Complied |
| 13.5617         | Neutral | 35.60              | 60.00              | 24.40       | Complied |
| 15.6812         | Neutral | 26.30              | 60.00              | 33.70       | Complied |

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

| Frequency (MHz) | Line    | Level (dB $\mu$ V) | Limit (dB $\mu$ V) | Margin (dB) | Result   |
|-----------------|---------|--------------------|--------------------|-------------|----------|
| 0.1698          | Neutral | 30.00              | 55.00              | 25.00       | Complied |
| 0.1772          | Neutral | 31.00              | 54.60              | 23.60       | Complied |
| 0.2174          | Neutral | 30.20              | 52.90              | 22.70       | Complied |
| 0.2739          | Neutral | 28.30              | 51.00              | 22.70       | Complied |
| 0.4467          | Neutral | 30.40              | 46.90              | 16.50       | Complied |
| 13.5617         | Neutral | 35.10              | 50.00              | 14.90       | Complied |
| 15.6812         | Neutral | 21.90              | 50.00              | 28.10       | Complied |

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

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

**5.2.2. Transmitter 20 dB Bandwidth****Test Summary:**

|                                   |              |                    |                   |
|-----------------------------------|--------------|--------------------|-------------------|
| <b>Test Engineer:</b>             | Krume Ivanov | <b>Test Dates:</b> | 22 September 2020 |
| <b>Test Sample Serial Number:</b> | B00351       |                    |                   |
| <b>Test Site Identification</b>   | SR 9         |                    |                   |

|                          |                                                                     |
|--------------------------|---------------------------------------------------------------------|
| <b>FCC Reference:</b>    | Part 15.215(c)                                                      |
| <b>Test Method Used:</b> | ANSI C63.10 Section 6.9.2 deviations in accordance with FCC Inquiry |

**Environmental Conditions:**

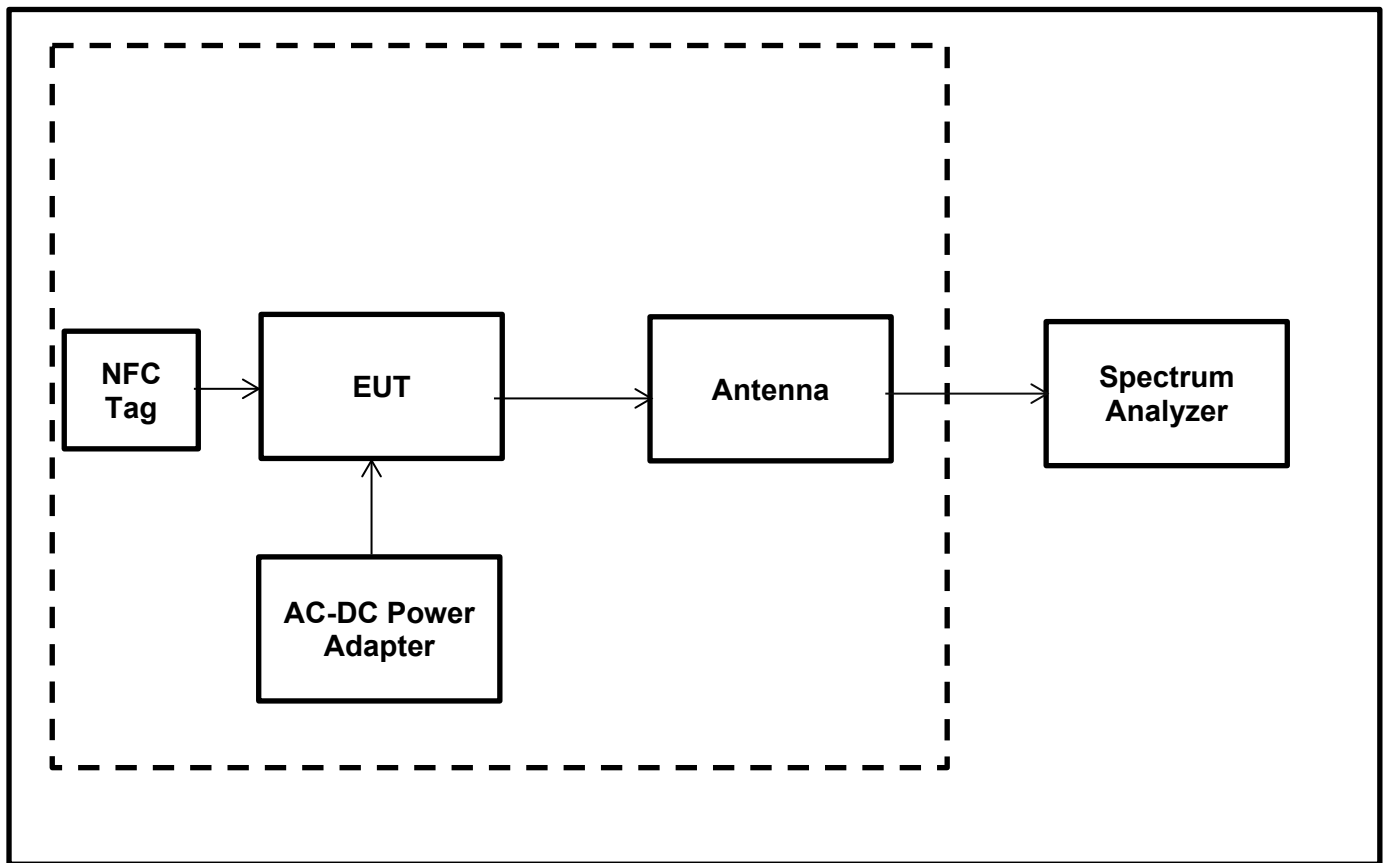
|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 26 |
| <b>Relative Humidity (%):</b> | 30 |

**Settings of the Instrument:**

|                   |                |
|-------------------|----------------|
| <b>RBW/VBW</b>    | 300 Hz / 1 kHz |
| <b>Span</b>       | 3 kHz          |
| <b>Sweep time</b> | 10 s           |
| <b>Detector</b>   | MaxPeak        |

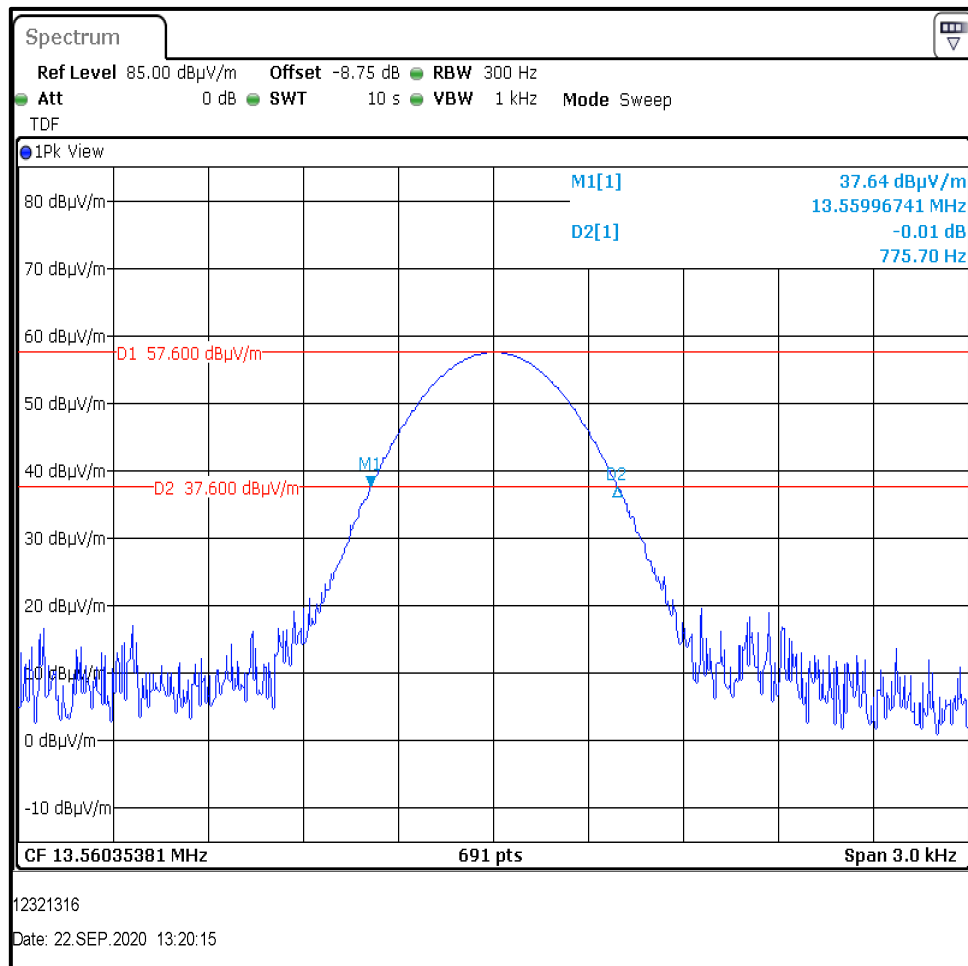
**Notes:**

1. In response to an FCC inquiry; reasonable deviations to test method ANSI C63.10 Section 6.9.2 were made to satisfy following requirements:
  - a. Larger values of RBW than those mentioned in ANSI C63.10 Section 6.9.2
  - b. Frequency span wide enough to capture all side bands of the signal
2. 20 dB BW determined with the lines at peak value and 20 dB below to peak. One normal and one delta marker used to measure 20 dB BW.
3. The emission shown on 20 dB Bandwidth plots show the single NFC channel at the frequency 13.56 MHz is the fundamental emission.

**Transmitter 20 dB Bandwidth (Continued)****Test Setup:**

**Transmitter 20 dB Bandwidth (continued)****Results: NFC-A / 848 Kbps:**

| NFC Channel | 20 dB Bandwidth (Hz) |
|-------------|----------------------|
| 13.56 MHz   | 775.70               |



NFC channel

**Result: Pass**

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

|                                   |             |                   |               |
|-----------------------------------|-------------|-------------------|---------------|
| <b>Test Engineer:</b>             | Sercan Usta | <b>Test Date:</b> | 24 April 2020 |
| <b>Test Sample Serial Number:</b> | B00351      |                   |               |
| <b>Test Site Identification</b>   | SR 1/2      |                   |               |

|                          |                         |
|--------------------------|-------------------------|
| <b>FCC Reference:</b>    | Part 15.225(a)(b)(c)(d) |
| <b>Test Method Used:</b> | ANSI C63.10 Section 6.4 |

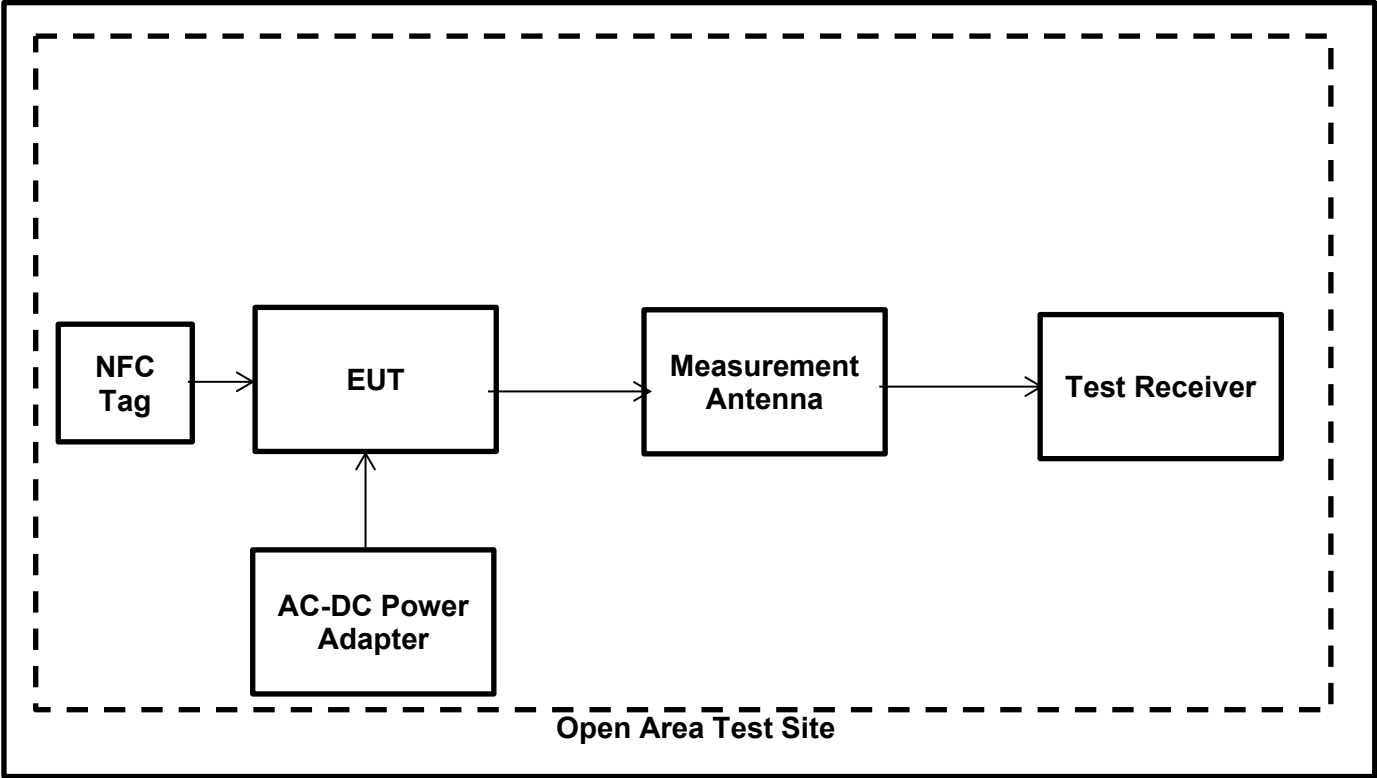
**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 22 |
| <b>Relative Humidity (%):</b> | 36 |

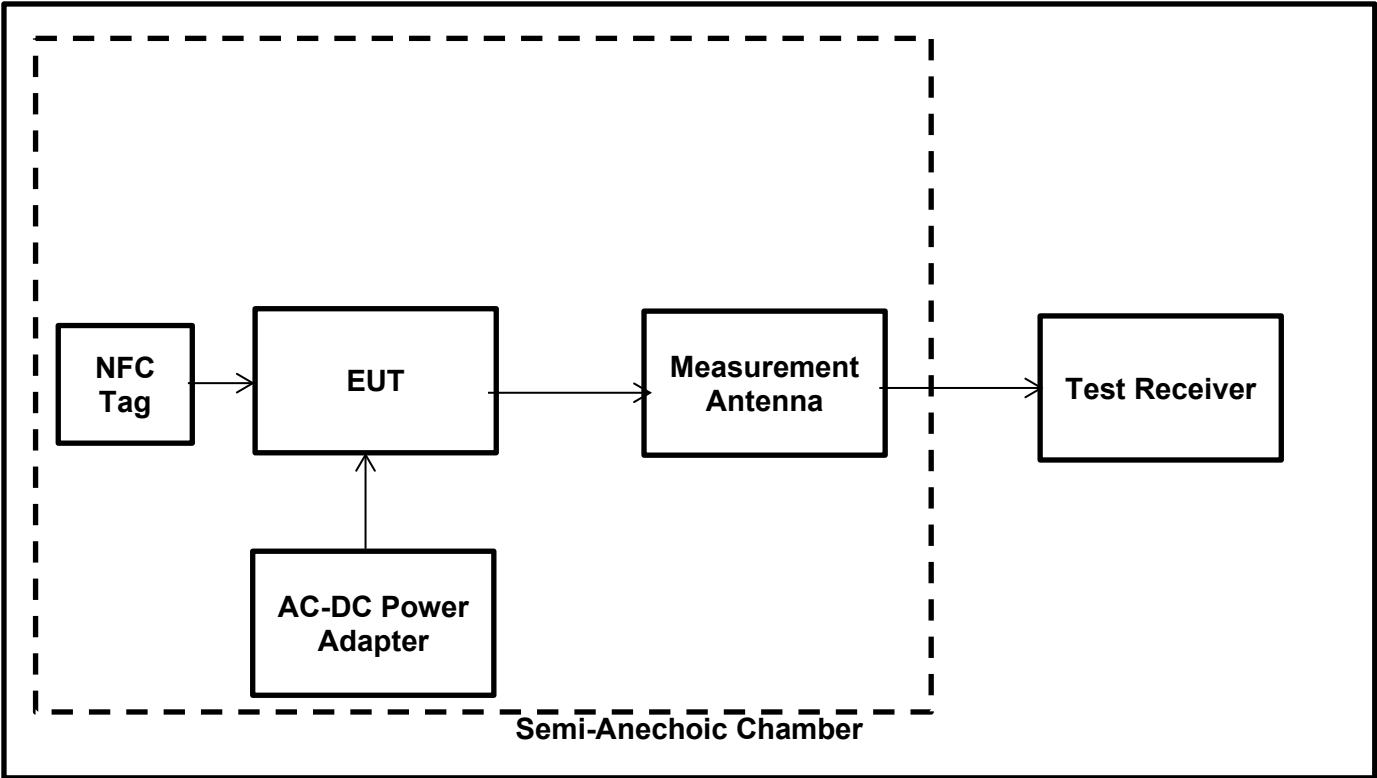
**Note(s):**

1. The limit is specified at a test distance of 30 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 a measurement distance of 3 m.
2. In accordance with 414788 D01 Radiated Test Site v01 & ANSI C63.10 clause 5.2 an alternative 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. The measurement was performed at a measurement distance of 3 m. This value was later extrapolated to a distance of 30 m by subtracting 40 dB from the result.
4. Pre-scan measurements were performed using a spectrum analyser with a peak detector and measurement bandwidth of 9 kHz. The fundamental field strength was maximized by rotating the measurement antenna and EUT.
5. The transducer factor on the measuring instrument was used to extrapolate the measured values from 30 m to 3 m using a distance extrapolation factor of 40 dB/decade.
6. A transducer factor including the fixed gain of the magnetic loop antenna, losses of the RF cable used to connect the antenna to the spectrum analyser was also taken into account to the result.

**Transmitter Fundamental Field strength test setup**  
**Open Area Test Site**

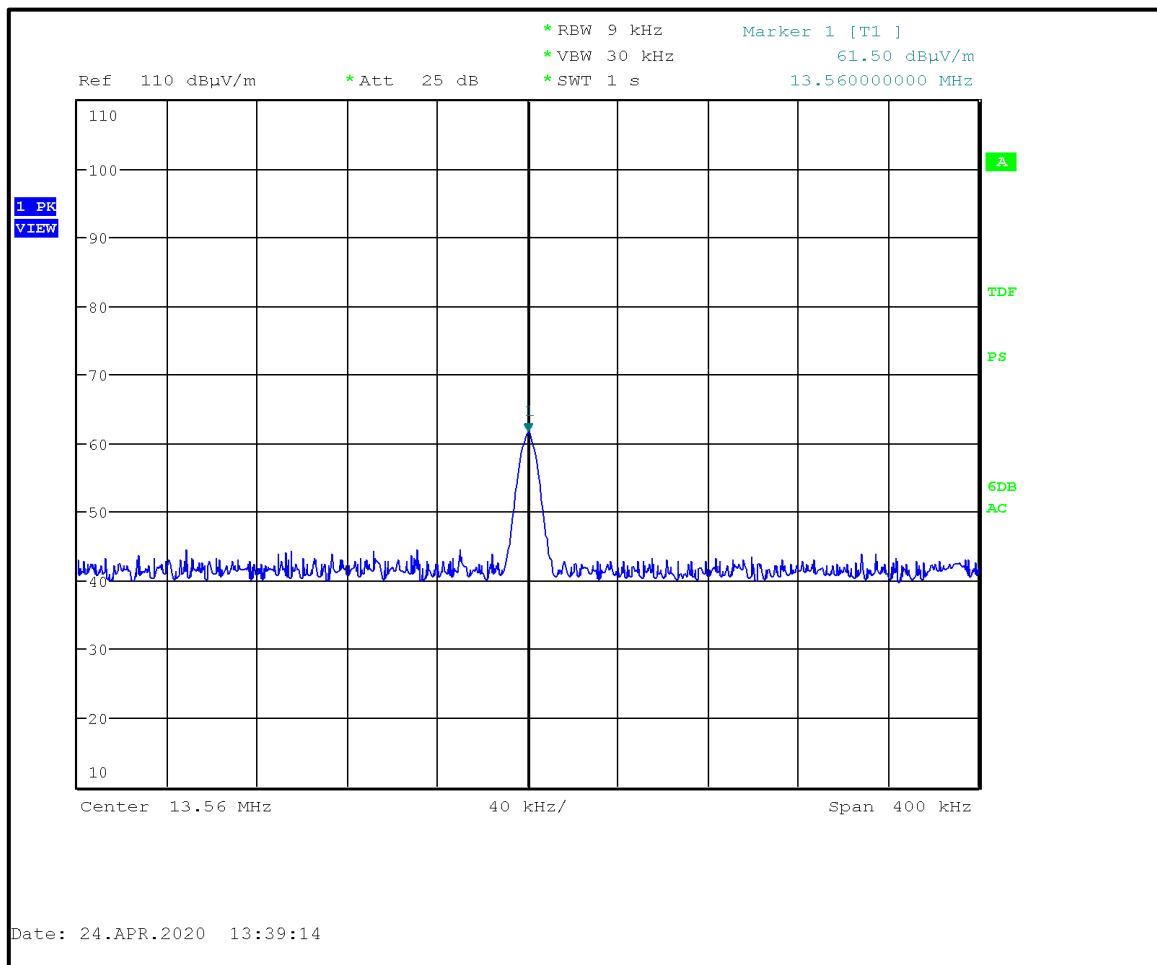


**Semi Anechoic Chamber**



**Transmitter Radiated Emissions (continued)****Results: NFC-A / 848 Kbps:**

| Frequency (MHz) | Antenna Polarity | Level at 3 m (dB $\mu$ V/m) | Deviation from OATS to SAC (dB) | Level at 3 m (dB $\mu$ V/m) with deviation added | Level at 30 m (dB $\mu$ V/m) | Limit at 30 m (dB $\mu$ V/m) | Margin (dB) | Result |
|-----------------|------------------|-----------------------------|---------------------------------|--------------------------------------------------|------------------------------|------------------------------|-------------|--------|
| 13.56           | Vertical         | 61.50                       | 1.38                            | 62.88                                            | 22.88                        | 84.0                         | 61.12       | Pass   |

**Result: Pass**

Fundamental field strength and spectrum mask / measured at 3 meters extrapolated to 30 meters / measured in a semi-anechoic chamber

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

|                                   |             |                   |             |
|-----------------------------------|-------------|-------------------|-------------|
| <b>Test Engineer:</b>             | Sercan Usta | <b>Test Date:</b> | 15 May 2020 |
| <b>Test Sample Serial Number:</b> | B00351      |                   |             |
| <b>Test Site Identification</b>   | SR 1/2      |                   |             |

|                          |                                       |
|--------------------------|---------------------------------------|
| <b>FCC Reference:</b>    | Parts 15.225(d) & 15.209(a)           |
| <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:**

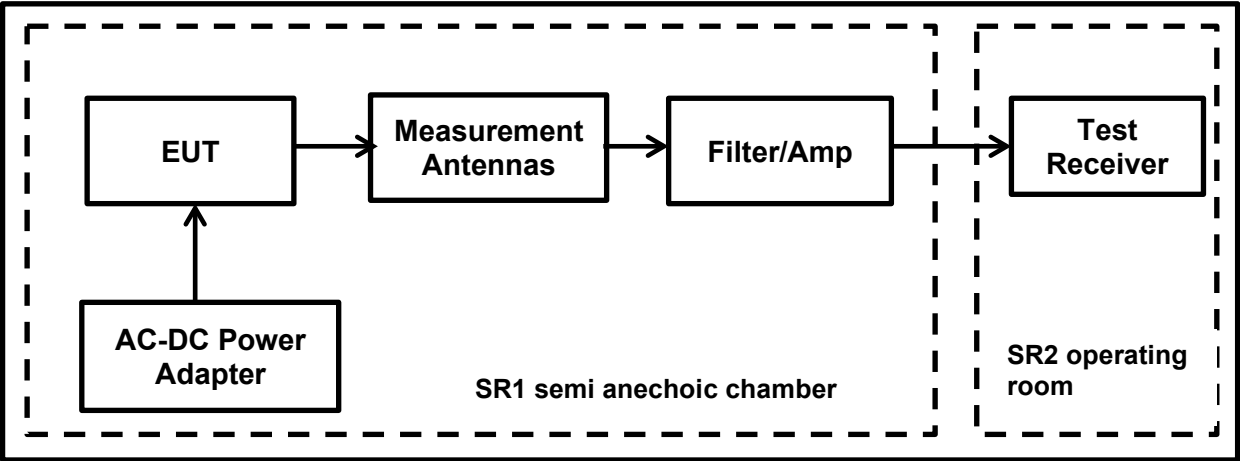
|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 31 |

**Note(s):**

- In accordance with 414788 D01 Radiated Test Site v01 & ANSI C63.10 clause 5.2 an alternative test site may be used. Therefore, the measurement was performed in a Semi Anechoic Chamber.
- The limits are specified at 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 a measurement distance of 3 m.
- 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 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.
- 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 1 m.
- 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: Max-Peak detector
  - Trace Mode: Max Hold
- The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
- All other emissions shown on the pre-scan plots were investigated and found to be below the system noise floor.
- The emissions shown at frequencies approximately 13.56 MHz on the 9 kHz to 30 MHz plots are the EUT's NFC 13.56 MHz fundamental for the tested channel.

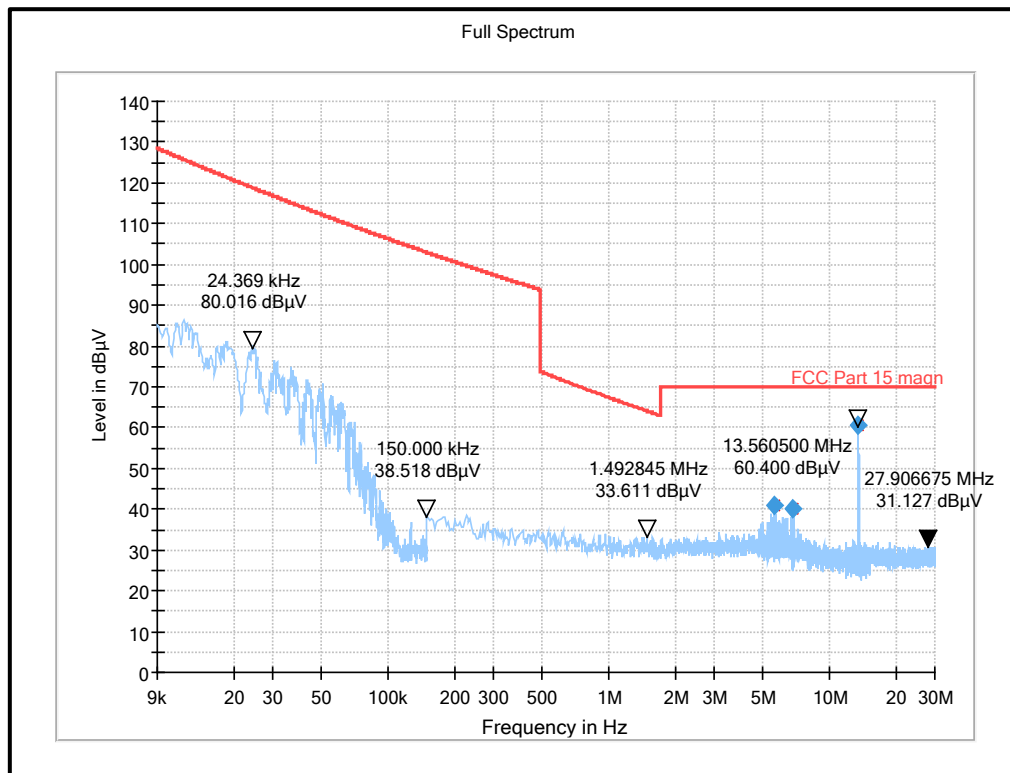
**Transmitter Radiated Spurious Emission (continued)**

**Test setup:**



**Transmitter Radiated Emissions (continued)****Results: NFC-A / 848 Kbps:**

| Frequency (MHz) | Loop Antenna Orientation | MaxPeak Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|--------------------------|------------------------------|----------------------|-------------|----------|
| 5.580915        | 90° to EUT               | 41.05                        | 69.50                | 28.45       | Complied |
| 6.784350        | 90° to EUT               | 40.14                        | 69.50                | 29.36       | Complied |

**Result: Pass**

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

|                                   |             |                   |               |
|-----------------------------------|-------------|-------------------|---------------|
| <b>Test Engineer:</b>             | Sercan Usta | <b>Test Date:</b> | 24 April 2020 |
| <b>Test Sample Serial Number:</b> | B00351      |                   |               |
| <b>Test Site Identification</b>   | SR 1/2      |                   |               |

|                          |                                       |
|--------------------------|---------------------------------------|
| <b>FCC Reference:</b>    | Parts 15.225(d) & 15.209(a)           |
| <b>Test Method Used:</b> | ANSI C63.10:2013 Sections 6.3 and 6.5 |
| <b>Frequency Range:</b>  | 30 MHz to 1000 MHz                    |

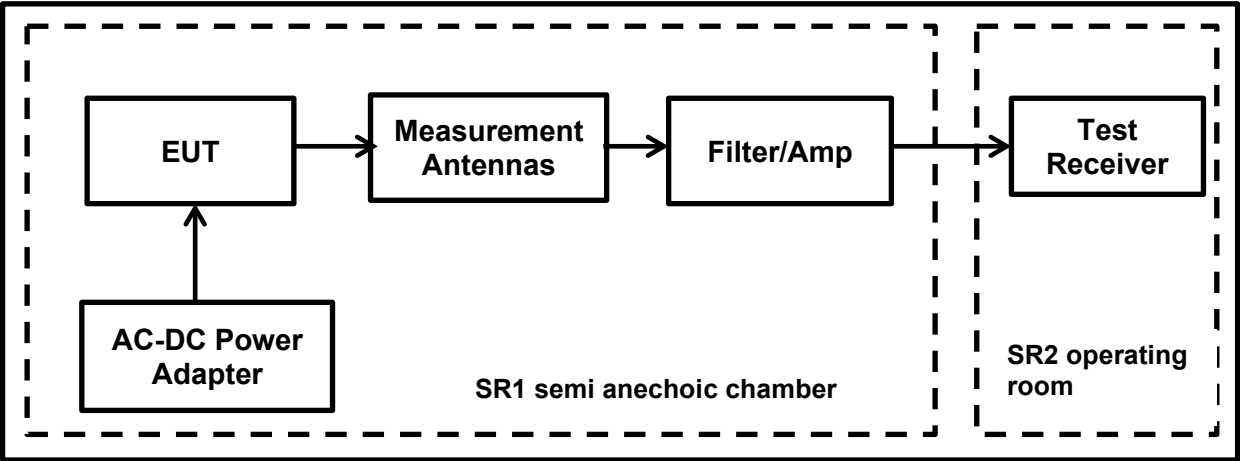
**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 31 |

**Note(s):**

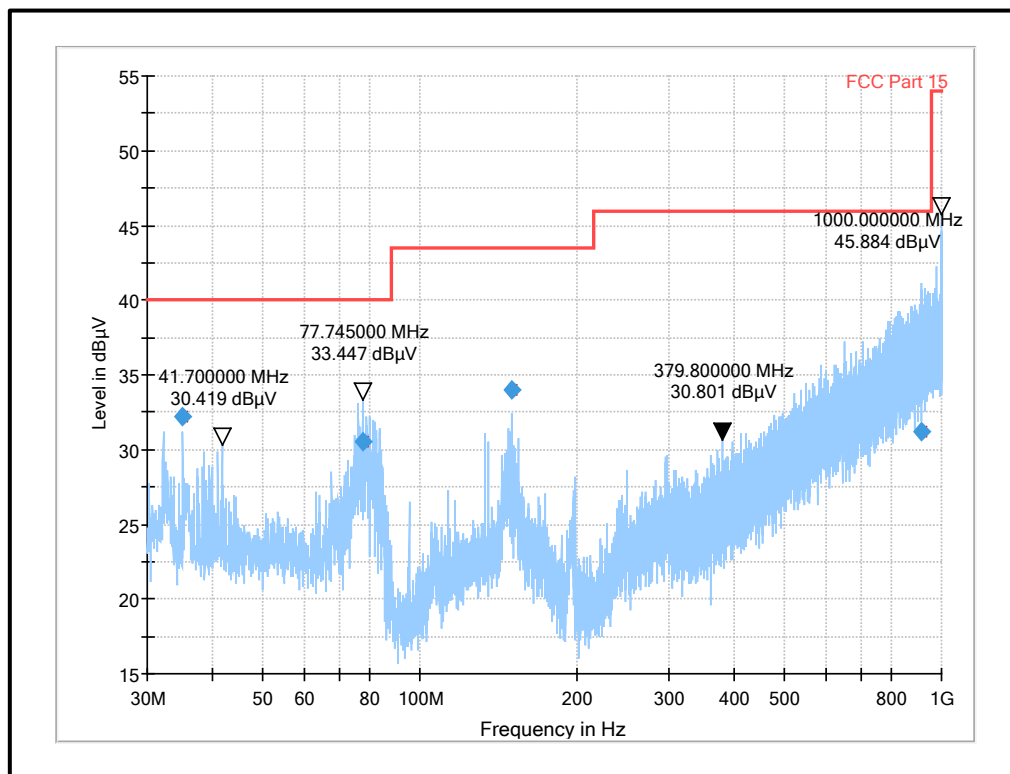
1. Measurements below 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement 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 final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss. Final measurements were performed on the marker frequencies and the results entered into the table below.
4. All other emissions shown on the pre-scan plot were investigated and found to be below the measurement system noise floor.

**Transmitter Radiated Spurious Emission (continued)**  
**Test Setup:**



**Transmitter Radiated Emissions (continued)****Results: NFC-A / 848 Kbps**

| Frequency (MHz) | Antenna Polarization | Max Peak Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|----------------------|-------------------------------|----------------------|-------------|----------|
| 35.13           | Vertical             | 32.22                         | 40.00                | 7.78        | Complied |
| 77.75           | Vertical             | 30.48                         | 40.00                | 9.52        | Complied |
| 150.02          | Vertical             | 33.95                         | 43.50                | 9.55        | Complied |
| 915.13          | Vertical             | 31.15                         | 46.00                | 14.85       | Complied |

**Result: Pass**

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

|                                   |              |                   |               |
|-----------------------------------|--------------|-------------------|---------------|
| <b>Test Engineer:</b>             | Krume Ivanov | <b>Test Date:</b> | 29 April 2020 |
| <b>Test Sample Serial Number:</b> | B00351       |                   |               |
| <b>Test Site Identification</b>   | SR 9         |                   |               |

|                          |                                     |
|--------------------------|-------------------------------------|
| <b>FCC Reference:</b>    | Part 15.225(e)                      |
| <b>Test Method Used:</b> | ANSI C63.10 Section 6.8.1 and 6.8.2 |

**Environmental Conditions:**

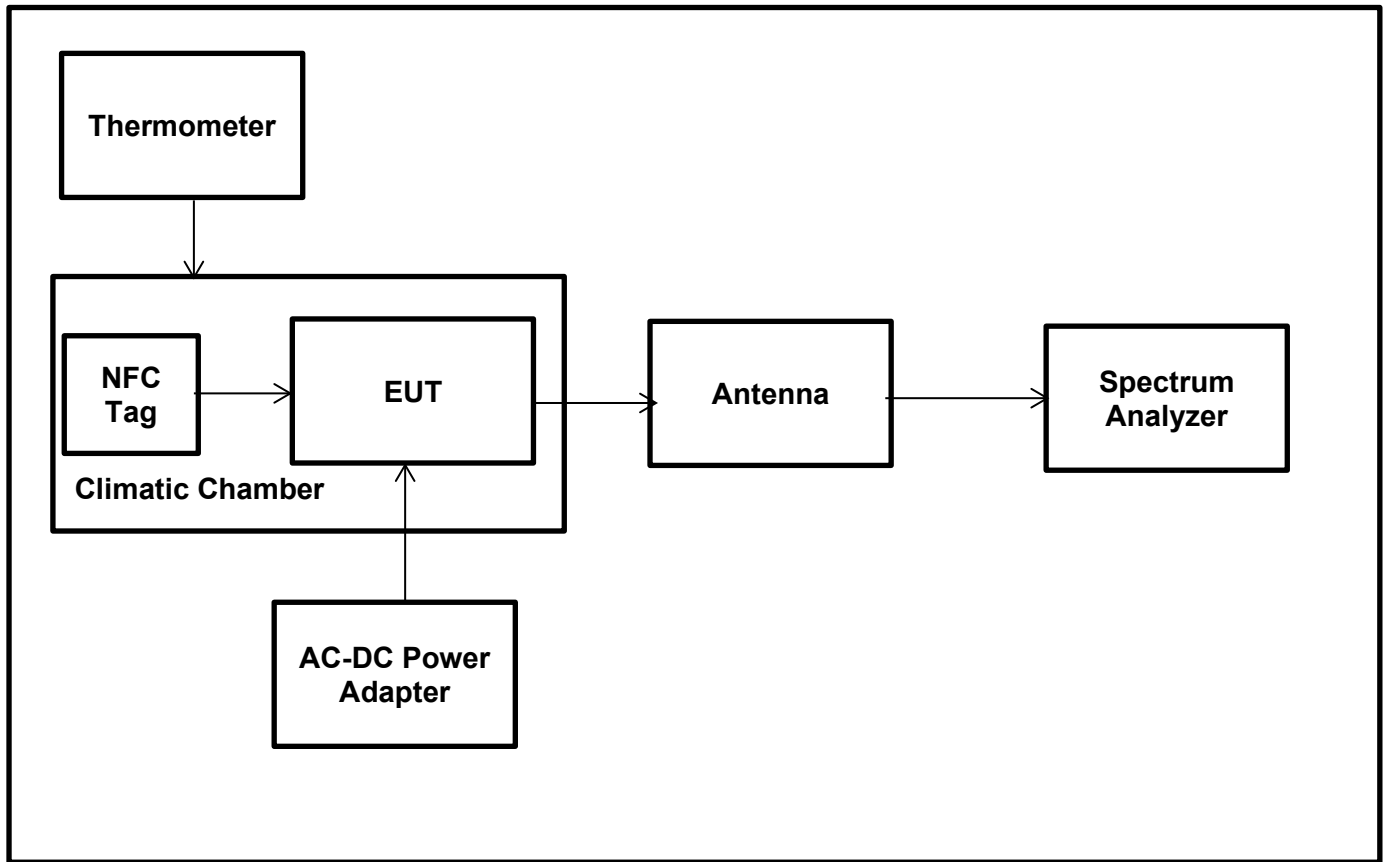
|                                       |    |
|---------------------------------------|----|
| <b>Ambient Temperature (°C):</b>      | 26 |
| <b>Ambient Relative Humidity (%):</b> | 30 |

**Settings of the Instrument:**

|                        |                |
|------------------------|----------------|
| <b>RBW/VBW</b>         | 30 Hz / 30 kHz |
| <b>Span</b>            | 4 kHz          |
| <b>Sweep Time</b>      | Auto           |
| <b>Sweep Mode</b>      | Single Sweep   |
| <b>Detector</b>        | Peak           |
| <b>Marker Function</b> | 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. As EUT was powered via 5 V DC using external AC-DC power supply; for voltage variations primary supply voltage (120 V AC) of AC-DC Power Supply was set to 85% of rated primary supply voltage & 115 % of rated primary supply voltage.
3. 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.
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 a 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)****Transmitter Frequency Stability Emissions test setup for temperature variations:**

**Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)****Results: NFC-A / 848 Kbps / Temperature Variations**

| Extreme Temperature (°C) | Time after EUT Power-up | Measured Frequency | Frequency Error |       | Frequency Error Limits |       | Result   |
|--------------------------|-------------------------|--------------------|-----------------|-------|------------------------|-------|----------|
|                          |                         |                    | %               | ppm   | %                      | ppm   |          |
| -20                      | at 0 minutes            | 13.560364884       | 0.002691        | 2.691 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560360499       | 0.002659        | 2.659 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560364701       | 0.002690        | 2.690 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560345539       | 0.002548        | 2.548 | ± 0.01                 | ± 100 | Complied |
| -10                      | at 0 minutes            | 13.560393809       | 0.002904        | 2.904 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560390805       | 0.002882        | 2.882 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560389123       | 0.002870        | 2.870 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560388357       | 0.002864        | 2.864 | ± 0.01                 | ± 100 | Complied |
| 0                        | at 0 minutes            | 13.560402998       | 0.002972        | 2.972 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560402958       | 0.002972        | 2.972 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560402809       | 0.002971        | 2.971 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560402694       | 0.002970        | 2.970 | ± 0.01                 | ± 100 | Complied |
| +10                      | at 0 minutes            | 13.560394832       | 0.002912        | 2.912 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560395790       | 0.002919        | 2.919 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560396404       | 0.002923        | 2.923 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560396518       | 0.002924        | 2.924 | ± 0.01                 | ± 100 | Complied |
| +20                      | at 0 minutes            | 13.560365014       | 0.002692        | 2.692 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560374440       | 0.002761        | 2.761 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560377801       | 0.002786        | 2.786 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560377345       | 0.002783        | 2.783 | ± 0.01                 | ± 100 | Complied |
| +30                      | at 0 minutes            | 13.560348670       | 0.002571        | 2.571 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560348670       | 0.002571        | 2.571 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560349753       | 0.002579        | 2.579 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560350574       | 0.002585        | 2.585 | ± 0.01                 | ± 100 | Complied |
| +40                      | at 0 minutes            | 13.560337017       | 0.002485        | 2.485 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560330311       | 0.002436        | 2.436 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560327761       | 0.002417        | 2.417 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560328009       | 0.002419        | 2.419 | ± 0.01                 | ± 100 | Complied |
| +50                      | at 0 minutes            | 13.560320537       | 0.002364        | 2.364 | ± 0.01                 | ± 100 | Complied |
|                          | at 2 minutes            | 13.560318828       | 0.002351        | 2.351 | ± 0.01                 | ± 100 | Complied |
|                          | at 5 minutes            | 13.560318666       | 0.002350        | 2.350 | ± 0.01                 | ± 100 | Complied |
|                          | at 10 minutes           | 13.560319027       | 0.002353        | 2.353 | ± 0.01                 | ± 100 | Complied |

**Result: Pass**

**Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)****Results: NFC-A / 848 Kbps / Voltage Variations**

| Extreme Voltage Conditions           | Extreme AC Voltage (V) | Rated Supply Voltage DC Voltage (V) | Measured Frequency (MHz) | Frequency Error |      | Frequency Error Limits |       | Result   |
|--------------------------------------|------------------------|-------------------------------------|--------------------------|-----------------|------|------------------------|-------|----------|
|                                      |                        |                                     |                          | %               | ppm  | %                      | ppm   |          |
| 85% of Primary Supply Voltage        | 102                    | 5.0                                 | 13.560364884             | 0.002691        | 2.69 | ± 0.01                 | ± 100 | Complied |
| 100% of Rated Primary Supply Voltage | 120                    | 5.0                                 | 13.560360499             | 0.002659        | 2.66 | ± 0.01                 | ± 100 | Complied |
| 115% of Primary Supply Voltage       | 138                    | 5.0                                 | 13.560364701             | 0.002690        | 2.69 | ± 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               |
| Transmitter Fundamental Field Strength  | 95%                  | ±3.10 dB               |
| Transmitter Radiated Spurious Emissions | 95%                  | ±3.10 dB               |
| Transmitter Frequency Stability         | 95%                  | ±92 Hz                 |
| Transmitter 20 dB Bandwidth             | 95%                  | ±0.87 %                |

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        | 11/07/2019       | 36                  |
| 460     | Deisl                         | Turntable                       | DT 4250 S  | n/a               | n/a              | n/a                 |
| 465     | Schwarzbeck                   | Antenna, Trilog Broadband       | VULB 9168  | 9168-240          | 20/03/2019       | 24                  |
| 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        | 09/07/2019       | 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                 |

### Test site: SR 7/8

| ID  | Manufacturer    | Type                            | Model     | Serial          | Calibration Date | Cal. Cycle (months) |
|-----|-----------------|---------------------------------|-----------|-----------------|------------------|---------------------|
| 23  | Rohde & Schwarz | Artificial Mains                | ESH3-Z5   | 831767/013      | 07/07/2020       | 12                  |
| 349 | Rohde & Schwarz | Receiver, EMI Test              | ESIB7     | 836697/009      | 09/07/2020       | 12                  |
| 351 | Rohde & Schwarz | network, Artificial Mains       | ESH3-Z5   | 862770/018      | 07/07/2020       | 12                  |
| 616 | Rohde & Schwarz | ISN                             | ENY81-CA6 | 101656          | 07/07/2020       | 12                  |
| -/- | Testo           | Thermo-Hygrometer               | 608-H1    | 08              | lab verification | n/a                 |
| 327 | SPS             | AC/DC power distribution system | PAS 5000  | A2464 00/1 0200 | lab verification | n/a                 |

### Test site: SR 9

| ID  | Manufacturer        | Type                            | Model               | Serial          | Calibration Date                            | Cal. Cycle (months) |
|-----|---------------------|---------------------------------|---------------------|-----------------|---------------------------------------------|---------------------|
| 621 | Ahlborn-Almemo      | Temperatur-/ Feuchtemessgerät   | MA2470-S2           | H16080099       | 03/05/2019                                  | 24                  |
| 625 | Schwarzbeck         | Antenna, H-field                | HFSL 7101           | 109             | lab verification only relative measurements | n/a                 |
| 637 | Rohde & Schwarz     | Spectrum Analyser               | FSV40               | 101587          | 08/07/2020                                  | 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                 |
| 194 | Hewlett Packard     | Digital Multimeter              | 34401A              | US36020807      | 08/07/2020                                  | 12                  |
| 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

48.765746, 9.250684



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          | -       | -               |

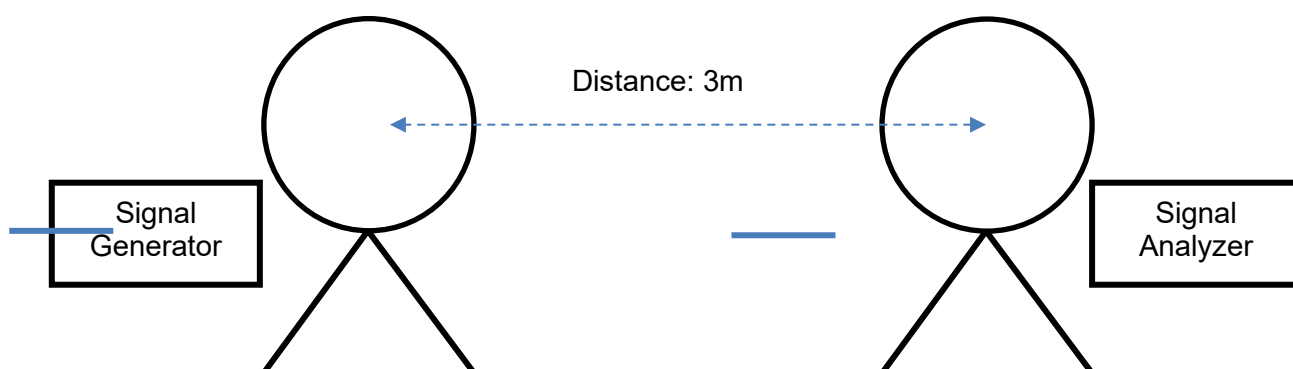
The transmit signal to the ETS Lindgren loop antenna is supplied by the SML signal generator.

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

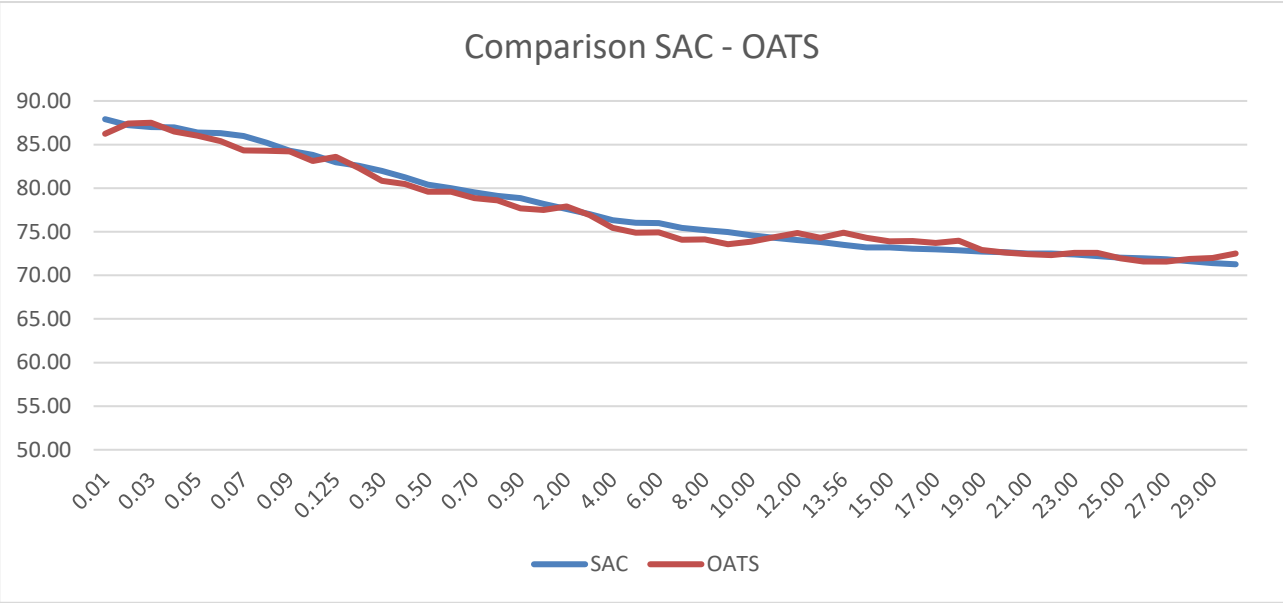
| Frequency (MHz)            | 0.01  | 0.02  | 0.03  | 0.04  | 0.05  | 0.06  | 0.07  | 0.08  | 0.09  | 0.10  | 0.125 | 0.20  |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| SR1 Measured power (dBμV)  | 87.91 | 87.22 | 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                                                                                                                                                                                                                                                                                            | -                | -        | Initial Version                                                              |
| <b>Test Report Version 1.1 supersede Version 1.0 with immediate effect</b><br>Test Report No. UL-RPT-RP-12321316-616-FCC Version 1.1, Issue Date 04 NOVEMBER 2020 replaces<br>Test Report No. UL-RPT-RP-12321316-616-FCC Version 1.0, Issue Date 26 OCTOBER 2020, which is no longer valid.    |                  |          |                                                                              |
| 1.1                                                                                                                                                                                                                                                                                            | -                | -        |                                                                              |
|                                                                                                                                                                                                                                                                                                | 1                | -        | Model No. corrected                                                          |
|                                                                                                                                                                                                                                                                                                | 7                | 3.1      | Model No. & Firmware Version corrected & reference to Software Version added |
| <b>Test Report Version 1.2 supersede Version 1.1 with immediate effect</b><br>Test Report No. UL-RPT-RP-12321316-616-ISED Version 1.2, Issue Date 18 NOVEMBER 2020 replaces<br>Test Report No. UL-RPT-RP-12321316-616-ISED Version 1.1, Issue Date 04 NOVEMBER 2020, which is no longer valid. |                  |          |                                                                              |
| 1.2                                                                                                                                                                                                                                                                                            | as below         | as below | Current Version                                                              |
|                                                                                                                                                                                                                                                                                                | 8                | 3.4      | Tested Temperature Range corrected                                           |
|                                                                                                                                                                                                                                                                                                | 20               | 5.2.3    | Note 1 test distance reference corrected                                     |
|                                                                                                                                                                                                                                                                                                | 23               | 5.2.4    | Note 2 test distance reference corrected                                     |
|                                                                                                                                                                                                                                                                                                | 25               | 5.2.4    | Transmitter Radiated Emissions Limits & Margin corrected                     |
|                                                                                                                                                                                                                                                                                                | 34               | 7        | Test site: SR 9 Used Equipment List Calibration Date updated                 |

END OF REPORT