

# TEST REPORT

## Electromagnetic Compatibility

**Report Reference No. .... :** REP009252

**Date of issue .....** 2023-03-30

**Test Report Verdict .....** PASS

**Testing Laboratory..... :** Nemko S.p.A.

**Address..... :** Via Del Carroccio, 4

**City .....** 20853 Biassono (MB)

**Country .....** Italy

**Testing location..... :** Described at clause 1.4

**Customer name..... :** TEXA S.p.A.

**Customer information..... :** Via I Maggio 9 31050 Monastier di Treviso TV - Italy

**Reference standards..... :** FCC CFR 47 Part 15 Subpart B

**Standard application .....** Full application

**Equipment under test .....** Vehicle diagnostic system with Bluetooth connectivity

**Trademark(s) .....** TEXA

**Manufacturer..... :** TEXA S.p.A.

**Model/Type reference .....** Described at clause 4.1

**Tests performed by .....** D. Guarnone



Firmato digitalmente da  
GUARNONE DANIELE  
Data: 2023.05.16 18:24:44  
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**Report approved by..... :** P. Barbieri



Firmato digitalmente da  
BARBIERI PAOLO  
Data: 2023.05.17 08:50:38  
+02'00'

## CONTENTS

|                                                                                           |    |
|-------------------------------------------------------------------------------------------|----|
| 1. GENERAL INFORMATION.....                                                               | 3  |
| 1.1 Project history .....                                                                 | 3  |
| 1.2 Symbol used in the report .....                                                       | 3  |
| 1.3 Date of sample(s) reception and tests .....                                           | 3  |
| 1.4 Testing location .....                                                                | 4  |
| 1.5 Environmental conditions .....                                                        | 4  |
| 1.6 Measurement uncertainty and assessment of conformity .....                            | 4  |
| 1.7 Instruments calibration table .....                                                   | 6  |
| 2. PRODUCT STANDARDS, TEST METHODS AND TECHNICAL PROCEDURES .....                         | 7  |
| 2.1 Standard(s) applied.....                                                              | 7  |
| 2.2 Test method(s) applied.....                                                           | 7  |
| 2.3 Nemko technical procedures.....                                                       | 7  |
| 3. SUMMARY OF TEST RESULTS AND VERDICTS .....                                             | 8  |
| 3.1 Measurement of electromagnetic disturbances emitted by the equipment under test ..... | 8  |
| 4. EQUIPMENT UNDER TEST .....                                                             | 9  |
| 4.1 EUT Identification .....                                                              | 9  |
| 4.2 EUT Power Supply.....                                                                 | 10 |
| 4.3 EUT Information declared by the Customer <sup>1</sup> .....                           | 10 |
| 4.4 EUT Operation Modes .....                                                             | 10 |
| 4.5 EUT Configuration Modes.....                                                          | 11 |
| 4.6 EUT Input/Output Ports.....                                                           | 11 |
| 4.7 EUT and Equipment Used During Test .....                                              | 12 |
| 4.8 EUT Electric/Block Diagram .....                                                      | 12 |
| 4.9 Information about radio module(s).....                                                | 13 |
| 5 TEST RESULTS .....                                                                      | 14 |
| 5.1 Radiated Emission .....                                                               | 14 |
| 5.2 Conducted emission .....                                                              | 21 |
| 6 EUT PHOTOS .....                                                                        | 24 |

## 1. GENERAL INFORMATION

### 1.1 Project history

| Report number | Modification to the report / comments | Date       |
|---------------|---------------------------------------|------------|
| REP009252     | First release                         | 2023-03-30 |
| --            | --                                    | --         |
| --            | --                                    | --         |
| --            | --                                    | --         |

### 1.2 Symbol used in the report

|                                                                                                                                                                                                                                                                                                       |                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> .....                                                                                                                                                                                                                                                             | The crossed square indicates that the listed condition, standard or equipment is applicable for this report.   |
| <input type="checkbox"/> .....                                                                                                                                                                                                                                                                        | The empty square indicates that the listed condition, standard or equipment is not applicable for this report. |
| NP (Not performed) .....                                                                                                                                                                                                                                                                              | Test case not performed according to customer request                                                          |
| N (Not applicable) .....                                                                                                                                                                                                                                                                              | Test case does not apply to the test object                                                                    |
| P (Pass) .....                                                                                                                                                                                                                                                                                        | Test object does meet the requirement                                                                          |
| F (Fail) .....                                                                                                                                                                                                                                                                                        | Test object does not meet the requirement                                                                      |
| <input type="checkbox"/> Comma (,) / <input checked="" type="checkbox"/> Dot (.) .....                                                                                                                                                                                                                | Symbol used as decimal separator throughout this report                                                        |
| Asterisk (*) .....                                                                                                                                                                                                                                                                                    | Symbol used to indicate a standard or a test not accredited by ACCREDIA                                        |
| EUT .....                                                                                                                                                                                                                                                                                             | Equipment Under Test                                                                                           |
| The results contained in this report reflect the results for this particular model(s) and serial number(s) and apply to the sample(s) as received. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. |                                                                                                                |

### 1.3 Date of sample(s) reception and tests

|                                         |            |
|-----------------------------------------|------------|
| Date of receipt of test sample(s) ..... | 2023-01-26 |
| Testing start date .....                | 2023-03-27 |
| Testing termination date .....          | 2023-03-30 |

## 1.4 Testing location

The tests have been performed in the place indicated below:

☒ Nemko premises location .....: Nemko S.p.A.  
Via Del Carroccio, 4  
20853 Biassono (MB) - Italy  
FCC site number: 682159

☐ Other location .....: --  
--  
--

## 1.5 Environmental conditions

The tests were carried out in the ranges of environmental conditions specified below:

Ambient temperature .....: 18-33 °C <sup>1</sup>

Relative Humidity .....: 25-70 % <sup>2</sup>

Atmospheric pressure .....: 860-1060 hPa

Notes:  
<sup>1</sup> For luminaire, temperature during tests was verified to be within 18 ÷ 30 °C  
<sup>2</sup> During ESD test, humidity was verified to be within 30 ÷ 60 %

The following instruments are used to monitor the environmental conditions:

| Equipment         | Trademark | Model    | Serial No.   |
|-------------------|-----------|----------|--------------|
| Thermo-hygrometer | Testo     | 175-H2   | 20012380/305 |
| Thermo-hygrometer | Testo     | 175-H2   | 38203337/703 |
| Barometer         | Castle    | GPB 3300 | 072015       |

## 1.6 Measurement uncertainty and assessment of conformity

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002. The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:

P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.

F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Hereafter Nemko's measurement uncertainties are reported:

| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Range                                                                                                       | Measurement Uncertainty | Notes |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------|-------|
| Radiated Disturbance                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Antenna distance 1 m, 3 m, 10 m<br>0.009 ÷ 200 MHz                                                          | 5.0 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Antenna distance 1 m, 3 m, 10 m<br>200 ÷ 1000 MHz                                                           | 5.2 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Antenna distance 1 m, 3 m, 10 m<br>1 ÷ 6 GHz                                                                | 5.2 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Antenna distance 1 m, 3 m<br>6 ÷ 18 GHz                                                                     | 5.5 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Antenna distance 1 m, 3 m<br>18 ÷ 40 GHz                                                                    | 7.2 dB                  | (1)   |
| Radiated Disturbance<br>with large loop antenna system (LLAS)                                                                                                                                                                                                                                                                                                                                                                                                               | 0.009 ÷ 30 MHz                                                                                              | 3.3 dB                  | (1)   |
| Conducted Disturbance                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.02 ÷ 150 kHz with AMN                                                                                     | 3.8 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 150 kHz ÷ 30 MHz with AMN                                                                                   | 3.4 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 150 kHz ÷ 30 MHz with AAN                                                                                   | 4.6 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 9 kHz ÷ 30 MHz with voltage probe                                                                           | 2.9 dB                  | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 150 kHz ÷ 30 MHz with current probe                                                                         | 2.9 dB                  | (1)   |
| Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10 Hz ÷ 1 kHz                                                                                               | 0.2 %                   | (1)   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 kHz ÷ 40 GHz                                                                                              | 10 <sup>-6</sup>        | (1)   |
| Electromagnetic fields (EMF)                                                                                                                                                                                                                                                                                                                                                                                                                                                | Magnetic, Electric and Electromagnetic fields: 0 Hz<br>÷ 40 GHz                                             | 25 %                    | (1)   |
| Electrical quantities (voltage, current,<br>resistance)                                                                                                                                                                                                                                                                                                                                                                                                                     | AC/DC Voltage 10 mV ÷ 1000 V 0÷100 kHz<br>AC/DC Current 0.1 mA ÷ 400 A 0÷1 kHz<br>Resistance 100 mΩ ÷ 10 MΩ | 2.5 %                   | (1)   |
| NOTES:<br>(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %<br>(2) The instruments used for this immunity test is according to the tolerances requested by the applicable standard<br>(3) The reported expanded uncertainty of measurement is related to the stimulus quantity |                                                                                                             |                         |       |

## 1.7 Instruments calibration table

Instrument cited in the report and not listed in this paragraph are not subject to calibration. The calibration is valid up to the last day of the due date month.

| Description                       | Manufacturer                | Model                     | Identifier    | Cal Date | Due Date |
|-----------------------------------|-----------------------------|---------------------------|---------------|----------|----------|
| EMI Receiver                      | Rohde & Schwarz             | ESW44                     | 101620        | 2022-08  | 2023-08  |
| EMI Receiver                      | Rohde & Schwarz             | ESU8                      | 100202        | 2022-09  | 2023-09  |
| Antenna Trilog 25MHz - 8GHz       | Schwarzbeck Mess-Elektronik | VULB9162                  | 9162-025      | 2021-07  | 2024-07  |
| Antenna Trilog 25-2000 MHz        | Schwarzbeck Mess-Elektronik | VULB9168                  | 9168-242      | 2021-06  | 2024-06  |
| Antenna 1 - 18 GHz                | Schwarzbeck Mess-Elektronik | STLP9148                  | STLP 9148-152 | 2021-09  | 2024-09  |
| Antenna 1 - 18 GHz                | Schwarzbeck Mess-Elektronik | STLP9148                  | STPL 9148-123 | 2021-06  | 2024-06  |
| Double Ridge Horn Antenna         | RFSpin                      | DRH40                     | 061106A40     | 2020-04  | 2023-04  |
| Broadband Bench Top Amplifier     | Sage                        | STB-1834034030-KFKF-L1    | 18490-01      | 2022-05  | 2023-05  |
| Broadband Amplifier               | Schwarzbeck Mess-Elektronik | BBV9718C                  | 00121         | 2022-03  | 2023-03  |
| Preamplifier                      | Schwarzbeck Mess-Elektronik | BBV9718                   | BBV9718-137   | 2022-04  | 2023-04  |
| Semi-anechoic chamber             | Nemko S.p.a.                | 10m semi-anechoic chamber | 530           | 2021-09  | 2023-09  |
| Common Mode Absorption Device     | Schwarzbeck Mess-Elektronik | CMAD1614                  | 00041         | 2022-05  | 2023-05  |
| LISN                              | Rohde & Schwarz             | ENV432                    | 101714        | 2022-08  | 2023-08  |
| LISN                              | Rohde & Schwarz             | ESH2-Z5                   | 872 460/041   | 2022-10  | 2023-10  |
| V-network                         | Rohde & Schwarz             | ESH3-Z5                   | 840 731/004   | 2022-08  | 2023-08  |
| Oscilloscope                      | Agilent                     | 54846A                    | MY40000254    | 2022-07  | 2023-07  |
| Multimeter                        | Rohde & Schwarz             | HMC8012                   | 101577        | 2022-07  | 2023-07  |
| Barometer                         | Castle                      | GBP 3300                  | 072015        | 2022-04  | 2023-04  |
| Data logger con diagnosi in campo | Testo                       | 175-H2                    | 20012380/305  | 2022-12  | 2024-12  |
| Data logger con diagnosi in campo | Testo                       | 175-H2                    | 38203337/703  | 2022-12  | 2024-12  |
| Attenuator                        | Aeroflex / Weinschel        | 2                         | CC8577        | 2022-08  | 2023-08  |
| 3m Semi anechoic chamber          | Comtest                     | SAC-3                     | 1711-150      | 2022-09  | 2024-09  |

## 2. PRODUCT STANDARDS, TEST METHODS AND TECHNICAL PROCEDURES

### 2.1 Standard(s) applied

The following standard(s) or specifications, accredited by ACCREDIA, were applied:

#### **FCC CFR 47 Part 15 Subpart B**

Code of Federal Regulations – Title 47 – Part 15 Radio Frequency Devices – Subpart B  
Unintentional radiators

### 2.2 Test method(s) applied

The following documents are referred to in the standard(s) in such a way that some or all of their content constitutes requirements for the standard itself.

#### **ANSI C63.4 (2014)**

American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

### 2.3 Nemko technical procedures

**WM L0177:** General routines for using instruments at Nemko

**WM L1002:** Measurement Uncertainty - Policy and Statement

**WM L0077:** General procedure for conducting EMC tests

### 3. SUMMARY OF TEST RESULTS AND VERDICTS

#### 3.1 Measurement of electromagnetic disturbances emitted by the equipment under test

| Emission Tests                    |                 |         |
|-----------------------------------|-----------------|---------|
| Requirement / test                | Method Standard | Verdict |
| Part §15.107 – Conducted emission | ANSI C63.4      | N       |
| Part §15.109 – Radiated emission  | ANSI C63.4      | P       |
| Notes:                            |                 |         |

## 4. EQUIPMENT UNDER TEST

### 4.1 EUT Identification

|                                                       |
|-------------------------------------------------------|
| Short description of the EUT                          |
| Vehicle diagnostic system with Bluetooth connectivity |
| Copy of marking plate(s) (if present)                 |
|                                                       |

|                                                  |                                          |
|--------------------------------------------------|------------------------------------------|
| Sample ID .....                                  | TONPY000070                              |
| Model/Type reference .....                       | DP2.2-488                                |
| Ratings .....                                    | 12V dc 80 mA                             |
| Equipment type .....                             | Electrical/electronic sub-assembly (ESA) |
| Accessories and detachable parts included .....  | Antenna                                  |
| Test performed.....                              | All tests were performed on this sample  |
| Software and/or firmware information .....       | See copy of marking plate                |
| Product variants not tested or partially tested: |                                          |
|                                                  |                                          |

## 4.2 EUT Power Supply

| Used <sup>1</sup>                                                                                                                                                                                                            | N° <sup>2</sup> | Type | Supply Voltage | Phases N° | Supplementary Information         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|----------------|-----------|-----------------------------------|
| <input checked="" type="checkbox"/>                                                                                                                                                                                          | 1               | DC   | 13.5 V         |           | without external earth connection |
| Notes:<br><sup>1</sup> The crossed square indicates that the supply voltage is used in at least one test.<br><sup>2</sup> This number will be used all over the report to identify the supply voltage(s) used for each test. |                 |      |                |           |                                   |

## 4.3 EUT Information declared by the Customer <sup>1</sup>

| Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Declaration                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| EUT highest frequency <sup>2</sup> .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | fc > 1000 MHz                   |
| Environment intended use.....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Other                           |
| Functional status for systems <sup>3</sup> .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | With immunity related functions |
| Ground connection.....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Negative to ground              |
| Notes:<br><sup>1</sup> Nemko S.p.A. declines all responsibility for the information above declared by the customer that may influence the validity of the results contained in this test report.<br><sup>2</sup> Highest frequency generated or used in the device or on which the device operates or tunes. If the clock frequency is not declared by the customer, according to the product standard(s), the worst case will be considered for each test.<br><sup>3</sup> Functional status definitions are specified in the standard used. |                                 |

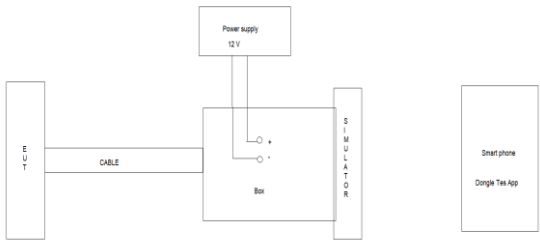
## 4.4 EUT Operation Modes

| N°           | Emission                            | Immunity                            | Description                                       |
|--------------|-------------------------------------|-------------------------------------|---------------------------------------------------|
| 1            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Simulation mode with the "DongleTest" application |
| Notes:<br>-- |                                     |                                     |                                                   |

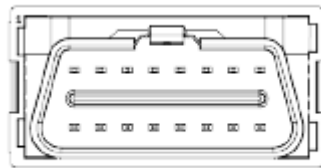
#### 4.5 EUT Configuration Modes

Emission: the EUT was configured to measure its highest possible radiation level. The test modes selected are according to EUT instruction manual.

Immunity: the EUT was configured to have its highest possible susceptibility against tested phenomena. The test modes selected are according to EUT instruction manual.

| N°           | Emission                            | Immunity                            | Description                                                                        |
|--------------|-------------------------------------|-------------------------------------|------------------------------------------------------------------------------------|
| 1            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |  |
| Notes:<br>-- |                                     |                                     |                                                                                    |

#### 4.6 EUT Input/Output Ports



| Port                                                                                                                                                                                                                             | Name             | Type <sup>1</sup> | Cable Max. >3m                      | Cable Shielded           | Description |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|-------------------------------------|--------------------------|-------------|
| 0                                                                                                                                                                                                                                | Enclosure        | N/E               | —                                   | —                        | —           |
| 1                                                                                                                                                                                                                                | 16 Pin connector | DC+I/O            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | -           |
| Notes:<br><sup>1</sup> Port type:<br>AC = AC Power Port      DC = DC Power Port      N/E = Non-Electrical      ANT = Antenna Port<br>I/O = Signal/Control Input or Output Port      TP = Wired network or telecommunication Port |                  |                   |                                     |                          |             |

#### 4.7 EUT and Equipment Used During Test

| Use <sup>1</sup>                                                                                                                                                                     | Product Type | Manufacturer | Model | Comments |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-------|----------|
| SIM                                                                                                                                                                                  | Simulator    |              |       | —        |
| SIM                                                                                                                                                                                  | BOX          |              |       | —        |
| AE                                                                                                                                                                                   | PC           | —            | —     | —        |
| Notes:<br><sup>1</sup> Use<br>EUT - Equipment Under Test                      SIM - Simulator (Not Subjected to Test)<br>AE - Auxiliary/Associated Equipment (Not Subjected to Test) |              |              |       |          |

#### 4.8 EUT Electric/Block Diagram

#### 4.9 Information about radio module(s)

| Radio module 1                                                     |                                                       |
|--------------------------------------------------------------------|-------------------------------------------------------|
| Description                                                        | Information                                           |
| Identification:                                                    | Mod: CYW20713      Trademark: CYPRESS                 |
| Frequency band (MHz):                                              | 2400 MHz to 2483.5 MHz                                |
| Modulation type:                                                   | Bluetooth 4.0 + EDR compliant.                        |
| Antenna information:                                               | 2.4 GHz KYOCERA AVX's Embedded Ceramic Bluetooth/WiFi |
| Other information:                                                 | 1.7 dBi gain                                          |
| Notes:<br>Single-Chip Bluetooth Transceiver and Baseband Processor |                                                       |

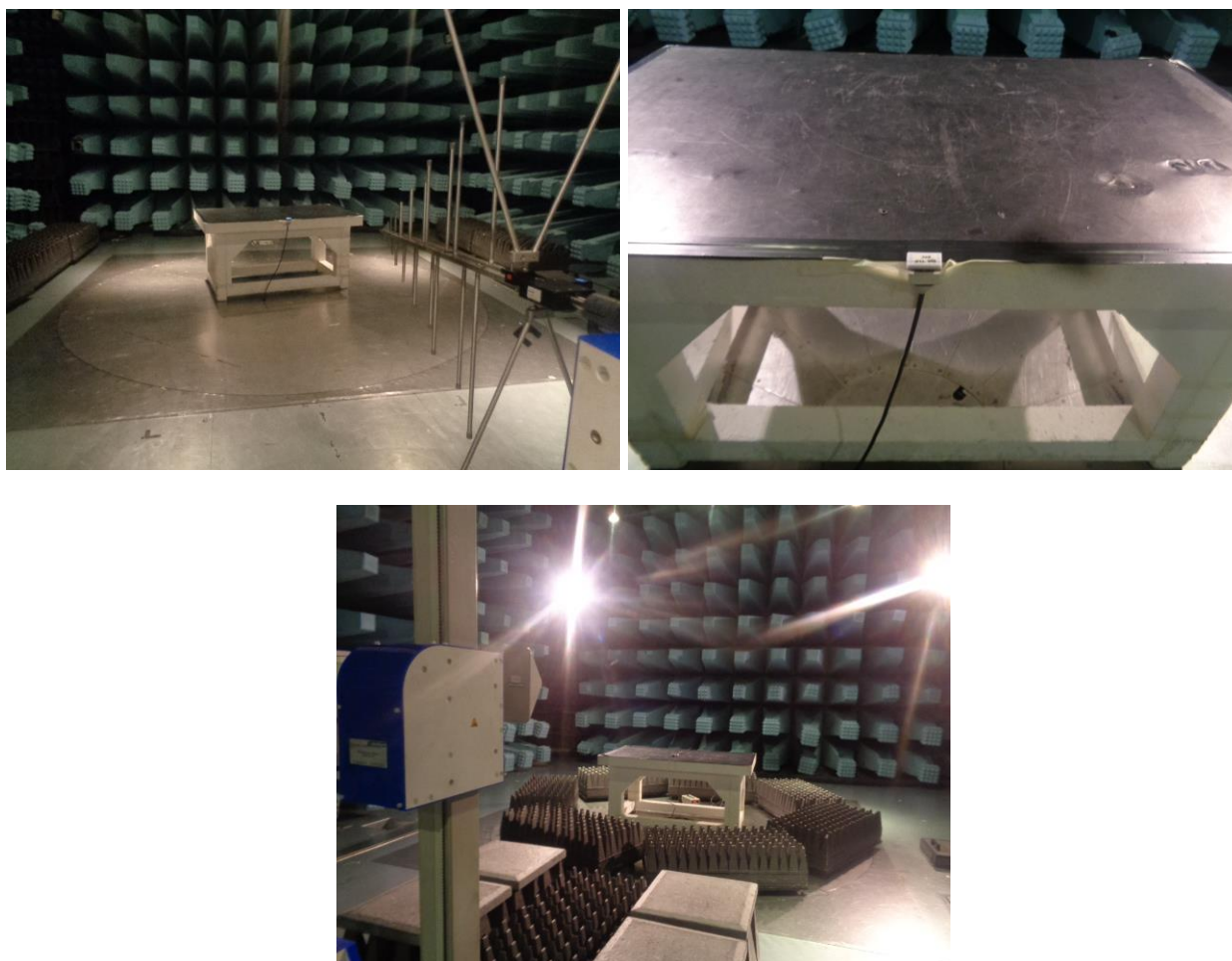
## 5 TEST RESULTS

### 5.1 Radiated Emission

#### 5.1.1 Test result

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Verdict:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N <sup>1</sup> <input type="checkbox"/> NP |
| Frequency range:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30 MHz – 40000 MHz <sup>2</sup>                                                                                                      |
| Test site:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Semi anechoic chamber                                                                                                                |
| Measurement distance:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3 m or 10 m <sup>3</sup>                                                                                                             |
| Notes:<br><sup>1</sup> If marked, the test is not applicable for the EUT.<br><sup>2</sup> For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation.<br><sup>3</sup> Test was performed at 10 m measurement distance for class A EUT in the frequency range from 30 to 1000 MHz; test was performed at 3 m measurement distance in all other cases. |                                                                                                                                      |

#### 5.1.2 Photo documentation of the test set-up



### 5.1.3 Test method

Method standard is reported at par. 3.1. Measurements were made on a semi anechoic chamber. Preliminary measurements were performed at an antenna to EUT separation distance of 3 or 10 meters with the receive antenna located at a fixed height (from 1 to 4 meter) in both horizontal and vertical polarizations. Final measurements were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 meters. All frequencies were investigated in both horizontal and vertical antenna polarization, where applicable.

Receiver reading  $P_R$ , reported in tables at clause 5.1.6, was achieved adjusting the input signal  $P_{IN}$  by a correction factor  $CF$ , to take into account of the insertion loss due to cables and attenuators, the antenna factor, the external preamplifier gain. This correction factor was pre-inserted in the firmware of the receiver and was applied by the instrument during the test. The relationship between  $P_R$  and  $P_{IN}$ , expressed in dB, is:

$$P_R = P_{IN} + CF$$

### 5.1.4 Limits for enclosure

| Radiated emission <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                   |                       |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|-----------------------|-------------------|
| Frequency<br>(MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Limit for Class A EUT |                   | Limit for Class B EUT |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | μV/m                  | dBμV/m            | μV/m                  | dBμV/m            |
| 30 to 88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 90                    | 39.0              | 100                   | 40.0              |
| 88 to 216                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 150                   | 43.5              | 150                   | 43.5              |
| 216 to 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 210                   | 46.4              | 200                   | 46.0              |
| 960 to 1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 300 <sup>2</sup>      | 49.5 <sup>2</sup> | 500 <sup>2</sup>      | 54.0 <sup>2</sup> |
| Above 1000 <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1000 <sup>2</sup>     | 59.5 <sup>2</sup> | 500 <sup>2</sup>      | 54.0 <sup>2</sup> |
| Notes:<br><sup>1</sup> For frequency range between 30 to 1000 MHz Quasi-Peak detector is used. For frequency range above 1000 MHz Average and Peak detector are used.<br><sup>2</sup> Above 1000 MHz, the limit reported refers to measurement s performed with Average detector. For measurements performed with Peak detector the limit is 20 dB greater.<br><sup>3</sup> For Class A radiated emission above 1 GHz, a measurement distance of 3 m can be used, with the limits increased by 10 dB. |                       |                   |                       |                   |

5.1.5 Test equipment used<sup>1</sup>

| Used <sup>2</sup>                                                                                                                    | Description                               | Manufacturer    | Model           | Identifier   |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------|-----------------|--------------|
| <input checked="" type="checkbox"/>                                                                                                  | SAC                                       | Nemko Spa       | 10m SAC         | 530          |
| <input checked="" type="checkbox"/>                                                                                                  | SAC                                       | Comtest         | 3m SAC          | 1711-150     |
| <input checked="" type="checkbox"/>                                                                                                  | EMI receiver                              | Rohde & Schwarz | ESW44           | 101620       |
| <input type="checkbox"/>                                                                                                             | EMI receiver                              | R&S             | ESU8            | 100202       |
| <input checked="" type="checkbox"/>                                                                                                  | Common mode absorption device             | Schwarzbeck     | CMAD1614        | 00041        |
| <input checked="" type="checkbox"/>                                                                                                  | Antenna                                   | Schwarzbeck     | VULB9162        | VULB9162-025 |
| <input type="checkbox"/>                                                                                                             | Antenna                                   | Schwarzbeck     | VULB9168        | VULB9168-242 |
| <input checked="" type="checkbox"/>                                                                                                  | Antenna                                   | Schwarzbeck     | STLP9148        | STLP9148-123 |
| <input type="checkbox"/>                                                                                                             | Antenna                                   | Schwarzbeck     | STLP9148        | STLP9148-152 |
| <input type="checkbox"/>                                                                                                             | Antenna                                   | RF Spin         | DRH40           | 061106A40    |
| <input type="checkbox"/>                                                                                                             | Preamplifier                              | Schwarzbeck     | BBV9718         | BBV9718-137  |
| <input checked="" type="checkbox"/>                                                                                                  | Preamplifier                              | Schwarzbeck     | BBV9718C        | 00121        |
| <input checked="" type="checkbox"/>                                                                                                  | Preamplifier                              | Sage            | STB-1834034030- | 18490-01     |
| <input checked="" type="checkbox"/>                                                                                                  | Controller for turntable and antenna mast | Maturo          | FCU3.0          | 10041        |
| <input checked="" type="checkbox"/>                                                                                                  | Tilt antenna mast                         | Maturo          | TAM4.0-E        | 10042        |
| <input checked="" type="checkbox"/>                                                                                                  | Turntable 4.5 t                           | Maturo          | TT4.0-5T        | 2.527        |
| Notes:<br><sup>1</sup> See clause 1.7 for calibration information.<br><sup>2</sup> If crossed, the instrument was used during tests. |                                           |                 |                 |              |

### 5.1.7 Test protocol

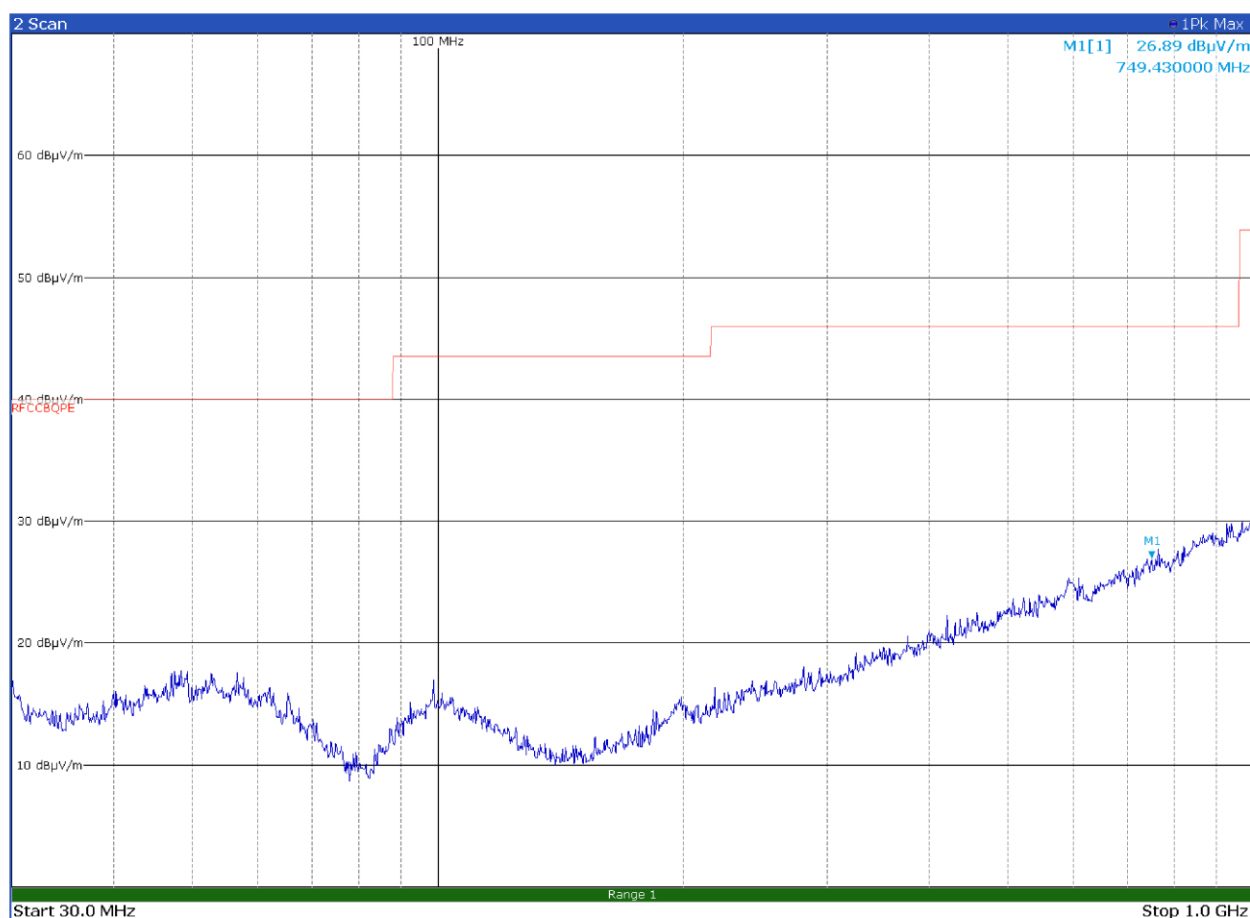
| Antenna Polarization | Supply Voltage <sup>1</sup> | Test Mode              |                            | Remarks | Verdict |
|----------------------|-----------------------------|------------------------|----------------------------|---------|---------|
|                      |                             | Operation <sup>2</sup> | Configuration <sup>3</sup> |         |         |
| Horizontal           | 1                           | 1                      | 1                          |         | P       |

Notes:

<sup>1</sup> See clause 4.2 EUT Power Supply

<sup>2</sup> See clause 4.4 EUT Operation Modes

<sup>3</sup> See clause 4.5 EUT Configuration Modes

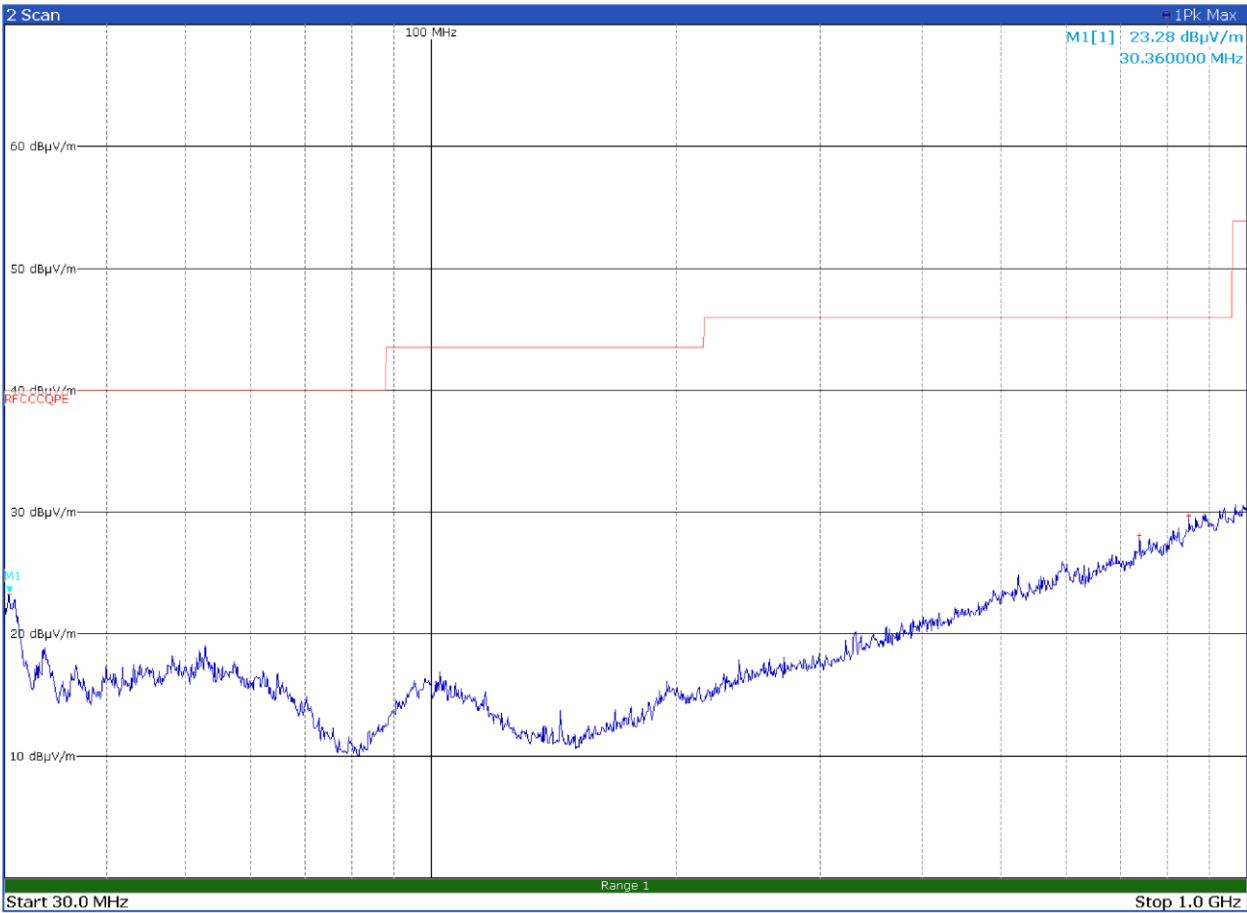


11:05:11 AM 03/24/2023

Page 1/1

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector |
|-----------------|----------------|----------------|-------------|----------|
| --              | --             | ---            | --          | --       |

| Antenna Polarization                                                                                                                                             | Supply Voltage <sup>1</sup> | Test Mode              |                            | Remarks | Verdict |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------|----------------------------|---------|---------|
|                                                                                                                                                                  |                             | Operation <sup>2</sup> | Configuration <sup>3</sup> |         |         |
| Vertical                                                                                                                                                         | 1                           | 1                      | 1                          |         | P       |
| Notes:<br><sup>1</sup> See clause 4.2 EUT Power Supply<br><sup>2</sup> See clause 4.4 EUT Operation Modes<br><sup>3</sup> See clause 4.5 EUT Configuration Modes |                             |                        |                            |         |         |

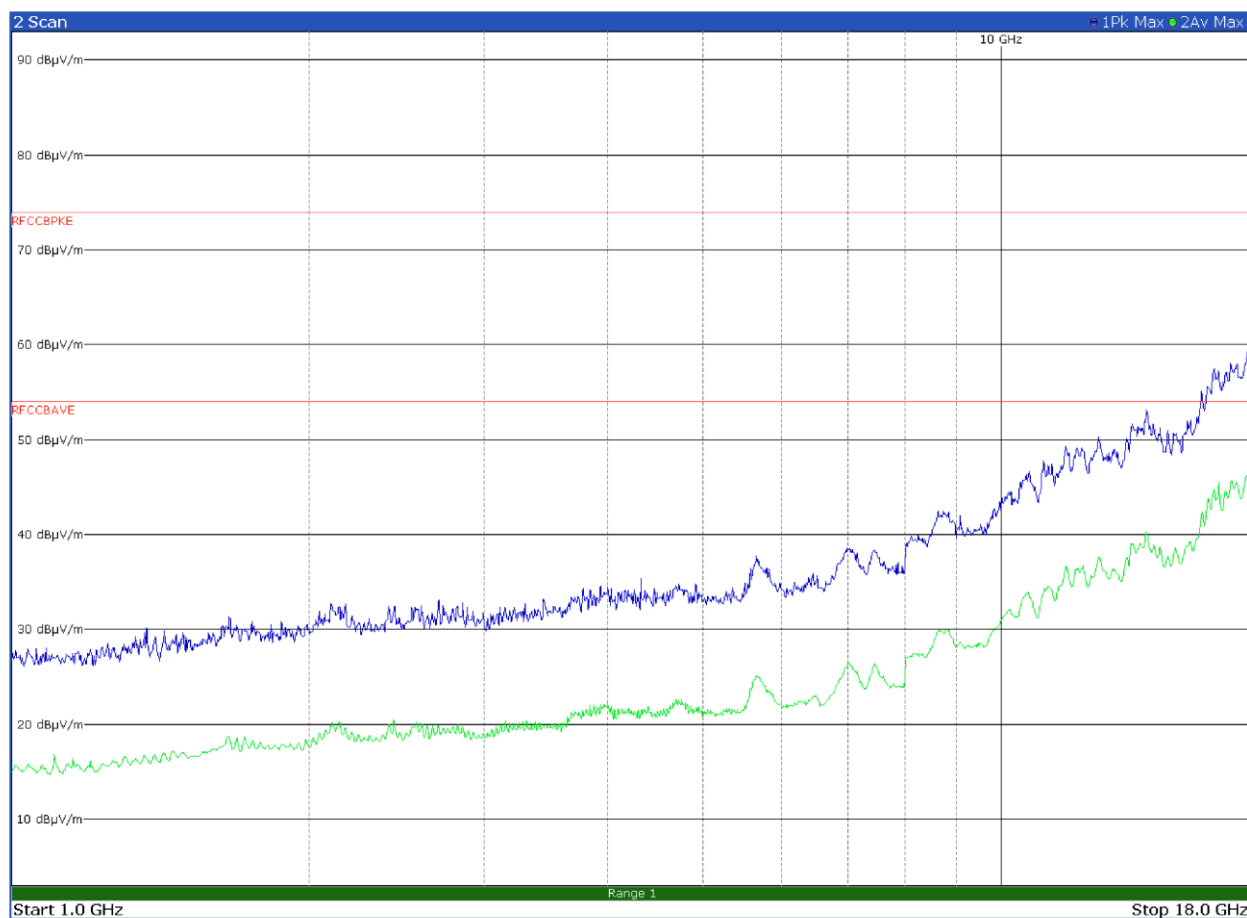


11:00:15 AM 03/24/2023

Page 1/1

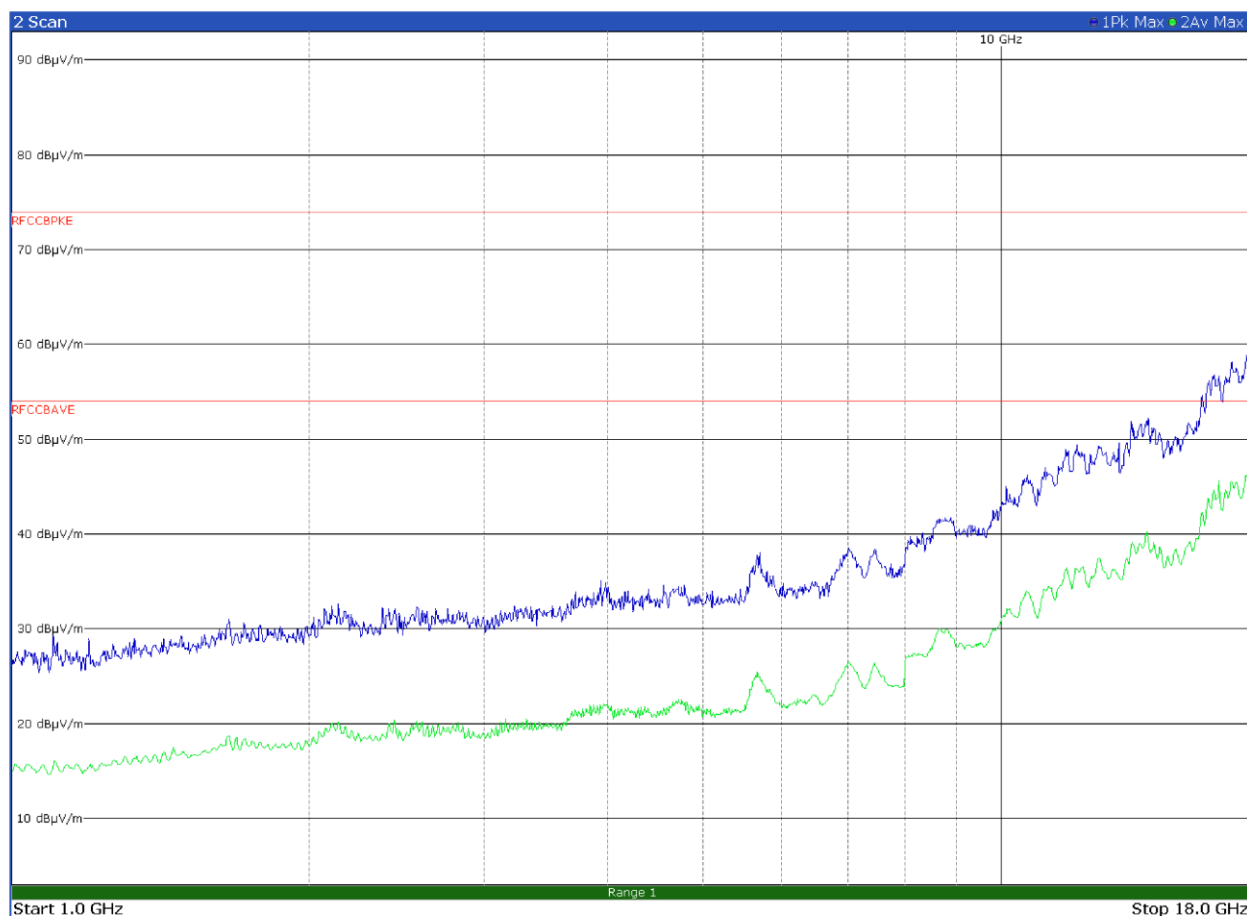
| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|-----------------|----------------|----------------|-------------|----------|
| --              | --             | --             | --          | --       |

| Antenna Polarization                                                                                                                                             | Supply Voltage <sup>1</sup> | Test Mode              |                            | Remarks | Verdict |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------|----------------------------|---------|---------|
|                                                                                                                                                                  |                             | Operation <sup>2</sup> | Configuration <sup>3</sup> |         |         |
| Horizontal                                                                                                                                                       | 1                           | 1                      | 1                          |         | P       |
| Notes:<br><sup>1</sup> See clause 4.2 EUT Power Supply<br><sup>2</sup> See clause 4.4 EUT Operation Modes<br><sup>3</sup> See clause 4.5 EUT Configuration Modes |                             |                        |                            |         |         |



| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector |
|-----------------|----------------|----------------|-------------|----------|
| --              | --             | --             | --          | --       |

| Antenna Polarization                                                                                                                                             | Supply Voltage <sup>1</sup> | Test Mode              |                            | Remarks | Verdict |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------|----------------------------|---------|---------|
|                                                                                                                                                                  |                             | Operation <sup>2</sup> | Configuration <sup>3</sup> |         |         |
| Vertical                                                                                                                                                         | 1                           | 1                      | 1                          |         | P       |
| Notes:<br><sup>1</sup> See clause 4.2 EUT Power Supply<br><sup>2</sup> See clause 4.4 EUT Operation Modes<br><sup>3</sup> See clause 4.5 EUT Configuration Modes |                             |                        |                            |         |         |



| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector |
|-----------------|----------------|----------------|-------------|----------|
| --              | --             | --             | --          | --       |

## 5.2 Conducted emission

### 5.2.1 Test result

|                                                                                                                                                                                                                                                                           |                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Verdict for AC mains port <sup>2</sup> :                                                                                                                                                                                                                                  | <input type="checkbox"/> P <input type="checkbox"/> F <input checked="" type="checkbox"/> N <sup>1</sup> <input type="checkbox"/> NP |
| Frequency range:                                                                                                                                                                                                                                                          | 0.15 MHz – 30 MHz                                                                                                                    |
| Kind of test site:                                                                                                                                                                                                                                                        | Shielded room                                                                                                                        |
| Notes:<br><sup>1</sup> If marked, the test is not applicable for the EUT, according to 15.107 (c)(1) or (d).<br><sup>2</sup> If applicable, KDB 174176D01 criterion was used for devices powered from a computer or any other external power source via a USB connection. |                                                                                                                                      |

### 5.2.2 Photo documentation of the test set-up

### 5.2.3 Test method

Method standard is reported at par. 3.1. Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. All power was connected to the system through Line Impedance Stabilization Networks (LISN). Conducted voltage measurements on mains lines were made at the output of the LISN.

Receiver reading  $P_R$ , reported in tables at clause 5.2.6, was achieved adjusting the input signal  $P_{IN}$  by a correction factor  $CF$ , to take into account of the insertion loss due to LISN and cables. This correction factor was pre-inserted in the firmware of the receiver and was applied by the instrument during the test. The relationship between  $P_R$  and  $P_{IN}$ , expressed in dB, is:

$$P_R = P_{IN} + CF$$

#### 5.2.4 Limits

| Conducted emissions from AC mains power ports |                         |         |                       |         |
|-----------------------------------------------|-------------------------|---------|-----------------------|---------|
| Frequency (MHz)                               | Quasi-Peak limit (dBμV) |         | Average limit (dBμV)  |         |
|                                               | Class B                 | Class A | Class B               | Class A |
| 0.15 to 0.50                                  | 66 to 56 <sup>1</sup>   | 79      | 56 to 46 <sup>1</sup> | 66      |
| 0.50 to 5                                     | 56                      | 73      | 46                    | 60      |
| 5 to 30                                       | 60                      | 73      | 50                    | 60      |

Notes:

<sup>1</sup> The limit level in dBμV decreases linearly with the logarithm of frequency

#### 5.2.5 Test equipment used<sup>1</sup>

| Used <sup>2</sup>                   | Description         | Manufacturer         | Model                        | Identifier  |
|-------------------------------------|---------------------|----------------------|------------------------------|-------------|
| <input checked="" type="checkbox"/> | EMI receiver        | R&S                  | ESU8                         | 100202      |
| <input type="checkbox"/>            | EMI receiver        | Rohde & Schwarz      | ESW44                        | 101620      |
| <input checked="" type="checkbox"/> | Attenuator          | Aeroflex / Weinschel | 2                            | CC8577      |
| <input type="checkbox"/>            | LISN 9 kHz ÷ 30 MHz | R&S                  | ESH2-Z5                      | 872 460/041 |
| <input checked="" type="checkbox"/> | LISN 9 kHz ÷ 30 MHz | R&S                  | ENV432                       | 101714      |
| <input type="checkbox"/>            | LISN 9 kHz ÷ 30 MHz | R&S                  | ESH3-Z5                      | 840 731/004 |
| <input checked="" type="checkbox"/> | Shielded room       | Siemens              | Conducted emission test room | 1862        |

Notes:

<sup>1</sup> See clause 1.7 for calibration information.

<sup>2</sup> If crossed, the instrument was used during tests.

## 5.2.6 Test protocol

| Test Port                                                                                                                                                                                                              |      | Supply Voltage <sup>2</sup> | Test Mode              |                            | Remarks | Verdict |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------|------------------------|----------------------------|---------|---------|
| EUT <sup>1</sup>                                                                                                                                                                                                       | Line |                             | Operation <sup>3</sup> | Configuration <sup>4</sup> |         |         |
| 1                                                                                                                                                                                                                      | L    | 1                           | 1                      | 1                          |         | F       |
| Notes:<br><sup>1</sup> See clause 4.6 EUT Input/Output Ports<br><sup>2</sup> See clause 4.2 EUT Power Supply<br><sup>3</sup> See clause 4.4 EUT Operation Modes<br><sup>4</sup> See clause 4.5 EUT Configuration Modes |      |                             |                        |                            |         |         |

| Test Port                                                                                                                                                                                                              |      | Supply Voltage <sup>2</sup> | Test Mode              |                            | Remarks | Verdict |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------|------------------------|----------------------------|---------|---------|
| EUT <sup>1</sup>                                                                                                                                                                                                       | Line |                             | Operation <sup>3</sup> | Configuration <sup>4</sup> |         |         |
| 1                                                                                                                                                                                                                      | N    | 1                           | 1                      | 1                          |         | N       |
| Notes:<br><sup>1</sup> See clause 4.6 EUT Input/Output Ports<br><sup>2</sup> See clause 4.2 EUT Power Supply<br><sup>3</sup> See clause 4.4 EUT Operation Modes<br><sup>4</sup> See clause 4.5 EUT Configuration Modes |      |                             |                        |                            |         |         |

## 6 EUT PHOTOS





End of report