

# EMC TEST REPORT

No. 2209805STO-101

## Electromagnetic disturbances

### EQUIPMENT UNDER TEST

Equipment: Air quality sensor  
Tested Type/Model: E2112 Vindstyrka air quality sensor  
Manufacturer: IKEA of Sweden AB  
Tested by request of: IKEA of Sweden AB

### SUMMARY

Referring to the emission limits, and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards:

FCC 47 CFR Part 15: Radio frequency devices, Subpart B: Unintentional radiators. Class B equipment.

ICES-001 Issue 5: Industrial, Scientific and Medical (ISM) Radio Frequency Generators with emission limits for class B Group 1 equipment

For details, see clause 2 – 4.

Date of issue: November 15, 2022

Tested by:

  
Anna Näslund

Approved by:

  
Per Granberg

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## Revision History

| Test report no. | Release no. | Date of issue     | Description                                                                                                                        |
|-----------------|-------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------|
| 2101144STO-102  | 1           | May 11, 2022      |                                                                                                                                    |
| 2209805STO-101  | 2           | November 15, 2022 | Updated of report 2101144STO-102 with measurements for FCC part 15 B above 1 GHz.<br>Correction values added to all result tables. |

## Terms, definitions and abbreviations

The following terms, definitions and abbreviations may be used throughout the report.

| Term/definition/abbreviation | Meaning                                                                                                   |
|------------------------------|-----------------------------------------------------------------------------------------------------------|
| AAN                          | Asymmetrical Artificial Network                                                                           |
| AC                           | Alternating Current                                                                                       |
| AE                           | Associated Equipment                                                                                      |
| AMN                          | Artificial Mains Network                                                                                  |
| ANSI                         | American National Standards Institute                                                                     |
| AV                           | Average                                                                                                   |
| BW                           | Bandwidth                                                                                                 |
| CAV                          | CISPR Average                                                                                             |
| CFR                          | Code of Federal Regulations                                                                               |
| CISPR                        | Comité international spécial des perturbations radioélectriques                                           |
| CM                           | Common Mode                                                                                               |
| CMAD                         | Common Mode Absorption Device                                                                             |
| DC                           | Direct Current                                                                                            |
| DM                           | Differential Mode                                                                                         |
| EM                           | Electromagnetic                                                                                           |
| EMC                          | Electromagnetic Compatibility                                                                             |
| EUT                          | Equipment Under Test                                                                                      |
| F                            | Fail                                                                                                      |
| FAR                          | Fully Anechoic Room                                                                                       |
| FCC                          | Federal Communications Commission                                                                         |
| $F_x$                        | Highest fundamental frequency generated or used within the EUT, or highest frequency at which it operates |
| ICES                         | Interference-Causing Equipment Standard                                                                   |
| H                            | Horizontal                                                                                                |
| $I_{ref}$                    | Reference Current                                                                                         |
| ISN                          | Impedance Stabilizing Network                                                                             |
| MU                           | Measurement Uncertainty                                                                                   |
| N/A                          | Not Applicable                                                                                            |
| P                            | Pass                                                                                                      |
| PE                           | Protective Earth                                                                                          |
| PK                           | Peak                                                                                                      |
| Pol.                         | Polarisation                                                                                              |
| QP / QPK                     | Quasi-Peak                                                                                                |
| RBW                          | Resolution Bandwidth                                                                                      |
| RF                           | Radio Frequency                                                                                           |
| RGP                          | Reference Ground Plane                                                                                    |
| RH                           | Relative Humidity                                                                                         |
| RMS                          | Root Mean Square                                                                                          |
| Rx                           | Receiver / Receiving                                                                                      |
| SAC                          | Semi-Anechoic Chamber                                                                                     |
| Tx                           | Transmitter / Transmitting                                                                                |
| V                            | Vertical                                                                                                  |
| VBW                          | Video Bandwidth                                                                                           |

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## 1. CLIENT INFORMATION

The EUT has been tested by request of

|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Company</b>         | IKEA of Sweden AB<br>SE-343 81 Älmhult<br>Sweden |
| <b>Name of contact</b> | Jeton Salihu                                     |
| <b>Client observer</b> | -                                                |

## 2. EQUIPMENT UNDER TEST (EUT)

### 2.1 Identification of the EUT

|                                                   |                                                                                                                                                                                                   |                   |                    |                  |                                                                                                                                                                               |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Equipment:</b>                                 | Environmental sensor                                                                                                                                                                              |                   |                    |                  |                                                                                                                                                                               |
| <b>Type/Model:</b>                                | E2112 Vindstyrka air quality sensor                                                                                                                                                               |                   |                    |                  |                                                                                                                                                                               |
| <b>Brand name:</b>                                | IKEA                                                                                                                                                                                              |                   |                    |                  |                                                                                                                                                                               |
| <b>S/N:</b>                                       | 50050                                                                                                                                                                                             |                   |                    |                  |                                                                                                                                                                               |
| <b>Manufacturer:</b>                              | IKEA of Sweden AB                                                                                                                                                                                 |                   |                    |                  |                                                                                                                                                                               |
| <b>Highest clock frequency, <math>F_X</math>:</b> | 80 MHz                                                                                                                                                                                            |                   |                    |                  |                                                                                                                                                                               |
| <b>Transmitting freq.:</b>                        | 2400–2483.5 MHz                                                                                                                                                                                   |                   |                    |                  |                                                                                                                                                                               |
| <b>Software version:</b>                          | 1.0.005-532                                                                                                                                                                                       |                   |                    |                  |                                                                                                                                                                               |
| <b>Hardware version:</b>                          | P1.2.1                                                                                                                                                                                            |                   |                    |                  |                                                                                                                                                                               |
| <b>Mounting position: (during normal use)</b>     | <input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor-standing <input type="checkbox"/> Wall/ceiling<br><input type="checkbox"/> Hand-held <input type="checkbox"/> Other: |                   |                    |                  |                                                                                                                                                                               |
| <b>Supplementary information:</b>                 |                                                                                                                                                                                                   |                   |                    |                  |                                                                                                                                                                               |
| <b>Input ratings</b>                              | <b>Voltage [V]</b>                                                                                                                                                                                | <b>Freq. [Hz]</b> | <b>Current [A]</b> | <b>Power [W]</b> | <b>Coupling</b>                                                                                                                                                               |
| <input type="checkbox"/> AC                       | -                                                                                                                                                                                                 | -                 | -                  | -                | <b>L1</b> <input type="checkbox"/> <b>L2</b> <input type="checkbox"/> <b>L3</b> <input type="checkbox"/> <b>N</b> <input type="checkbox"/> <b>PE</b> <input type="checkbox"/> |
| <input checked="" type="checkbox"/> DC            | 5                                                                                                                                                                                                 | -                 | 0.2                | -                | <b>V+</b> <input checked="" type="checkbox"/> <b>V-</b> <input checked="" type="checkbox"/> <b>PE</b> <input type="checkbox"/>                                                |
| <input type="checkbox"/> Battery                  |                                                                                                                                                                                                   |                   |                    |                  | <b>V+</b> <input type="checkbox"/> <b>V-</b> <input type="checkbox"/> <b>PE</b> <input type="checkbox"/>                                                                      |
| <input type="checkbox"/> Other:                   |                                                                                                                                                                                                   |                   |                    |                  |                                                                                                                                                                               |

Test set up and EUT photos are enclosed in Annex 1 (2209805STO-102) to this test report.



**Photo/copy of marking/rating plate**

## 2.2 Additional information about the EUT

The EUT is an environmental sensor for both indoor and outdoor values such as temperature, humidity, PM2.5, VOC and Pollen. The outdoor values will be imported from an external source. The sensor can optionally be paired to the IKEA Gateway or to the air purifier STARKVIND.

The EUT consists of the following units:

| Unit               | Type/model | Description |
|--------------------|------------|-------------|
| Air quality sensor | E2112      | -           |

The EUT has the following ports:

| Port type                                          | Port name | Shielded                 |
|----------------------------------------------------|-----------|--------------------------|
| <b>AC I/O</b>                                      |           |                          |
| <input type="checkbox"/> AC power input            |           | <input type="checkbox"/> |
| <input type="checkbox"/> AC power output           |           | <input type="checkbox"/> |
| <b>DC I/O</b>                                      |           |                          |
| <input checked="" type="checkbox"/> DC power input | DC input  | <input type="checkbox"/> |
| <input type="checkbox"/> DC power output           | DC output | <input type="checkbox"/> |
| <b>Signal/control I/O</b>                          |           |                          |
| <input type="checkbox"/> Telecom/network           |           | <input type="checkbox"/> |
| <input type="checkbox"/> Signal/control            |           | <input type="checkbox"/> |
| <b>Supplementary information:</b>                  |           |                          |

The EUT ports were connected according to the following:

| Port name | Cable type     | Connected to  |
|-----------|----------------|---------------|
| DC input  | Two-core USB-C | AC/DC adapter |

## 2.3 Peripheral/auxiliary equipment

### Auxiliary

Equipment needed for correct operation of the EUT and is part of the system under test.

| Equipment     | Manufacturer | Type/Model   | S/N  |
|---------------|--------------|--------------|------|
| AC/DC adapter | IKEA         | ICPSW5-5EU-1 | 2114 |

## 2.4 Decision rule

The statements of conformity are reported as:

Passed – When the measured values are within the specified limits.

Failed – When one or more measures values are outside the specified limits.

### 3. TEST SPECIFICATIONS

#### 3.1 Additions, deviations and exclusions from standards and accreditation

The following editions of basic standards were applied instead of the standards referenced in FCC 47 CFR Part 15 and ICES-001:

| Referenced      | Applied                 |
|-----------------|-------------------------|
| CSA CISPR 11:19 | CISPR 11:2015 + A1:2016 |
| ANSI C63.4-2014 | ANSI C63.4-2014         |

#### 3.2 Test site

Measurements were performed at:

Intertek Semko AB.  
Torshamnsgatan 43,  
P.O. Box 1103  
SE-164 22 Kista

Intertek Semko AB is an FCC listed test site with site registration number 90913  
Intertek Semko AB is an FCC accredited conformity assessment body with designation number SE0002

Intertek Semko AB is an Industry Canada listed test facility with IC assigned code 2042G

Measurement chambers

| Measurement Chamber                              | Type of chamber               | IC Site filing # |
|--------------------------------------------------|-------------------------------|------------------|
| <input checked="" type="checkbox"/> STORA HALLEN | Semi-anechoic<br>10 m and 3 m | 2042G-2          |
| <input checked="" type="checkbox"/> BJÖRKHALLEN  | Semi-anechoic<br>3 m          | 2042G-1          |
| <input type="checkbox"/> 5 m CHAMBER             | Semi-anechoic<br>5 m          | 2042G-3          |

### Mode of operation during the test

| Mode no. | Supply    | Description                                                                                                         |
|----------|-----------|---------------------------------------------------------------------------------------------------------------------|
| 1        | 120V/60Hz | The EUT measures humidity, temperature and amount of particles in the air and displays the value on the LED screen. |

| Test                           | Mode of operation |
|--------------------------------|-------------------|
| Conducted continuous emission  | 1                 |
| Radiated emission of EM fields | 1                 |

## TEST SUMMARY

The test has been carried out at the Intertek Semko AB premises in Kista, Sweden.

The results in this report apply only to sample tested.

Result: P – F – N/A

| EMISSION TESTS             |             |                                |              |         |         |
|----------------------------|-------------|--------------------------------|--------------|---------|---------|
| Chapter                    | Standard(s) | Description                    | Port type(s) | Note(s) | Verdict |
| 5                          | ANSI C63.4  | Conducted continuous emission  | AC input     | -       | P       |
| 5                          | CISPR 11    | Conducted continuous emission  | AC input     | -       | P       |
| 6                          | ANSI C63.4  | Radiated emission of EM fields | Enclosure    | -       | P       |
| 6                          | CISPR 11    | Radiated emission of EM fields | Enclosure    | -       | P       |
| Supplementary information: |             |                                |              |         |         |

#### 4. CONDUCTED CONTINUOUS DISTURBANCES

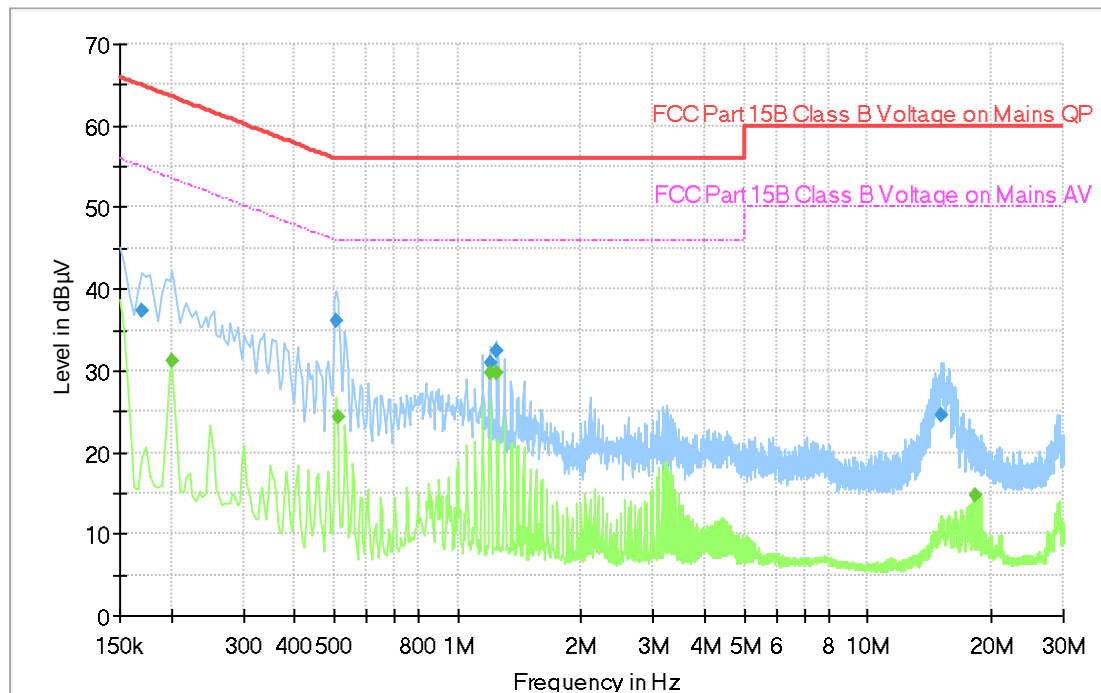
| Date of test    | Temp. [°C] | Humidity [%RH] | Tested by |
|-----------------|------------|----------------|-----------|
| January 5, 2022 | 21         | 22             | Leo Doma  |

| <b>Test setup and procedure:</b>                                                                                                                                                    | EUT was placed 0.8 m from the AMN / ISN.<br>Overview sweeps were performed for each lead of the cable(s).<br>AE requiring mains power to operate was/were connected to AMN / ISN terminated with 50 $\Omega$ , when applicable. |                         |              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------|
| <b>EUT position:</b>                                                                                                                                                                | <input checked="" type="checkbox"/> Table-top (EUT 0.4 m from the RGP)<br><input type="checkbox"/> Floor-standing (EUT 12 mm from the RGP)<br><input type="checkbox"/> Other:                                                   |                         |              |
| Tested port type(s):                                                                                                                                                                | Coupling device                                                                                                                                                                                                                 | Measurement uncertainty |              |
|                                                                                                                                                                                     |                                                                                                                                                                                                                                 | Frequency range         | Value        |
| <input checked="" type="checkbox"/> AC power                                                                                                                                        | <input checked="" type="checkbox"/> AMN                                                                                                                                                                                         | 0.15 – 30 MHz           | $\pm 3.3$ dB |
| <b>Supplementary information:</b><br>Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011.<br>The measurement uncertainty is given with a confidence of 95 %. |                                                                                                                                                                                                                                 |                         |              |

| Port                                                                                                                                                                   | Frequency [MHz] | Voltage limits [dBμV] (2) |             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------|-------------|
|                                                                                                                                                                        |                 | QP                        | AV          |
| Limits FCC Part 15 subpart B                                                                                                                                           |                 |                           |             |
| □ AC power input Class A                                                                                                                                               | 0.15 – 0.50     | 79                        | 66          |
|                                                                                                                                                                        | 0.50 – 30.0     | 73                        | 60          |
| ☒ AC power input Class B                                                                                                                                               | 0.15 – 0.50     | 66 – 56 (1)               | 56 – 46 (1) |
|                                                                                                                                                                        | 0.50 – 5.00     | 56                        | 46          |
|                                                                                                                                                                        | 5.00 – 30.0     | 60                        | 50          |
| <b>Supplementary information:</b><br>(1) The limits decrease linearly with the logarithm of the frequency.<br>(2) At transitional frequencies the lower limit applies. |                 |                           |             |

| Port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Frequency<br>[MHz] | Rated input power of<br>≤ 20 kVA (2) |              | Rated input power of<br>> 20 kVA (2),(3) |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------|--------------|------------------------------------------|--------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    | QP<br>dB(μV)                         | AV<br>dB(μV) | QP<br>dB(μV)                             | AV<br>dB(μV) |
| Limits ICES-001, Class A group 1 according to CISPR 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                      |              |                                          |              |
| <input type="checkbox"/> AC power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.15 – 0.50        | 79                                   | 66           | 100                                      | 90           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.50 – 5.00        | 73                                   | 60           | 86                                       | 76           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5.00 – 30.0        | 73                                   | 60           | 90-73 (1)                                | 80-60 (1)    |
| Limits ICES-001, Class B group 1 according to CISPR 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                      |              |                                          |              |
| <input checked="" type="checkbox"/> AC power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.15 – 0.50        | 66-56 (1)                            | 56-46 (1)    | 66-56 (1)                                | 56-46 (1)    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.50 – 5.00        | 56                                   | 46           | 56                                       | 46           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.50 – 30.0        | 60                                   | 50           | 60                                       | 50           |
| Supplementary information:<br>(1) The limits decrease linearly with the logarithm of the frequency.<br>(2) At transitional frequencies the lower limit applies.<br>(3) These limits apply to equipment with a rated input power > 20 kVA and intended to be powered by a dedicated power transformer or generator, and which is not connected to Low Voltage (LV) overhead power lines. For equipment not intended to be powered by a user specific power transformer, the limits for ≤ 20 kVA apply. The manufacturer and/or supplier shall provide information on installation measures that can be used to reduce emissions from the installed equipment. In particular, it shall be indicated that this equipment is intended to be powered by a dedicated power transformer or generator and not by LV overhead power lines. |                    |                                      |              |                                          |              |

#### 4.1 Test results, Conducted continuous disturbances, AC Power input port, Class B



Diagram, Peak and AV overview sweep

##### Measurement results, Quasi-peak

| Frequency (MHz) | QuasiPeak (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | PE  | Corr. (dB) |
|-----------------|------------------|--------------|-------------|-----------------|-----------------|------|-----|------------|
| 0.169000        | 37.33            | 65.01        | 27.68       | 1000.0          | 9.000           | N    | GND | 10.0       |
| 0.506000        | 36.20            | 56.00        | 19.80       | 1000.0          | 9.000           | N    | GND | 10.1       |
| 1.200000        | 30.94            | 56.00        | 25.06       | 1000.0          | 9.000           | L1   | GND | 10.1       |
| 1.250000        | 32.47            | 56.00        | 23.53       | 1000.0          | 9.000           | N    | GND | 10.1       |
| 15.054000       | 24.51            | 60.00        | 35.49       | 1000.0          | 9.000           | N    | GND | 10.8       |

##### Measurement results, Average

| Frequency (MHz) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | PE  | Corr. (dB) |
|-----------------|-----------------|--------------|-------------|-----------------|-----------------|------|-----|------------|
| 0.200000        | 31.21           | 53.61        | 22.40       | 1000.0          | 9.000           | N    | GND | 10.0       |
| 0.511000        | 24.20           | 46.00        | 21.80       | 1000.0          | 9.000           | N    | GND | 10.1       |
| 1.200000        | 29.80           | 46.00        | 16.20       | 1000.0          | 9.000           | N    | GND | 10.1       |
| 1.250000        | 29.60           | 46.00        | 16.40       | 1000.0          | 9.000           | N    | GND | 10.1       |
| 18.333000       | 14.85           | 50.00        | 35.15       | 1000.0          | 9.000           | N    | GND | 11.0       |

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

## 4.2 Test equipment

| Equipment type       | Manufacturer    | Model        | Inv. No. | Last Cal. date | Cal. interval |
|----------------------|-----------------|--------------|----------|----------------|---------------|
| Measurement software | Rohde & Schwarz | EMC32        | --       | --             | --            |
| Receiver             | Rohde & Schwarz | ESCI 3       | 12741    | July-2021      | 1 year        |
| Pulse limiter        | Rohde & Schwarz | ESH3-Z2      | 32798    | July-2021      | 1 year        |
| AMN                  | Rohde & Schwarz | ESH3-Z5      | 5875     | July-2021      | 1 year        |
| Coaxial cable        | Suhner          | RG 223/U     | 9786     | February-2021  | 1 year        |
| Coaxial cable        | Suhner          | G 03232 D-01 | 39069    | September-2021 | 1 year        |

## 5. RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHz – 1 GHz

| Date of test     | Temp. [°C] | Humidity [%RH] | Tested by    |
|------------------|------------|----------------|--------------|
| January 7, 2022  | 21         | 23             | Leo Doma     |
| November 9, 2022 | 21         | 48             | Anna Näslund |

|                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                 |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Test setup and procedure:</b>                                                                                                                                              | The EUT was placed on a non-conductive support on the RGP. Overview sweeps were performed with the measurement receiver in max hold mode and the peak detector activated in the frequency range 30 – 1000 MHz. Above 1 GHz, both the peak and average detectors were activated, when applicable. During height scan above 1 GHz the EUT was kept in antennas cone of radiation. |                                |
| <b>EUT position:</b>                                                                                                                                                          | <input checked="" type="checkbox"/> Table-top (EUT 0.8 m from the RGP)<br><input type="checkbox"/> Floor-standing (EUT 12 mm from the RGP)<br><input type="checkbox"/> Other:                                                                                                                                                                                                   |                                |
| <b>Highest measured frequency:</b>                                                                                                                                            | <input type="checkbox"/> $F_X \leq 108$ MHz: 1 GHz<br><input type="checkbox"/> $108 \text{ MHz} < F_X \leq 500$ MHz: 2 GHz<br><input type="checkbox"/> $500 \text{ MHz} < F_X \leq 1$ GHz: 5 GHz<br><input checked="" type="checkbox"/> $F_X > 1$ GHz: $5 \times F_X$ up to a max. of 40 GHz<br><input type="checkbox"/> $F_X$ is unknown: 40 GHz                               |                                |
| <b>Frequency range:</b>                                                                                                                                                       | <b>Measuring distance</b>                                                                                                                                                                                                                                                                                                                                                       | <b>Measurement uncertainty</b> |
| <input type="checkbox"/> 30 to 1000 MHz                                                                                                                                       | 3 m                                                                                                                                                                                                                                                                                                                                                                             | $\pm 5.1$ dB                   |
| <input checked="" type="checkbox"/> 30 to 1000 MHz                                                                                                                            | 10 m                                                                                                                                                                                                                                                                                                                                                                            | $\pm 5.0$ dB                   |
| <input checked="" type="checkbox"/> 1.0 to 18 GHz                                                                                                                             | 3 m                                                                                                                                                                                                                                                                                                                                                                             | $\pm 4.5$ dB                   |
| <input type="checkbox"/> 18 to 26 GHz                                                                                                                                         | 3 m                                                                                                                                                                                                                                                                                                                                                                             | $\pm 4.8$ dB                   |
| <input type="checkbox"/> 26 to 40 GHz                                                                                                                                         | 3 m                                                                                                                                                                                                                                                                                                                                                                             | $\pm 5.7$ dB                   |
| <b>Supplementary information:</b> Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011. The measurement uncertainty is given with a confidence of 95 %. |                                                                                                                                                                                                                                                                                                                                                                                 |                                |

| Test    | Freq.<br>[MHz] | Meas.<br>angle<br>[°] | Antenna |         |               | RBW<br>[kHz] |      |      | VBW<br>[kHz] |
|---------|----------------|-----------------------|---------|---------|---------------|--------------|------|------|--------------|
|         |                |                       | Type    | Height  | Pol.          | QP           | PK   | AV   | PK           |
| Preview | 30 – 1000      | 0 – 359               | Bilog   | 1 – 4 m | V<br>and<br>H | -            | 120  | -    | 1000         |
| Final   |                |                       |         |         |               | 120          | -    | -    | -            |
| Preview | 1000 – 40000   | 0 – 359               | Horn    | 1 – 4 m |               | -            | 1000 | 1000 | 3000         |
| Final   |                |                       |         |         |               | -            | 1000 | 1000 | -            |

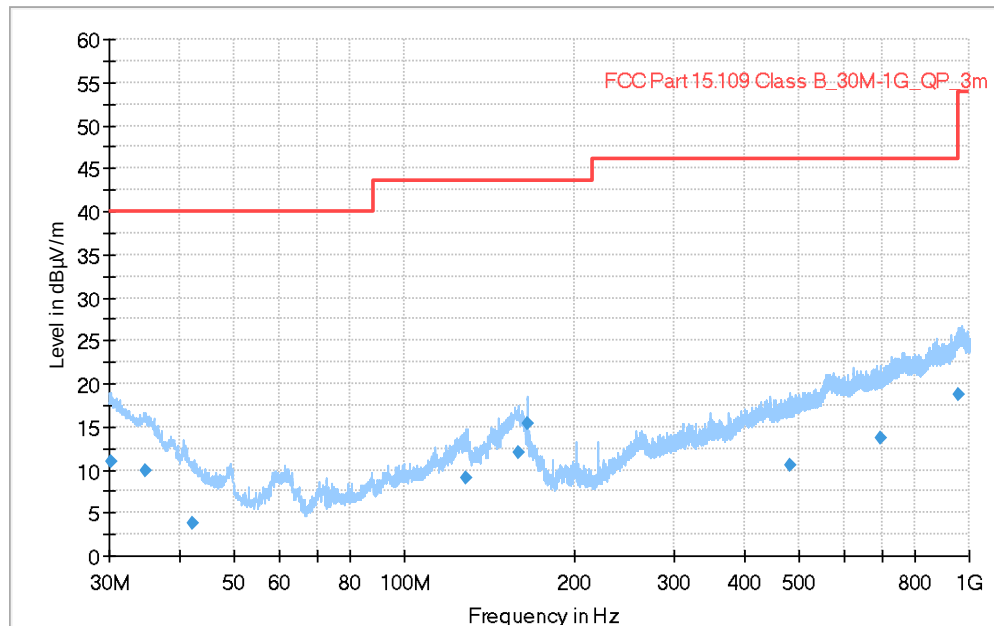
| Measurement distance<br>[m] | Frequency<br>[MHz] | Limits [dBµV/m] |      |      |
|-----------------------------|--------------------|-----------------|------|------|
|                             |                    | QP              | PK   | AV   |
| Limits, FCC, Class A        |                    |                 |      |      |
| □ 3 / □ 10                  | 30 – 88            | 49.5 / 39.1     | -    | -    |
|                             | 88 – 216           | 54.0 / 43.5     | -    | -    |
|                             | 216 – 960          | 56.9 / 46.4     | -    | -    |
|                             | 960 – 1000         | 60.0 / 49.5     | -    | -    |
| □ 3                         | Above 1000         | -               | 80.0 | 60.0 |
| Limits, FCC, Class B        |                    |                 |      |      |
| □ 3 / ☒ 10                  | 30 – 88            | 40.0 / 29.5     | -    | -    |
|                             | 88 – 216           | 43.5 / 33.1     | -    | -    |
|                             | 216 – 960          | 46.0 / 35.6     | -    | -    |
|                             | 960 – 1000         | 54.0 / 43.5     | -    | -    |
| ☒ 3                         | Above 1000         | -               | 74.0 | 54.0 |

| Test facility & measurement distance                   | Frequency [MHz] | Limits [dBμV/m]            |                                |
|--------------------------------------------------------|-----------------|----------------------------|--------------------------------|
|                                                        |                 | Rated input power ≤ 20 kVA | Rated input power > 20 kVA (1) |
|                                                        |                 | QP                         | QP                             |
| Limits ICES-001, Class A group 1 according to Cispr 11 |                 |                            |                                |
| ☐ SAC, 10 m                                            | 30 – 230        | 40                         | 50                             |
|                                                        | 230 – 1000      | 47                         | 50                             |
| ☐ SAC, 3 m                                             | 30 – 230        | 50                         | 60                             |
|                                                        | 230 – 1000      | 57                         | 60                             |
| Limits ICES-001, Class B group 1 according to Cispr 11 |                 |                            |                                |
| ☒ SAC, 10 m                                            | 30 – 230        | 30                         | 30                             |
|                                                        | 230 – 1000      | 37                         | 37                             |
| ☐ SAC, 3 m                                             | 30 – 230        | 40                         | 40                             |
|                                                        | 230 – 1000      | 47                         | 47                             |

**Supplementary information:**

(1): These limits apply to equipment with a rated input power of > 20 kVA and intended to be used at locations where there is a distance greater than 30 m between the equipment and third party sensitive radio communications. The manufacturer shall indicate in the technical documentation that this equipment is intended to be used at locations where the separation distance to third party sensitive radio services is > 30 m. If the manufacturer does not include the particular conditions of use of the equipment in the technical documentation for the user, then the limits for equipment with a rated input power of ≤ 20 kVA shall apply

## 5.1 Test results, 30 – 1000 MHz, FCC, Class B



Diagram, Peak overview sweep

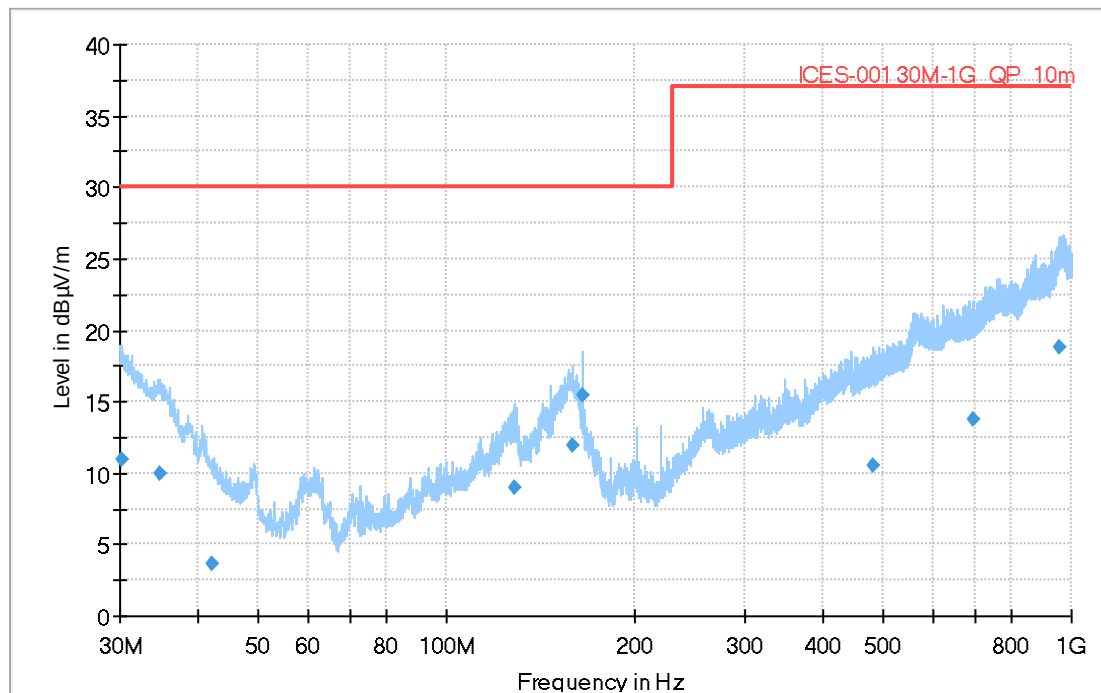
### Measurement results, Quasi-peak

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| 30.120          | 11.01              | 40.00          | 28.99       | 1000.0          | 120.0           | 218.0       | H   | 25.0          | -15          |
| 34.710          | 9.91               | 40.00          | 30.09       | 1000.0          | 120.0           | 100.0       | V   | 173.0         | -17          |
| 42.240          | 3.71               | 40.00          | 36.29       | 1000.0          | 120.0           | 339.0       | V   | 278.0         | -21          |
| 128.340         | 8.99               | 43.52          | 34.53       | 1000.0          | 120.0           | 111.0       | V   | 90.0          | -21          |
| 158.580         | 11.92              | 43.52          | 31.60       | 1000.0          | 120.0           | 100.0       | V   | 186.0         | -22          |
| 165.060         | 15.38              | 43.52          | 28.14       | 1000.0          | 120.0           | 100.0       | V   | 132.0         | -23          |
| 482.040         | 10.50              | 46.02          | 35.52       | 1000.0          | 120.0           | 198.0       | H   | 147.0         | -14          |
| 694.260         | 13.77              | 46.02          | 32.25       | 1000.0          | 120.0           | 239.0       | V   | 87.0          | -10          |
| 959.340         | 18.78              | 46.02          | 27.24       | 1000.0          | 120.0           | 120.0       | V   | 231.0         | -5           |

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

## 5.2 Test results, 30 – 1000 MHz, ICES-001, Group 1, Class B



Diagram, Peak overview sweep

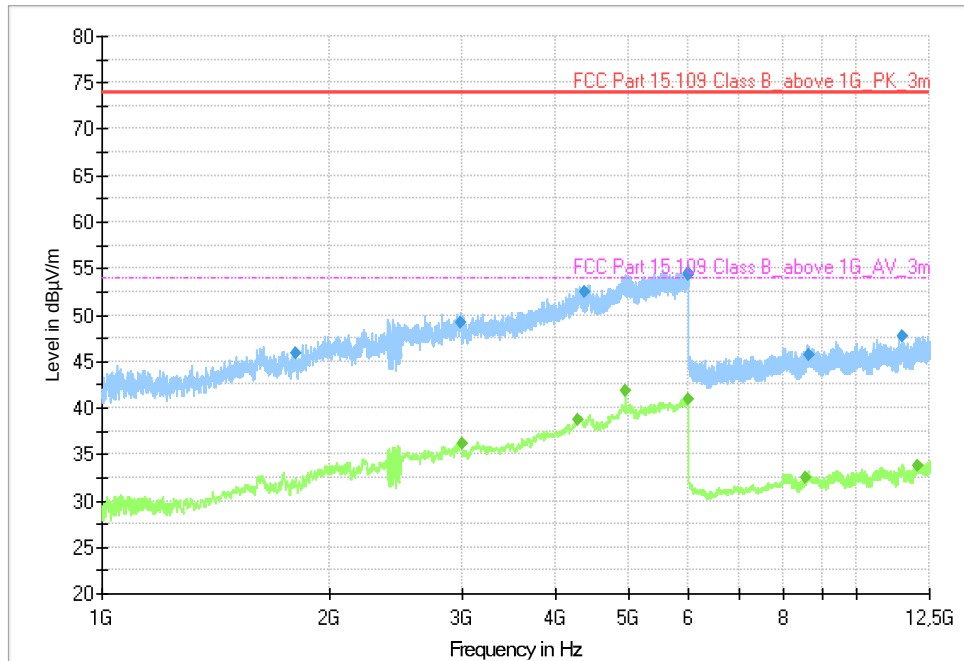
### Measurement results, Quasi-peak

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| 30.120          | 11.01              | 30.00          | 18.99       | 1000.0          | 120.0           | 218.0       | H   | 25.0          | -15          |
| 34.710          | 9.91               | 30.00          | 20.09       | 1000.0          | 120.0           | 100.0       | V   | 173.0         | -17          |
| 42.240          | 3.71               | 30.00          | 26.29       | 1000.0          | 120.0           | 339.0       | V   | 278.0         | -21          |
| 128.340         | 8.99               | 30.00          | 21.01       | 1000.0          | 120.0           | 111.0       | V   | 90.0          | -21          |
| 158.580         | 11.92              | 30.00          | 18.08       | 1000.0          | 120.0           | 100.0       | V   | 186.0         | -22          |
| 165.060         | 15.38              | 30.00          | 14.62       | 1000.0          | 120.0           | 100.0       | V   | 132.0         | -23          |
| 482.040         | 10.50              | 37.00          | 26.50       | 1000.0          | 120.0           | 198.0       | H   | 147.0         | -14          |
| 694.260         | 13.77              | 37.00          | 23.23       | 1000.0          | 120.0           | 239.0       | V   | 87.0          | -10          |
| 959.340         | 18.78              | 37.00          | 18.22       | 1000.0          | 120.0           | 120.0       | V   | 231.0         | -5           |

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

### 5.3 Test results, 1 – 12.5 GHz, FCC, Class B



Diagram, Peak and Average overview sweep

#### Measurement results, MaxPeak and Average

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|------------|-----------------|-------------|-----|---------------|--------------|
| 1803.000        | 45.81            | ---              | 74.0           | 28.2        | 1000       | 1000.000        | 163.0       | H   | 195.0         | -4.4         |
| 2982.500        | 49.18            | ---              | 74.0           | 24.8        | 1000       | 1000.000        | 286.0       | V   | 108.0         | 1.5          |
| 2996.250        | ---              | 36.16            | 54.0           | 17.8        | 1000       | 1000.000        | 247.0       | V   | 150.0         | 1.8          |
| 4261.750        | ---              | 38.71            | 54.0           | 15.3        | 1000       | 1000.000        | 181.0       | H   | 300.0         | 9.5          |
| 4369.000        | 52.39            | ---              | 74.0           | 21.6        | 1000       | 1000.000        | 110.0       | H   | 111.0         | 9.7          |
| 4942.750        | ---              | 41.82            | 54.0           | 12.2        | 1000       | 1000.000        | 102.0       | H   | 159.0         | 11.6         |
| 5974.250        | ---              | 41.00            | 54.0           | 13.0        | 1000       | 1000.000        | 119.0       | H   | 38.0          | 12.2         |
| 5987.000        | 54.39            | ---              | 74.0           | 19.6        | 1000       | 1000.000        | 263.0       | V   | 319.0         | 12.2         |
| 5987.750        | 54.45            | ---              | 74.0           | 19.6        | 1000       | 1000.000        | 150.0       | V   | 287.0         | 12.2         |
| 8581.000        | ---              | 32.42            | 54.0           | 21.6        | 1000       | 1000.000        | 165.0       | V   | 315.0         | 2.0          |
| 8639.500        | 45.71            | ---              | 74.0           | 28.3        | 1000       | 1000.000        | 257.0       | H   | 52.0          | 2.1          |
| 11483.000       | 47.75            | ---              | 74.0           | 26.3        | 1000       | 1000.000        | 282.0       | V   | 144.0         | 2.3          |
| 12059.750       | ---              | 33.84            | 54.0           | 20.2        | 1000       | 1000.000        | 101.0       | H   | 81.0          | 3.2          |

#### 5.4 Test equipment

| Equipment type       | Manufacturer            | Model                               | Inv. No. | Last Cal. date | Cal. interval |
|----------------------|-------------------------|-------------------------------------|----------|----------------|---------------|
| Measurement software | Rohde & Schwarz         | EMC32                               | --       | --             | --            |
| Measurement Receiver | Rohde & Schwarz         | ESW 44                              | 33890    | July-2021      | 1 year        |
| Antenna              | Teseq                   | CBL 6111D                           | 34200    | March-2020     | 3 year        |
| Preamplifier         | Semko                   | AM1331                              | S7992    | September-2021 | 1 year        |
| Measurement cable    | Huber & Suhner          | Sucoflex 106                        | 39122    | May-2021       | 1 year        |
| Measurement cable    | Rosenberger             | LA5-S003-10000                      | 39163    | February-2021  | 1 year        |
| Measurement cable    | Rosenberger             | LA5-S003-8500 (UFB293C)             | 39148    | May-2021       | 1 year        |
| Measurement Receiver | Rohde & Schwarz         | ESW44                               | 34030    | July-2022      | 1 year        |
| Antenna              | Rohde & Schwarz         | HF907                               | 32307    | September-2021 | 3 year        |
| Preamplifier         | Rohde & Schwarz         | TS-PRE1                             | 32306    | October-2022   | 1 year        |
| Measurement cable    | Rosenberger             | LA5-S003-8500 (UFB 293C)            | 39149    | June-2022      | 1 year        |
| Measurement cable    | Rosenberger             | LU7-S074-300 (UFA2 10A)             | 39167    | May-2022       | 1 year        |
| Measurement cable    | Rosenberger             | LU7-S083-3000                       | 39184    | July-2022      | 1 year        |
| Measurement cable    | MEGAPHASE               | GC12-K1K 1-140                      | 39232    | April-2022     | 1 year        |
| Filter               | Wainwright Ins tr. GmbH | WRCGV10 -2381-240 1-2479-24 99-40SS | 34448    | December-2021  | 1 year        |