

Test Report

Report Number:

F241002E6

Equipment under Test (EUT):

Control unit for welding inverters

BCU iWave 190/230 Smart 2

Applicant:

Fronius International GmbH

Manufacturer:

Fronius International GmbH



Deutsche
Akkreditierungsstelle
D-PL-17186-01-00

References

- [1] **ANSI C63.10-2020+Cor.1-2023+C63.10a-2024 + Errata to C63.10a-2024***, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

*Remark: This standard is not in accreditation scope of the laboratory yet.

- [2] **FCC CFR 47 Part 15** Radio Frequency Devices

- [3] **RSS-210 Issue 11 (June 2024)**

Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

- [4] **RSS-Gen, Issue 5 Amendment 2 (2021-02)**

General Requirements for Compliance of Radio Apparatus

Test Result

The requirements of the tests performed as shown in the overview (clause 4) were fulfilled by the equipment under test. The complete test results are presented in the following.

“Passed” indicates that the equipment under test conforms with the relevant limits of the testing standard without taking any measurement uncertainty into account as stated in clause 1.4 of ANSI C63.10 (2020). However, the measurement uncertainty is calculated and shown in this test report.

Tested and
written by:

Signature

Reviewed and
approved by:

Signature

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Contents:	Page
1 Identification	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Test Laboratory	5
1.4 EUT (Equipment under Test)	6
1.5 Technical Data of Equipment	7
1.6 Dates	7
2 Operational States	8
3 Additional Information	9
4 Overview.....	10
5 Results.....	11
5.1 Test setups.....	11
5.2 99 % bandwidth.....	17
5.3 Radiated emissions	18
5.4 AC power-line conducted emissions	23
6 Measurement Uncertainties	26
7 Test Equipment used for Tests	27
8 Test site Verification.....	28
9 Report History.....	28
10 List of Annexes	28

1 Identification

1.1 Applicant

Name:	Fronius International GmbH
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Country:	Austria
Name for contact purposes:	Mr. Jan HERNDLER
Phone:	+43-7242-241-0
eMail address:	herndler.jan@fronius.com
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	Fronius International GmbH
Address:	Fronius Straße 5, 4642 Sattledt
Country:	Austria
Name for contact purposes:	Mr. Jan HERNDLER
Phone:	+43-7242-241-0
eMail address:	herndler.jan@fronius.com
Manufacturer represented during the test by the following person:	None

1.3 Test Laboratory

The tests were carried out by: **PHOENIX TESTLAB GmbH**
Königswinkel 10
32825 Blomberg
Germany

accredited by *Deutsche Akkreditierungsstelle GmbH (DAkkS)* according to DIN EN ISO/IEC 17025:2018. The accreditation is only valid for the scope of accreditation listed in the annex of the certificate D-PL-17186-01-00. FCC Test Firm Designation Number DE0004, FCC Test Firm Registration Number 469623, CAB Identifier DE0003 and ISED# 3469A.

1.4 EUT (Equipment under Test)

Test object: *	Steering unit for welding inverters
Model name: *	BCU iWave 190/230 Smart 2
Model number: *	43,0001,1788
Order number: *	N/A
FCC ID: *	QKWBCU2
IC certification number: *	12270A-BCU2
PMN: *	BCU iWAVE 190/230 Smart 2
HVIN: *	V0.2B
FVIN: *	N/A

	EUT number		
	1	2	3
Serial number: *	00002375	-	-
PCB identifier: *	4,071,879	-	-
Hardware version: *	V0.2B_A	-	-
Software version: *	2.3.0-38650.79495-G2	-	-

* Declared by the applicant

One EUT was used for all tests.

Note: PHOENIX TESTLAB GmbH does not take samples. The samples used for tests are provided exclusively by the applicant.

1.5 Technical Data of Equipment

General						
Power supply EUT: *	DC					
Supply voltage EUT: *	$U_{nom} =$	24.0 V _{DC}	$U_{min} =$	21.6 V _{DC}	$U_{max} =$	26.4 V _{DC}
Temperature range: *	-25 °C to +65 °C					
Lowest / highest internal frequency: *	20 kHz / 2480 MHz					

* Declared by the applicant

RFID part	
Operating frequency: *	13.56 MHz
Number of channels: *	N/A
Type of modulation: *	ISO 14443A/B, ISO 15693, ISO 18092, NFCIP-2
Data rate: *	106 – 848 kbps
Duty cycle: *	N/A
Antenna type: *	PCB antenna
Antenna connector: *	PCB connector

* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
Ethernet *	HSD	RJ45	< 100 m	Yes (CAT6)
Speednet *	HSD	Left open	< 100 m	Yes (CAT6)
DC mains *	Customized	4 mm laboratory plug	≈ 2 m	No
Internal port	Mini-B-USB	Left open	-	Yes
Antenna connector	SMA connector	SMA connector	-	Yes

Equipment used for testing	
NFC Sample Card: * ¹	NTAG213
Laptop PC: * ²	Fujitsu Lifebook USeries

*¹ Provided by the applicant

*² Provided by the laboratory

Ancillary equipment	
-	-

*¹ Provided by the applicant

1.6 Dates

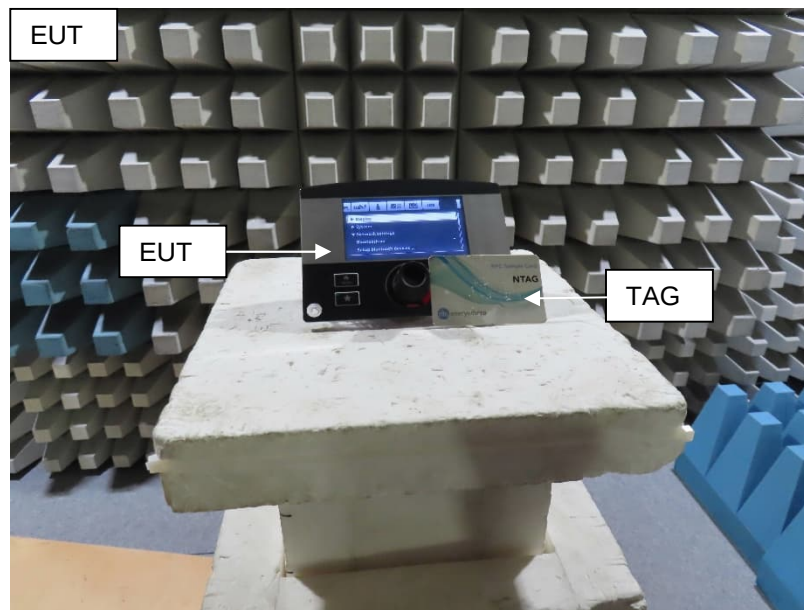
Date of receipt of test sample:	08.07.2025
Start of test:	14.07.2025
End of test:	22.07.2025

2 Operational States

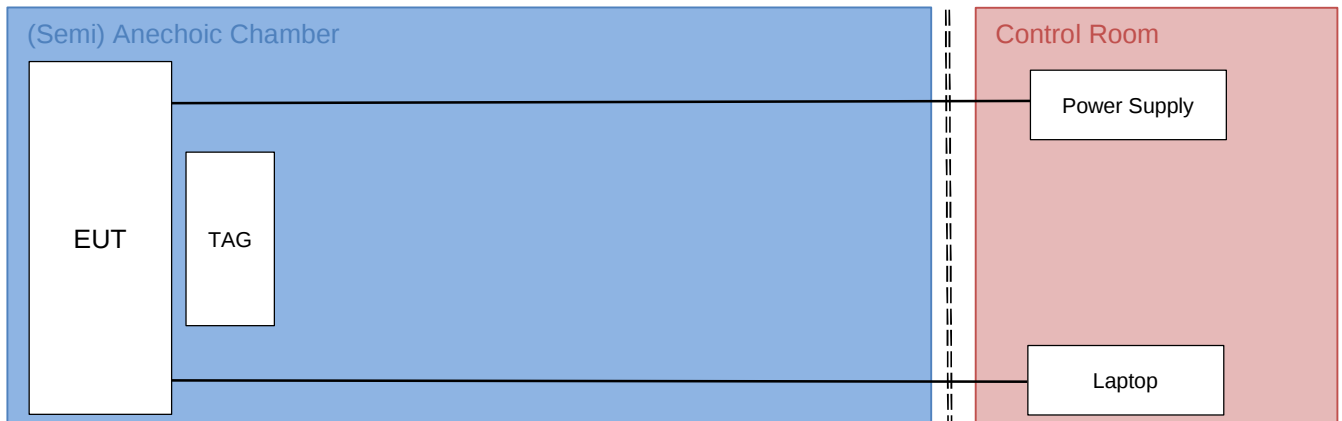
Description of function of the EUT:

The EUT is a control unit with NFC functionality to be inserted into welding inverters. The EUT was powered with 24 V_{DC} and set to read a TAG continuously.

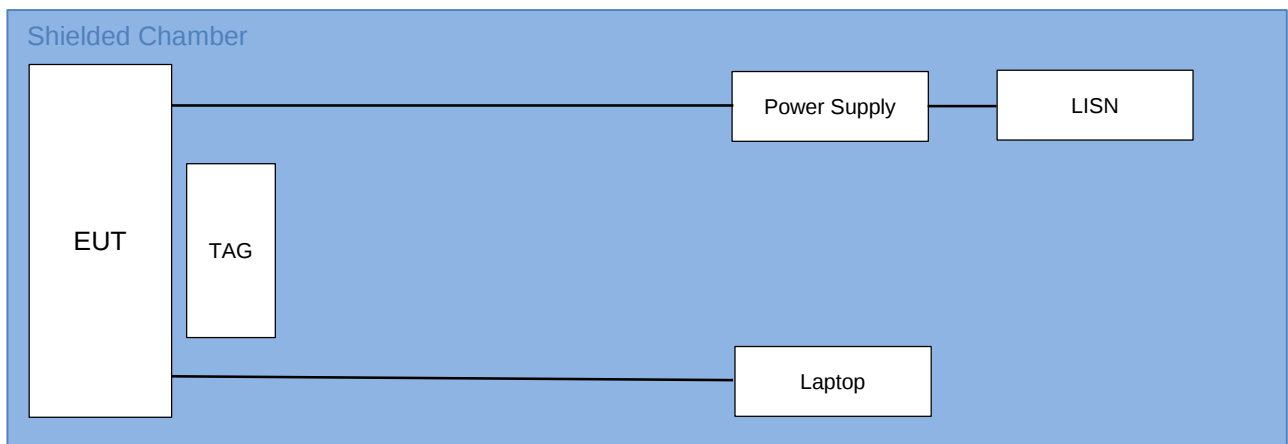
The EUT was set up as follows:



2.1.1 Block Diagram (Radiated)



2.1.2 Block Diagram (Conducted)



3 Additional Information

The EUT was not labeled as required by FCC / IC.
This report contains only the results for the NFC part built in the EUT.

4 Overview

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	RSS-Gen, Issue 5 [4] and RSS-210, Issue 11 [3]	Tested EUT	Status
99 % bandwidth	13.56	-	6.7 [4]	1	Passed
Conducted emissions on supply line	0.15 – 30	15.207 (a)	8.8 [4]	1	Passed
Radiated emissions	0.009 – 1000***	15.205 (a) 15.209 (a)	8.9 and 8.10 [4] 8.1 and 8.3 [3]	1	Passed
Antenna requirement	-	15.203 [2]	6.8 [4]	-	Passed *

*: Integrated antenna only, requirement fulfilled.

**.: No measurement of the receiver spurious emissions was performed, because of a continuously operating co-located transmitter.

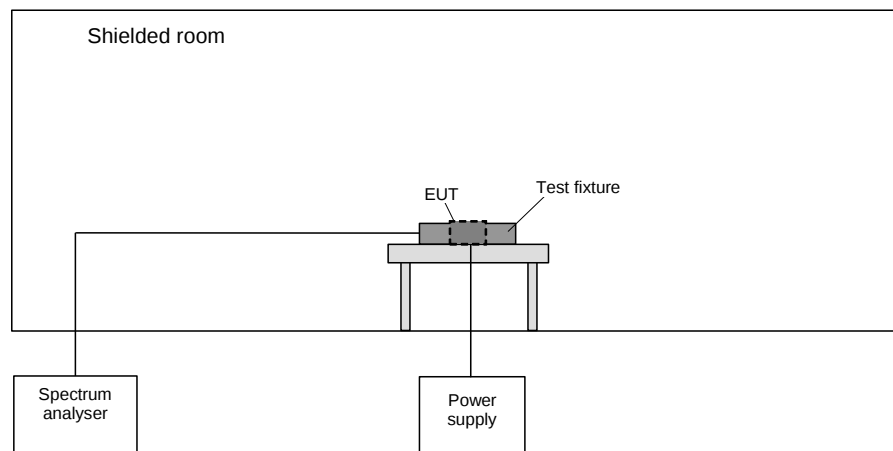
***.: As declared by the applicant the highest radio clock frequency is 13.56 MHz. Therefore the radiated emission measurement must be carried out up to 10th of the highest radio clock frequency in this case 13.56 MHz but was exceeded to 1 GHz in this report.

5 Results

5.1 Test setups

5.1.1 Radiated: Test fixture

The test is carried out in a shielded chamber. Table-top devices are set up on a table and the spectrum analyser is connected to a test fixture / loop antenna, which is placed around / on top of the EUT.



Alternatively, the EUT and test fixture are placed on a non-conductive table inside a temperature chamber if measurements at extreme temperatures are performed.

5.1.2 Radiated: 9 kHz to 30 MHz

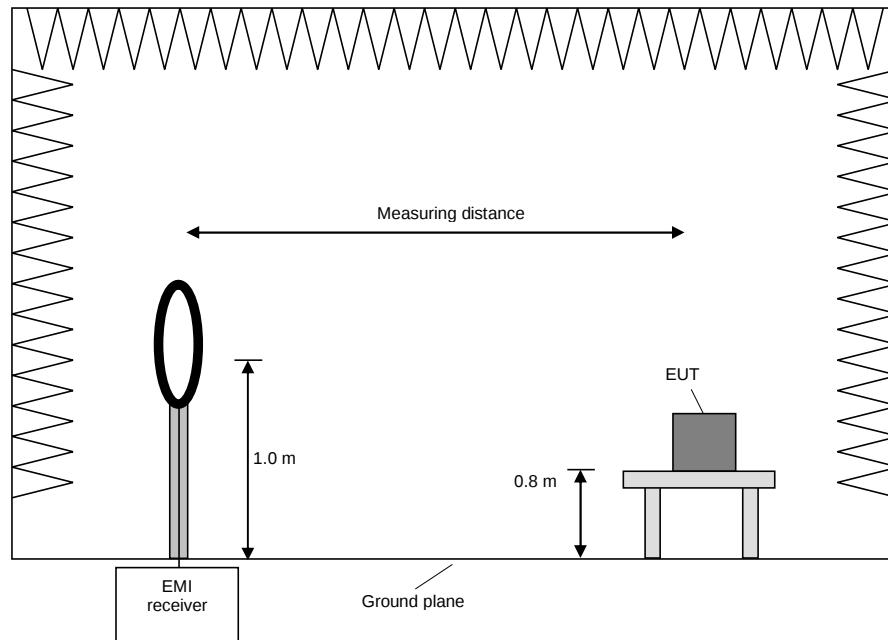
5.1.2.1 Preliminary measurement 9 kHz to 30 MHz

In the first stage a preliminary measurement is performed in a semi-anechoic chamber at a measuring distance of 3 meters. Table-top devices are set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices are placed directly on the turntable / ground plane. The setup of the equipment under test is in accordance with [1].

The frequency range 9 kHz to 30 MHz is monitored with an EMI receiver while the system and its cables are manipulated to find out the configuration with the maximum emission levels if applicable. The EMI receiver is set to MAX hold mode. The EUT and the measuring antenna are rotated around their vertical axis to find the maximum emission levels.

The resolution bandwidth of the EMI receiver is set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



Procedure preliminary measurement:

Pre-scans are performed in the frequency range 9 kHz to 150 kHz and 150 kHz to 30 MHz.

The following procedure is used:

- 1) Monitor the frequency range with the measuring antenna facing the EUT and an EUT / turntable azimuth of 0 °.
- 2) Manipulate the system cables to produce the maximum levels of emissions.
- 3) Rotate the EUT by 360 ° to maximize the detected signals.
- 4) Measure the frequencies of the highest detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency values.
- 5) If the EUT is portable or ceiling mounted, repeat steps 1 to 4 with other orientations (x, y, z) of the EUT.
- 6) Rotate the measuring antenna and repeat steps 1 to 5.

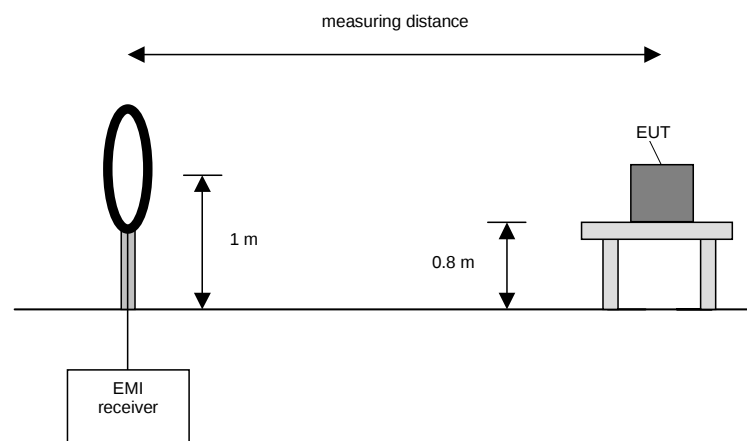
5.1.2.2 Final measurement 9 kHz to 30 MHz

In the second stage a final measurement is performed on an open area test site with no conducting ground plane at a measuring distance of 3 m, 10 m, or 30 m. If the standard requires larger measuring distances for a given frequency, the results are extrapolated according to section 15.31 (f) (2) [2]. The final measurement is performed with an EMI receiver set to Quasi-Peak detector, except for the frequency bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where an Average detector is used according section 15.209 (d) [2].

At the frequencies, which were detected during the preliminary measurements, the final measurement is performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum level value is found.

The resolution bandwidth of the EMI receiver is set to the following values:

Frequency range	Resolution bandwidth	Measuring time
9 kHz to 150 kHz	200 Hz	1 s
150 kHz to 30 MHz	9 kHz	1 s



Procedure final measurement:

The following procedure is used:

- 1) Monitor the selected frequencies from the preliminary measurement with the measuring antenna facing the EUT and an EUT azimuth of 0 °.
- 2) Rotate the EUT by 360 ° to maximize the detected signals.
- 3) Rotate the measuring antenna and repeat steps 1 to 2 until the maximum value is found and note it.
- 4) If the EUT is portable or ceiling mounted, repeat steps 1 to 3 with other orientations (x,y,z) of the EUT.

5.1.3 Radiated: 30 MHz to 1 GHz

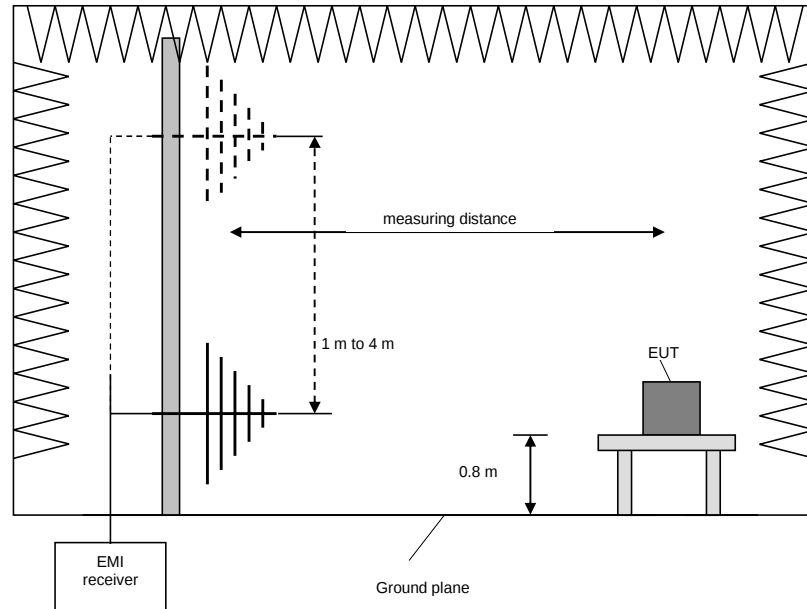
5.1.3.1 Preliminary and final measurement 30 MHz to 1 GHz

The preliminary and final measurements are performed in a semi-anechoic chamber with a metal ground plane at a measuring distance of 3 meters. Table-top devices are set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices are placed directly on the turntable / ground plane. The setup of the equipment under test is in accordance with [1].

During the tests the EUT is rotated in the range of 0 ° to 360 °, the measuring antenna is set to horizontal and vertical polarization and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI receiver is set to the following values:

Test	Frequency range	Step-size	Resolution bandwidth	Measuring time	Detector
Preliminary measurement	30 MHz to 1 GHz	30 kHz	120 kHz	-	Peak Average
Frequency peak search	± 120 kHz	10 kHz	120 kHz	1 s	Peak
Final measurement	30 MHz to 1 GHz	-	120 kHz	1 s	QuasiPeak



Procedure preliminary measurement:

The following procedure is used:

- 1) Set the measuring antenna to 1 m height.
- 2) Monitor the frequency range at horizontal polarization of the measuring antenna and an EUT / turntable azimuth of 0 °.
- 3) Rotate the EUT by 360° to maximize the detected signals.
- 4) Repeat steps 2 to 3 with the vertical polarization of the measuring antenna.
- 5) Increase the height of the measuring antenna for 0.5 m and repeat steps 2 to 4 until the final height of 4 m is reached.
- 6) The highest values for each frequency are saved by the software, including the measuring antenna height and polarization and the turntable azimuth for that value.

Procedure final measurement:

The following procedure is used:

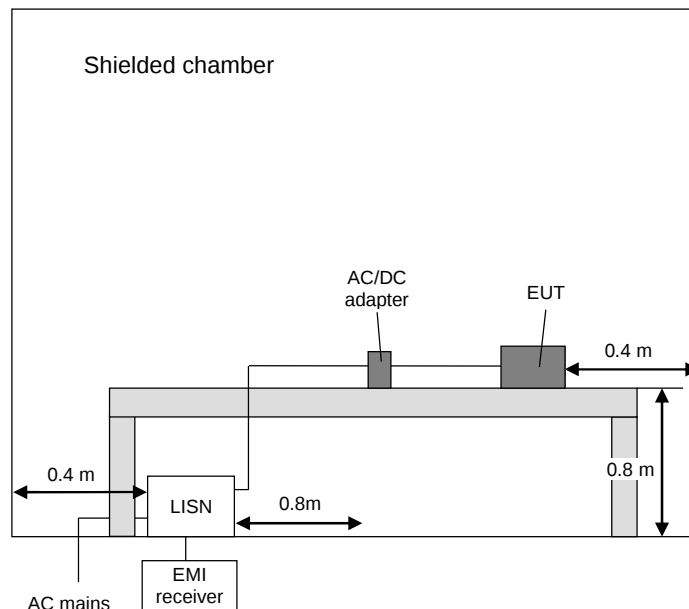
- 1) Select the highest frequency peaks (lowest margin to the limit) for the final measurement.
- 2) The software determines the exact peak frequencies by doing a partial scan with reduced step size of the pre-scan of the selected peaks.
- 3) If the EUT is portable or ceiling mounted, find the worst-case EUT orientation (x, y, z) for the final test.
- 4) The worst-case measuring antenna height is found via varying the height by ± 0.5 m from the value obtained in the preliminary measurement while monitoring the emission level.
- 5) The worst-case turntable position is found via varying the turntable azimuth by $\pm 30^\circ$ from the value obtained in the preliminary measurement while monitoring the emission level.
- 6) The final measurement is performed at the worst-case measuring antenna height and the worst-case turntable azimuth.
- 7) Steps 2 to 6 are repeated for each frequency peak selected in step 1.

5.1.4 Conducted: AC power line

The test is carried out in a shielded chamber. Table-top devices are set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm above the ground plane. Floor-standing devices are placed directly on the ground plane. In case of DC powered equipment, which is not exclusively powered by a battery, it is connected to the LISN via a suitable AC/DC adaptor. The setup of the equipment under test is in accordance with [1].

The frequency range 150 kHz to 30 MHz is measured with an EMI receiver set to MAX hold mode with Peak and Average detectors and a resolution bandwidth of 9 kHz. A scan is carried out on the phase and neutral line of the AC mains network. If emissions less than 10 dB below the appropriate limit are detected, these emissions are measured with an Average and Quasi-Peak detector on all lines.

Frequency range	Resolution bandwidth	Measuring time
150 kHz to 30 MHz	9 kHz	5 s



5.2 99 % bandwidth

5.2.1 Test setup (99 % bandwidth)

Test setup (99 % bandwidth)			
Used	Setup	See sub-clause	Comment
☒	Radiated: Test fixture	5.1.1	-

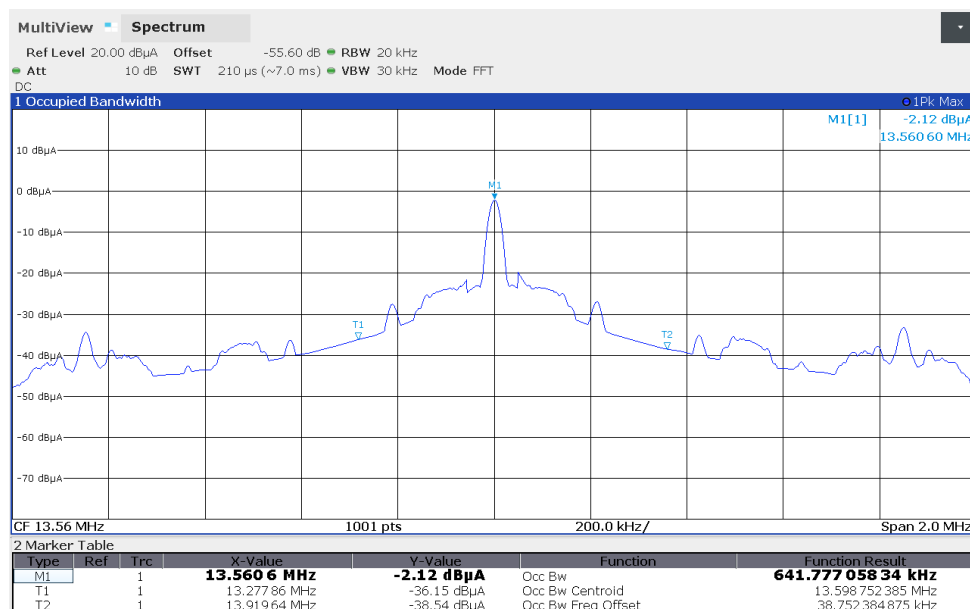
5.2.2 Test method (99 % bandwidth)

Test method (99 % bandwidth)				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☒	6.9.3	Occupied bandwidth – power bandwidth (99%) measurement procedure	-	-

5.2.3 Test results (99 % bandwidth)

Ambient temperature:	22 °C
Relative humidity:	59 %

Date:	22.07.2025
Tested by:	S. KREHS



F_L	F_U	BW ($F_U - F_L$)
13.27786 MHz	13.91964 MHz	641.78 kHz

Test result: Passed

Test equipment (please refer to chapter 7 for details)
1 - 4

5.3 Radiated emissions

5.3.1 Test setup (Maximum unwanted emissions)

Test setup (Maximum unwanted emissions)			
Used	Setup	See sub-clause	Comment
☒	Radiated: 9 kHz to 30 MHz / 30 MHz to 1 GHz	5.1.2 / 5.1.3	-

5.3.2 Test method (Maximum unwanted emissions)

☒ Test method (radiated) see sub-clause 5.1.2 / 5.1.3 as described herein

5.3.3 Test results (Maximum unwanted emissions)

5.3.3.1 Test results preliminary measurement 9 kHz to 30 MHz

Ambient temperature:	23 °C	Date:	15.07.2025
Relative humidity:	58 %	Tested by:	D. BRUSCHINSKI

Position of EUT: For measurements between 9 kHz to 30 MHz, the EUT was set up on a table with a height of 80 cm. The distance between EUT and antenna was 3 m.

Cable guide: For detailed information of test set-up and the cable guide refer to the pictures in annex A in the test report.

Test record: The measurement value was already corrected by 40 dB/decade as described in 47 CFR 15.31(f)(2) regarding to the measurement distance as requested in 47 CFR 15.209(a)

Remark: The EUT was tested in normal installation orientation.

Calculations:

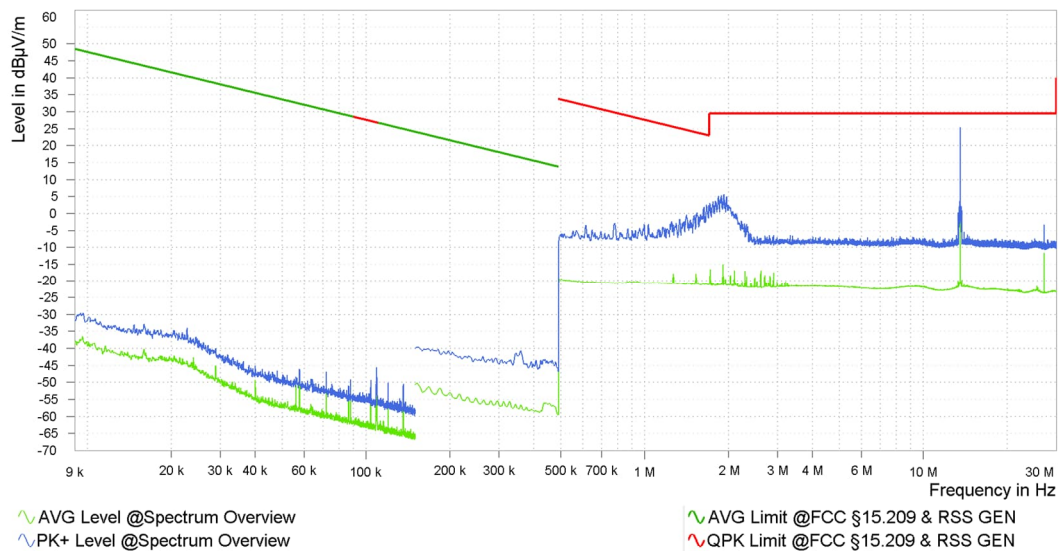
Result @ norm. dist. [dB μ V/m] = Reading [dB μ V] + AF [dB/m] - Distance corr. fact. [dB μ V/m]

Result @ norm. dist. [dB μ A/m] = Result @ norm. dist. [dB μ V/m] – 20 x log₁₀ (377 Ω)

Margin [dB] = Limit [dB(μ V| μ A)/m] - Result [dB(μ V| μ A)/m]

Worst case plot:

Spurious emissions from 9 kHz to 30 MHz:



The following frequency was found in the frequency range 9 kHz to 30 MHz:
- 13.560 MHz

This frequency has to be measured within a final measurement.

Test equipment (please refer to chapter 7 for details)
3, 5 - 12

5.3.3.2 Test results final measurement 9 kHz to 30 MHz

Ambient temperature:	18 °C
Relative humidity:	80 %

Date:	17.07.2025
Tested by:	S. KREHS

The results of the standard subsequent measurement on the outdoor test site are indicated in the table below. The limits as well as the measured results (levels) refer to the above-mentioned standard while taking account of the specified requirements for a 30 m measuring distance.

Results 9 kHz - 30 MHz											
Frequency [MHz]	Reading @ measuring distance [dB(μV)]	Result @ norm. distance [dB(μV/m)]	Result @ norm. distance [dB(μA/m)]	Limit acc. 15.209 [dB(μV/m)]	Limit acc. RSS-Gen Table 6 [dB(μA/m)]	Margin [dB]	Detector	Antenna factor [dB/m]	Measuring distance [m]	Normative distance [m]	Distance correction factor [dB]
13.560	41.1	21.3	-30.2	29.5	-22.0	8.2	QP	20.2	3	30	40

Remark:

The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ω.

For example, the measurement frequency X kHz resulted in the level of Y dBμV/m, which is equivalent to $Y - 51.5 = Z$ dBμA/m, which was the same margin, W dB, to the corresponding RSS-GEN Table 6 as it has to the 15.209(a) limit.

Remark: At 10 m measuring distance the signal of the EUT was below the sensitivity of the measuring system.

Test result: Passed

Test equipment (please refer to chapter 7 for details)
23 - 25

5.3.3.3 Test results (30 MHz – 1 GHz)

Ambient temperature:	23 °C
Relative humidity:	59 %

Date:	14.07.2025
Tested by:	D. BRUSCHINSKI

Position of EUT: For measurements between 30 MHz to 1 GHz, the EUT was set up on a table with a height of 80 cm. The distance between EUT and antenna was 3 m.

Cable guide: For detailed information of test set-up and the cable guide refer to the pictures in annex A in the test report.

Test record: Plots for each frequency range are submitted below.

Remark: All 3 orthogonal planes were tested separately
Operation mode of transmitter: Continuously reading a TAG.

Calculations:

Result [dBμV/m] = Reading [dBμV] + Correction [dBμV/m]

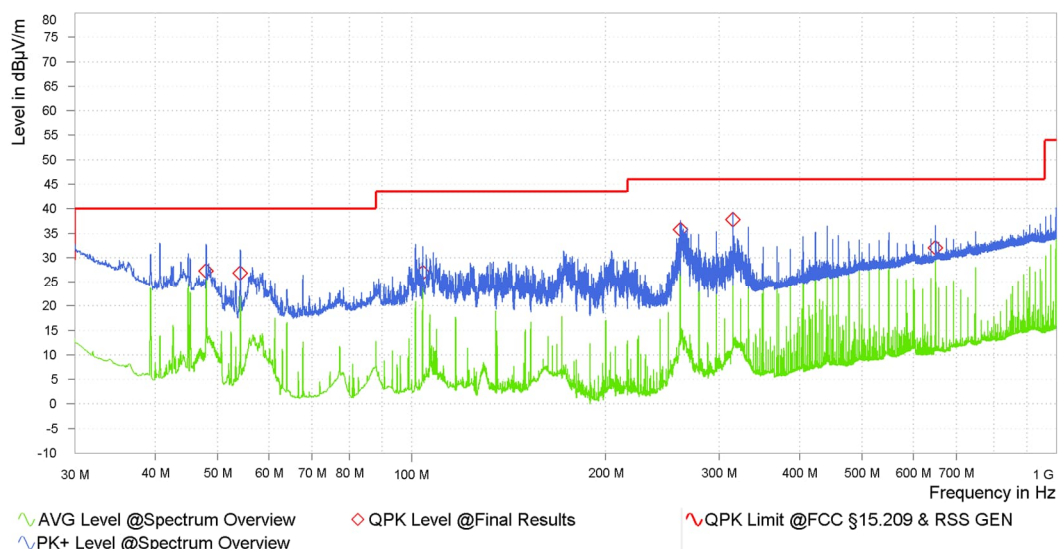
Correction [dBμV/m] = AF [dB/m] + Cable attenuation [dB] + optional preamp gain [dB]

Margin [dB] = Limit [dBμV/m] - Result [dBμV/m]

The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above-mentioned standard. The measured points marked with “◇” are the measured results of the standard subsequent measurement in a semi-anechoic chamber.

Worst case plot:

Spurious emissions from 30 MHz to 1 GHz:



Result tables:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Readings [dBμV]	Correction [dB/m]	Height [cm]	Azimuth [deg]	Pol. (H/V)
48.00	27.2	40.0	12.8	12.3	14.9	132	371	V
54.24	26.8	40.0	13.2	14.6	12.2	109	370	V
104.01	27.0	43.5	16.5	9.4	17.6	102	43	V
261.00	35.8	46.0	10.2	18.0	17.8	121	252	H
315.00	37.8	46.0	8.2	18.4	19.4	100	146	H
650.01	32.0	46.0	14.0	5.4	26.6	100	19	V

Test result: Passed

Test equipment (please refer to chapter 7 for details)
3, 6 - 18

5.4 AC power-line conducted emissions

5.4.1 Test setup (Conducted emissions on power supply lines)

Test setup (Conducted emissions on power supply lines)			
Used	Setup	See sub-clause	Comment
☒	Conducted: AC power line	5.1.4	-
☐	Not applicable, because ...	-	-

5.4.2 Test method (Conducted emissions on power supply lines)

Test setup (Conducted emissions on power supply lines)				
Used	Clause [1]	Name of method	Sub-clause	Comment
☒	6.2	Tabletop equipment testing	5.1.4	Provided AC switching power adaptor
☐	6.2	Floor-standing equipment testing	-	-

The AC power adaptor provided by the applicant was used for the tests: UE36LCP1-240150SPA
The power adaptor itself was supplied by 120 V_{AC} 60Hz and 240 V_{AC} 60 Hz.

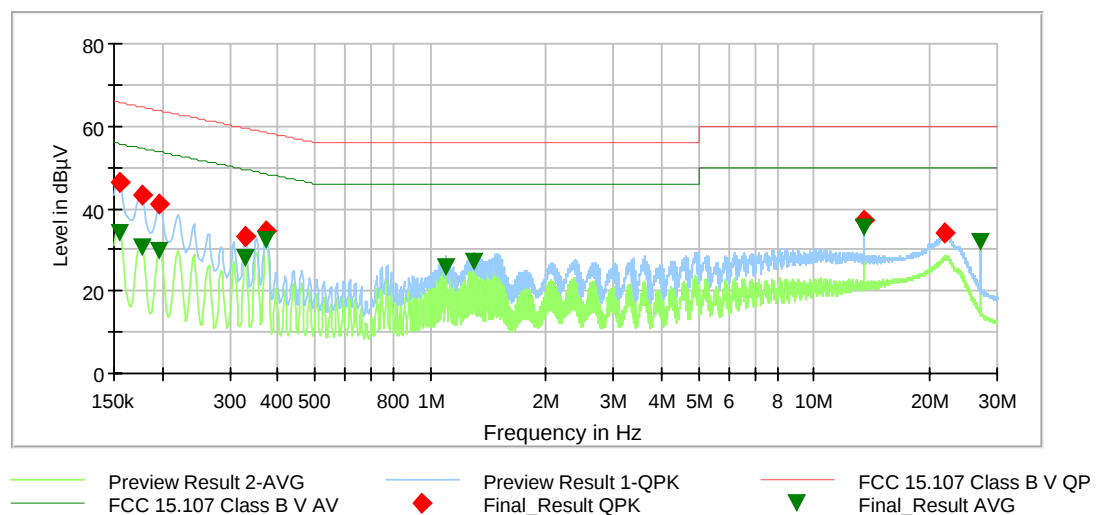
5.4.3 Test results (Conducted emissions on power supply lines)

Ambient temperature:	23 °C
Relative humidity:	64 %

Date:	14.07.2025
Tested by:	B. RHODE

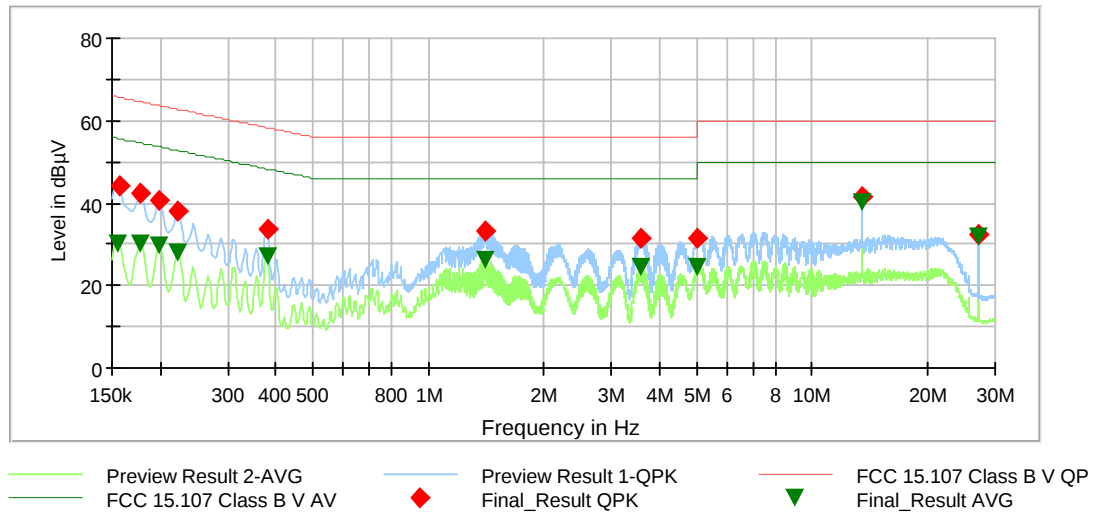
The curves in the diagrams below only represent for each frequency point the maximum measured value of all preliminary measurements which were made for each power supply line. The top measured curve represents the peak measurement and the bottom measured curve the average measurement. The quasi-peak measured points are marked by ◆ and the average measured points by ▼.

Supply voltage power adaptor: 120V_{AC} 60Hz:



Frequency [MHz]	QuasiPeak [dB(µV)]	Average [dB(µV)]	Limit [dB(µV)]	Margin [dB]	Line	PE	Corr. [dB]
0.15450	46.29	---	65.75	19.46	N	GND	19.9
0.15450	---	34.23	55.75	21.52	N	GND	19.9
0.17700	43.22	---	64.63	21.41	N	GND	19.8
0.17700	---	30.71	54.63	23.91	N	GND	19.8
0.19725	---	29.81	53.73	23.92	N	GND	19.8
0.19725	41.08	---	63.73	22.65	L1	FLO	19.8
0.33000	---	28.08	49.45	21.37	L1	FLO	19.7
0.33000	33.40	---	59.45	26.05	L1	FLO	19.7
0.37275	34.37	---	58.44	24.07	L1	GND	19.7
0.37275	---	32.26	48.44	16.18	L1	FLO	19.7
1.09950	---	25.94	46.00	20.06	N	FLO	19.7
1.29750	---	26.94	46.00	19.06	N	FLO	19.8
13.56000	37.34	---	60.00	22.66	L1	FLO	20.3
13.56000	---	35.51	50.00	14.49	N	GND	20.3
21.97725	33.90	---	60.00	26.10	L1	GND	20.3
27.12075	---	32.13	50.00	17.87	L1	GND	20.4

Supply voltage power adaptor: 240V_{AC} 60Hz:



Frequency [MHz]	QuasiPeak [dB(μV)]	Average [dB(μV)]	Limit [dB(μV)]	Margin [dB]	Line	PE	Corr. [dB]
0.15450	---	30.21	55.75	25.54	N	FLO	19.9
0.15675	44.15	---	65.63	21.48	L1	GND	19.9
0.17700	---	30.21	54.63	24.42	N	FLO	19.8
0.17700	42.26	---	64.63	22.37	L1	FLO	19.8
0.19950	---	29.65	53.63	23.98	N	FLO	19.8
0.19950	40.64	---	63.63	22.99	L1	GND	19.8
0.22200	---	27.84	52.74	24.91	N	GND	19.8
0.22200	38.11	---	62.74	24.64	L1	GND	19.8
0.37950	---	26.96	48.29	21.33	L1	FLO	19.7
0.37950	33.62	---	58.29	24.67	L1	GND	19.7
1.40550	33.44	---	56.00	22.56	N	FLO	19.8
1.40550	---	26.10	46.00	19.90	N	FLO	19.8
3.57675	31.62	---	56.00	24.38	N	FLO	20.1
3.59475	---	24.40	46.00	21.60	N	GND	20.1
4.99875	31.34	---	56.00	24.66	N	FLO	20.1
4.99875	---	24.34	46.00	21.66	N	GND	20.1
13.56000	41.69	---	60.00	18.31	L1	GND	20.3
13.56000	---	40.24	50.00	9.76	N	GND	20.3
27.12075	---	31.75	50.00	18.25	N	GND	20.4
27.12075	32.35	---	60.00	27.65	L1	GND	20.4

Test result: Passed

Test equipment (please refer to chapter 7 for details)

19 - 22

6 Measurement Uncertainties

Conducted measurements		
Measurement method	Standard used for calculating measurement uncertainty	Expanded measurement uncertainty (95 %) U_{lab}
Frequency error	ETSI TR 100 028	4.5×10^{-8}
Bandwidth measurements	-	9.0×10^{-8}
Conducted emissions from 150 kHz to 30 MHz with LISN	CISPR 16-4-2	2.8 dB

Radiated measurements		
Frequency error		
(Semi-) Anechoic chamber	ETSI TR 100 028	4.5×10^{-8}
OATS	ETSI TR 100 028	4.5×10^{-8}
Test fixture	ETSI TR 100 028	4.5×10^{-8}
Bandwidth measurements		
(Semi-) Anechoic chamber	-	9.0×10^{-8}
OATS	-	9.0×10^{-8}
Test fixture	-	9.1×10^{-8}
Radiated field strength M20		
CBL6112B @ 3 m 30 MHz – 1 GHz	CISPR 16-4-2	5.3 dB
R&S HL050 @ 3 m		
1 – 6 GHz	CISPR 16-4-2	5.1 dB
6 – 18 GHz	CISPR 16-4-2	5.4 dB
Flann Standard Gain Horns 18 – 40 GHz	-	5.9 dB
Radiated field strength M276		
R&S HL562E @ 3 m 30 MHz – 1 GHz	CISPR 16-4-2	4.8 dB
R&S HL050 @ 3 m	-	
1 – 6 GHz	CISPR 16-4-2	5.1 dB
6 – 18 GHz	CISPR 16-4-2	5.4 dB
Flann Standard Gain Horns 18 – 40 GHz	-	5.9 dB
OATS		
Field strength measurements below 30 MHz on OATS without ground plane	-	4.4 dB

7 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	Loop antenna	22.5 cm	PHOENIX TESTLAB	-	410085	Calibration not necessary	
2	Power Supply	TOE8852 (DC)	Toellner Electronic	51712	480233	Calibration not necessary	
3	Multimeter	971A	Hewlett Packard	JP40010640	480724	02.04.2024	04.2026
4	Signal & spectrum analyser	FSW43	Rohde & Schwarz	102954	483957	10.07.2024	07.2026
5	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059	21.02.2024	02.2026
6	EMC test software	Elektra V5.10.00	Rohde & Schwarz	---	483755	Calibration not necessary	
7	RF Switch Matrix	OSP220	Rohde & Schwarz	101391	482976	Calibration not necessary	
8	Turntable	TT3.0-3t	Maturo	825/2612/.01	483224	Calibration not necessary	
9	Controller	NCD	Maturo	474/2612.01	483226	Calibration not necessary	
10	Semi Anechoic Chamber M276	SAC5-2	Albatross Projects	C62128-A540-A138-10-0006	483227	Calibration not necessary	
11	EMI receiver / Spectrum analyser	ESW44	Rohde & Schwarz	101828	482979	21.02.2024	02.2026
12	DC Power Supply	TOE8951	Toellner Electronic	81995	481252	Calibration not necessary	
13	Attenuator 6 dB	WA2-6	Weinschel	8254	410119	Calibration not necessary	
14	Ultralog antenna	HL562E	Rohde & Schwarz	101079	482978	24.04.2024	04.2027
15	Antenna support tilt mast	BAM 4.5-P-10kg	Maturo	222/2612.01	483225	Calibration not necessary	
16	SPS_EMV	Software	Spitzenberger & Spies	A7078 B22 M1	480114	Calibration not necessary	
17	EMC test system	EMC D 30000 / PAS	Spitzenberger & Spies	A4507 00/1 1110	481301	Calibration not necessary	
18	Control unit	SyCore 1k4	Spitzenberger & Spies	A4507 12/0 1110	481302	19.02.2025	08.2027
19	V-LISN	NSLK8128RC	Schwarzbeck	0412	483186	28.02.2024	02.2026
20	Shielded chamber M155	SK3	Albatross Projects		482786	Calibration not necessary	
21	Software	EMC32 Ver. 10.60.20	Rohde & Schwarz	100619	483182	Calibration not necessary	
22	EMI receiver	ESR7	Rohde & Schwarz	101939	482558	21.02.2024	02.2026
23	Loop antenna	HFH2-Z2	Rohde & Schwarz	100417	481912	21.02.2024	02.2026
24	Outdoor test site	-	PHOENIX TESTLAB	-	480293	Calibration not necessary	
25	EMI receiver / Spectrum analyser	ESI 40	Rohde & Schwarz	100064/040	480355	20.02.2024	02.2026

8 Test site Verification

Test equipment	PM. No.	Frequency range	Type of validation	According to	Val. Date	Val Due
Shielded chamber M155	482784	9 kHz – 30 MHz	GND-Plane	ANSI C63.4-2014	14.11.2022	13.11.2025
OATS Outdoor	480293	9 kHz – 30 MHz	-	ANSI C63.4-2014	-	-
Semi anechoic chamber M276	483227	30 – 1000 MHz	NSA	ANSI C63.4-2014 ANSI C63.4a-2017	01.03.2023	28.02.2026

9 Report History

Report Number	Date	Comment
F241002E6	23.01.2026	Initial Test Report
-	-	-
-	-	-

10 List of Annexes

Annex A Test Setup Photos

4 pages

----- end of test report -----