

Test Report

Report Number:

F251885E10

Equipment under Test (EUT):

Controlunit PILOT3

Applicant:

Fronius International GmbH

Manufacturer:

Fronius International GmbH



Deutsche
Akkreditierungsstelle
D-PL-17186-01-00

References

- [1] ANSIC63.4-2014+C63.4a-2017 American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- [2] FCC 47 CFR Part 2: General Rules and Regulations
- [3] FCC 47 CFR Part 15: Radio Frequency Devices (Subpart B)
- [4] ICES-003 Issue 7: (October 2020) Spectrum Management and Telecommunications. Interference-Causing Equipment Standard. Information Technology Equipment (Including Digital Apparatus) —Limits and Methods of Measurement

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 10.2.8.2 of ANSI C63.4 (2014). However, the measurement uncertainty is calculated and shown in this test report.

Tested by:

Signature

Written by:

Signature

Reviewed and
approved by:

Signature

This test report is only valid in its original form.

Any reproduction of its contents in extracts without written permission of the accredited test laboratory NMI TESTLAB GmbH is prohibited.

The test results herein refer only to the tested sample. NMI TESTLAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the NMI TESTLAB Logo and the TEST REPORT NUMBER.

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	8
2 Operational States	9
3 Additional Information	10
4 Overview	11
5 Results	12
5.1 Test setups	12
5.2 Radiated emissions	17
5.3 AC power-line conducted emissions	25
6 Measurement Uncertainties	27
7 Test Equipment used for Tests	28
8 Test site Verification	29
9 Report History	29
10 List of Annexes	29

1 Identification

1.1 Applicant

Name:	Fronius International GmbH
Address:	Günter-Fronius-Straße 1, 4600 Wels-Thalheim
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:	Partly: Mr. Jan HERNDLER

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:	Partly: Mr. Jan HERNDLER

1.3 Test Laboratory

The tests were carried out by: NMI TESTLAB GmbH formerly 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: *	Control and steering unit for solar inverters
Model name: *	Controlunit PILOT3
Model number: *	43,0001,1844
Order number: *	N/A
FCC ID: *	QKWPILOT3
IC certification number: *	12270A-PILOT3
PMN: *	Controlunit PILOT3
HVIN: *	V1.1A_A
FVIN: *	N/A

	EUT number	
	1	Type plate
Serial number: *	036007 0003	
PCB identifier: *	4,071,926,RD	
Hardware version: *	V1.1A_A	
Software version: *	N/A	

* Declared by the applicant

One EUT was used for all tests.

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

1.5 Technical Data of Equipment

General EUT data			
Power supply EUT: *	DC		
Supply voltage EUT: *	$U_{nom} = 12 \text{ V}_{DC}$	$U_{min} = 10.8 \text{ V}_{DC}$	$U_{max} = 13.2 \text{ V}_{DC}$
Supply voltage EUT: *	$U_{nom} = 24 \text{ V}_{DC}$	$U_{min} = 22.6 \text{ V}_{DC}$	$U_{max} = 26.4 \text{ V}_{DC}$
Temperature range: *	-40°C to + 65°C		
Lowest / highest internal clock frequency: *	10 kHz / 2462 MHz		

* Declared by the applicant

WLAN part	
Fulfils WLAN specification: *	IEEE 802.11™ (b/g/n (HT20))
Operating frequency range: *	2412 MHz to 2462 MHz
Number of channels: *	11
Type of modulation: *	IEEE 802.11 b: DSSS (1Mbps DBPSK, 2Mbps DQPSK, 5.5/11Mbps CCK) IEEE 802.11 g: OFDM (6/9Mbps BPSK, 12/18Mbps QPSK, 24/36Mbps 16-QAM, 48/54Mbps 64-QAM) IEEE 802.11n (HT20): OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
Antenna type: *	Dipole antenna
Antenna name: *	Taoglas GW.40
Antenna gain: *	3.15 dBi
Antenna connector: *	RP-SMA-Reverse

* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
Power connection cable	Customized	Customized	3m	no
Ethernet	RJ45	RJ45	3m	yes
Ethernet	RJ45	Left open	---	---
RS485	RJ45/ Customized (parallel)	Left open	---	---
DC / IO 16 pin	Customized 16 pol plug	Left open	---	---
IN / OUT 4 pin	Customized 4 pol plug	Left open	---	---
-	-	-	-	-

Equipment used for testing	
Laptop PC: * ¹	Fujitsu Lifebook S751 (PM No. 201036)
Power supply * ¹	bel HC24-2.4-AG
Ethernet switch with fibre optic port * ¹	FL SWITCH SFN 7GT/SX, Phoenix Contact (order no. 2891518)

*¹ Provided by the laboratory

1.6 Dates

Date of receipt of test sample:	17.02.2026
Start of test:	25.02.2026
End of test:	27.02.2026

2 Operational States

Description of function of the EUT:

The EUT is a control and steering unit for solar inverters, equipped with IEEE 802.11 WiFi for communication purposes.

The following states were defined as the operating conditions:

For radiated measurements:

The EUT was supplied by 24 V DC (as declared by the applicant, 24 V DC is the normally used case, only 24 V input was used for the test) from a laboratory power supply and connected to the ground of the floor. Both ethernet ports were connected to a laptop and a Fping command was running to simulate a continuous load.

The antenna port was terminated with a 50 Ohm resistor. The WLAN AP was open and in standby mode. The other ports were not connected as requested by the applicant.

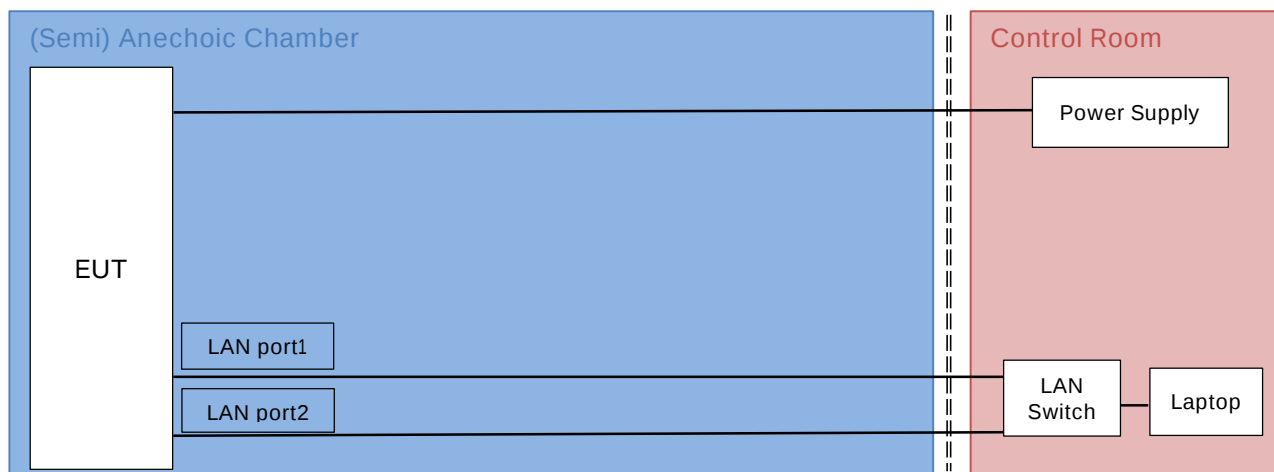
For AC mains conducted measurement:

The EUT was supplied by 24 V DC with a power supply provided by the test laboratory.

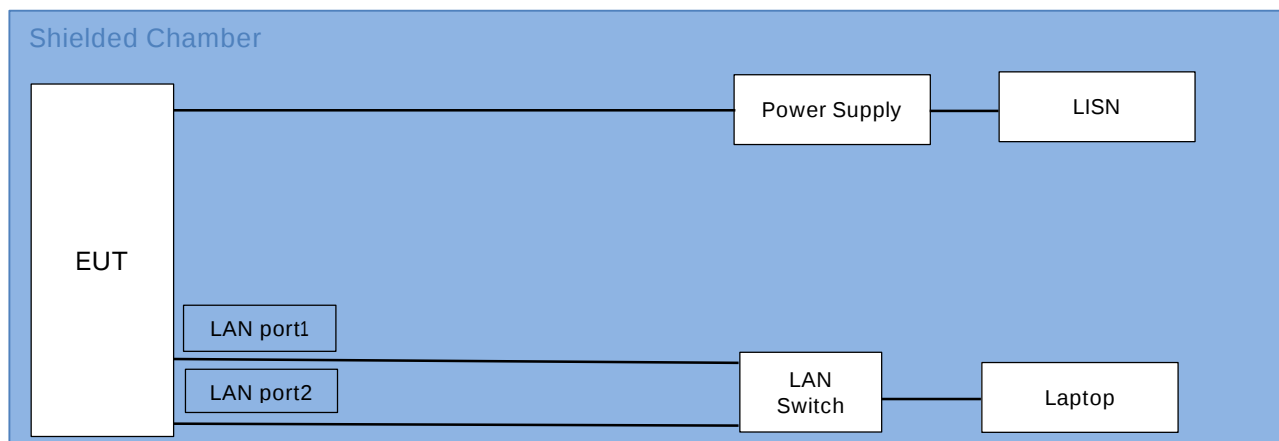
Both ethernet ports were connected to a laptop and a Fping command was running to simulate a continuous load.

The antenna port was terminated with a 50 Ohm resistor. The WLAN AP was open and in standby mode. The other ports were not connected as requested by the applicant.

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.

4 Overview

Conducted emissions FCC 47 CFR Part 15 section 15.107 (a), (b) [3] ICES-003 Issue 7 section 3.2.1[4]					
Application	Frequency range	Limits	Reference standard	Tested EUT	Status
AC supply line Class B	0.15 to 0.5 MHz	66 to 56 dB(μV) QP* 56 to 46 dB(μV) AV*	ANSI C63.4	1	Passed
	0.5 to 5 MHz	56 dB(μV) QP 46 dB(μV) AV			
	5 to 30 MHz	60 dB(μV) QP 50 dB(μV) AV			
*: Decreases with the logarithm of the frequency					

Radiated emissions FCC 47 CFR Part 15 section 15.109 (a) [3]					
Application	Frequency range	Limits	Reference standard	Tested EUT	Status
Radiated Emission Class B	30 to 88 MHz	40.0 dB(μV/m) QP at 3 m	ANSI C63.4	1	Passed
	88 to 216 MHz	43.5 dB(μV/m) QP at 3 m			
	216 to 960 MHz	46.0 dB(μV/m) QP at 3 m			
	960 to 1000 MHz	54.0 dB(μV/m) QP at 3 m			
	above 1000 MHz	54.0 dB(μV/m) AV at 3 m and 74.0 dB(μV/m) PK at 3 m			

Radiated emissions ICES-003 Issue 7 section 3.2.2 [4]					
Application	Frequency range	Limits	Reference standard	Tested EUT	Status
Radiated Emission Class B	30 to 88 MHz	40.0 dB(μV/m) QP at 3 m	ANSI C63.4	1	Passed
	88 to 216 MHz	43.5 dB(μV/m) QP at 3 m			
	216 to 230 MHz	46.0 dB(μV/m) QP at 3 m			
	230 to 960 MHz	47.0 dB(μV/m) QP at 3 m			
	960 to 1000 MHz	54.0 dB(μV/m) QP at 3 m			
	above 1000 MHz	54 dB(μV/m) AV at 3 m and 74 dB(μV/m) PK at 3 m			

Remark: As declared by the applicant the highest internal clock frequency is 2.462 GHz.
Therefore the radiated emission measurement must be carried out up to 5th of the highest internal clock frequency up to 12.4 GHz, in this case the measurement was carried out up to 13 GHz.

The EUT was classified by the applicant as CLASS B equipment.

5 Results

5.1 Test setups

5.1.1 Radiated: 30 MHz to 1 GHz

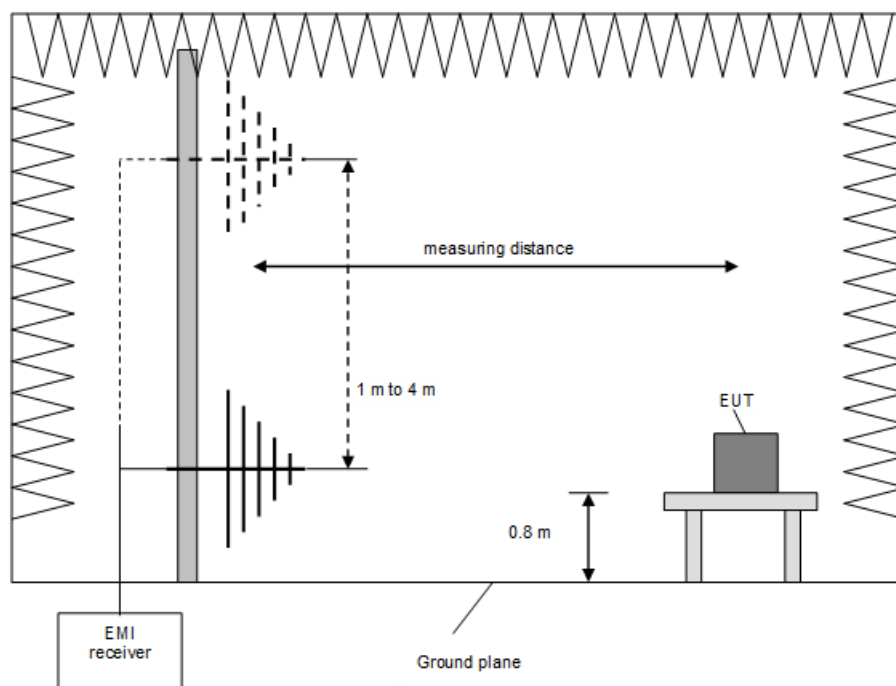
5.1.1.1 Preliminary and final measurement 30 MHz to 1 GHz

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 +/- 30° 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.

5.1.2 Radiated: 1 GHz to 40 GHz

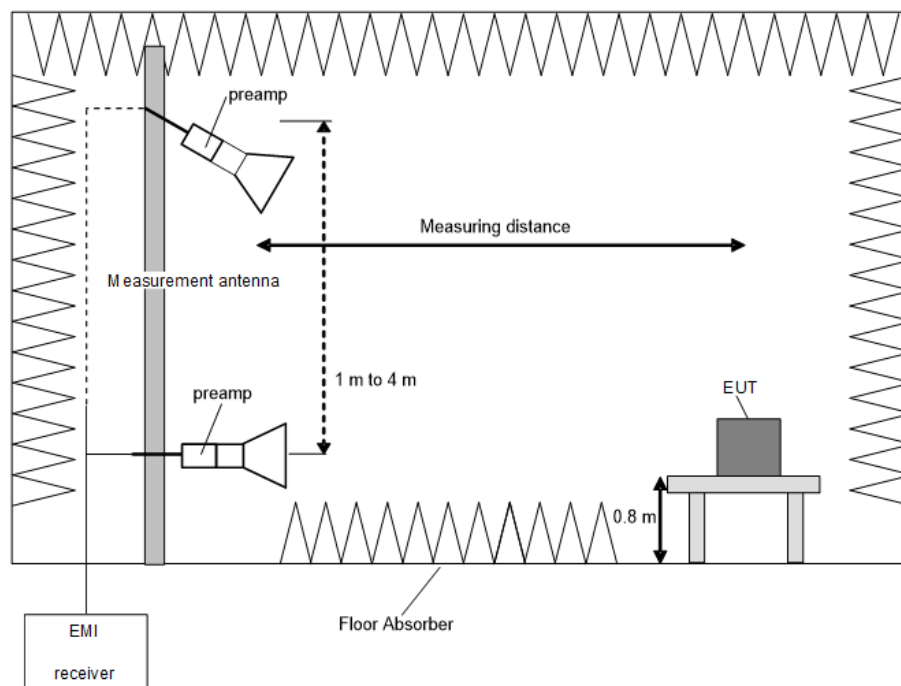
5.1.2.1 Preliminary and final measurement 1 to 40 GHz

The preliminary and final measurements are performed in a semi-anechoic chamber at a measuring distance of 3 meters, with floor absorbers between EUT and measuring antenna. 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. While changing the height, the measuring antenna gets tilted so that it is always aiming at the EUT.

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	1 - 40 GHz	250 kHz	1 MHz	-	Peak Average
Frequency peak search	+ / - 1 MHz	50 kHz	1 MHz	100 ms	Peak
Final measurement	1 - 40 GHz	-	1 MHz	100 ms	Peak Average



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:

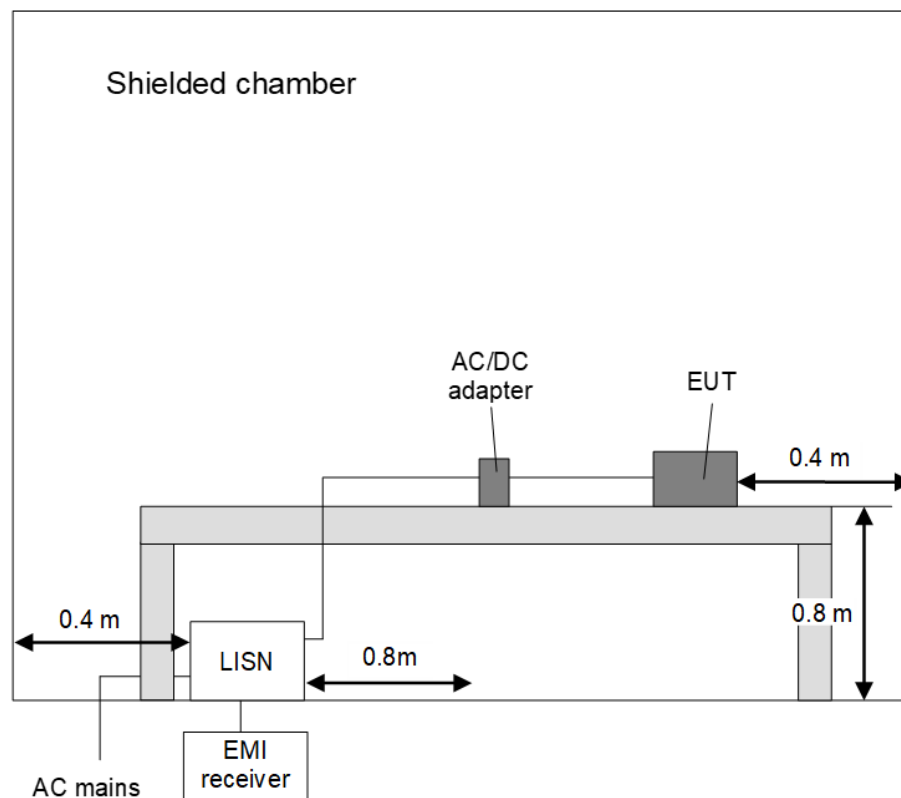
- 1) Select the highest frequency peaks (lowest margin to the limit) for the final measurement.
- 2) The software determines the exact peak frequencies by doing a partial scan with reduced step size of the pre-scan of the selected peaks.
- 3) If the EUT is portable or ceiling mounted, find the worst-case 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 +/- 30° 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.

5.1.3 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 Radiated emissions

5.2.1 Test setup (Maximum unwanted emissions)

Test setup (Maximum unwanted emissions)			
Used	Setup	See sub-clause	Comment
☒	Radiated: 30 MHz to 1 GHz / 1 GHz to 40 GHz	5.1.1 / 5.1.2	-

5.2.2 Test method (Maximum unwanted emissions)

☒ Test method (radiated) see sub-clause 5.1.1 / 5.1.2 as described herein

5.2.3 Test results (Maximum unwanted emissions)

5.2.3.1 Test results (30 MHz – 1 GHz)

Ambient temperature:	22 °C
Relative humidity:	23 %

Date:	25/26/27.02.2026
Tested by:	M. EPPINGER

Position of EUT: For tests for between 30 MHz and 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 setup and the cable guide refer to the pictures in annex A of this test report.

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

Remark: All 3 orthogonal planes were tested separately

Calculations:

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

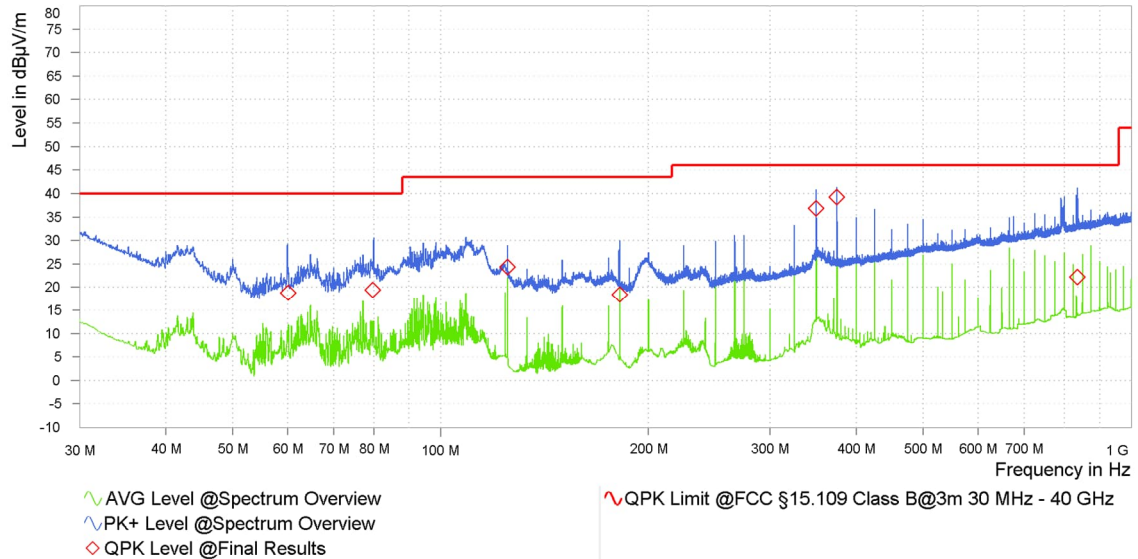
Correction [dB/m] = AF [dB/m] + Cable attenuation [dB] + optional preamp gain [dB]

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.

Spurious emissions from 30 MHz to 1 GHz position 1:

Test plots:



Result tables:

Results according to FCC 47 CFR Part 15 section 15.109 (a), (b) [3]

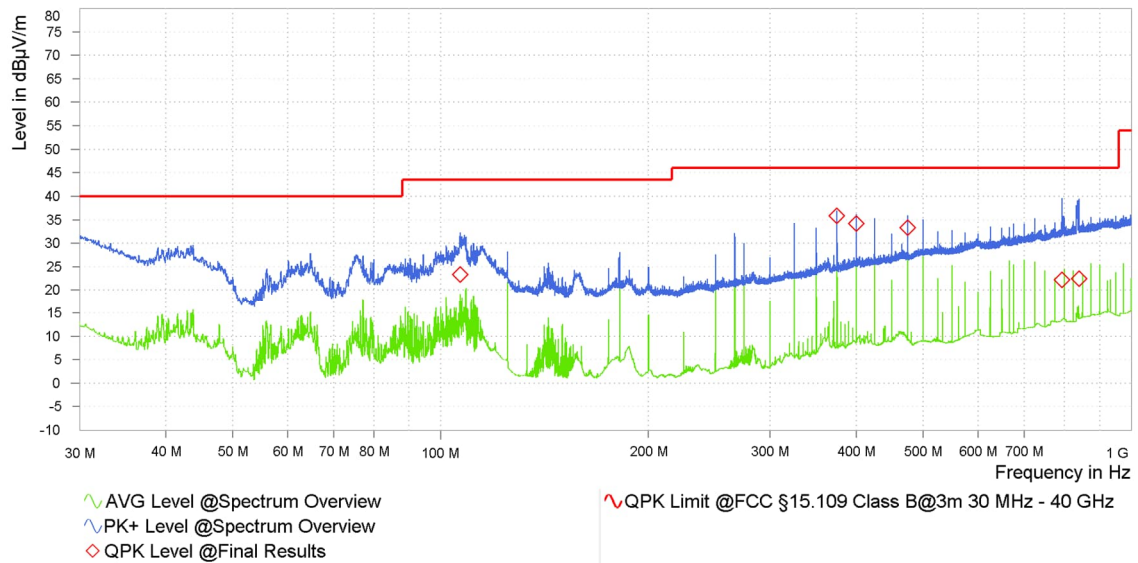
Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Pol. (H/V)	Azimuth [deg]	Height [m]
60.210	18.76	40.00	21.24	12.35	V	152	1.52
79.740	19.38	40.00	20.62	16.14	V	130	1.60
125.010	24.36	43.50	19.14	17.11	V	205	1.11
181.830	18.45	43.50	25.05	15.65	V	134	1.00
350.010	36.82	46.00	9.18	20.43	V	192	1.15
375.000	39.20	46.00	6.80	20.94	V	190	1.33
836.130	22.22	46.00	23.78	28.95	V	267	2.25

Results according to ICES-003 Issue 7 section 3.2.2 [4]

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Pol. (H/V)	Azimuth [deg]	Height [m]
60.210	18.76	40.00	21.24	12.35	V	152	1.52
79.740	19.38	40.00	20.62	16.14	V	130	1.60
125.010	24.36	43.50	19.14	17.11	V	205	1.11
181.830	18.45	43.50	25.05	15.65	V	134	1.00
350.010	36.82	47.00	10.18	20.43	V	192	1.15
375.000	39.20	47.00	7.80	20.94	V	190	1.33
836.130	22.22	47.00	24.78	28.95	V	267	2.25

Spurious emissions from 30 MHz to 1 GHz position 2:

Test plots:



Result tables:

Results according to FCC 47 CFR Part 15 section 15.109 (a), (b) [3]

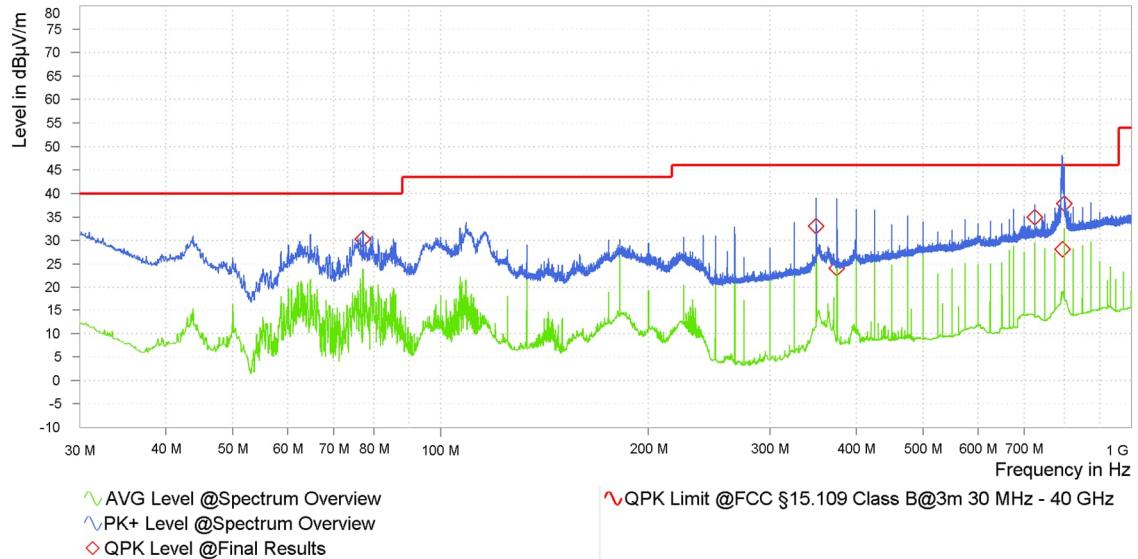
Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Pol. (H/V)	Azimuth [deg]	Height [m]
106.740	23.27	43.50	20.23	17.67	V	242	1.01
375.000	35.78	46.00	10.22	20.94	H	74	2.10
400.020	34.24	46.00	11.76	21.75	H	200	1.54
475.020	33.32	46.00	12.68	23.57	V	246	1.00
793.680	22.24	46.00	23.76	28.25	H	134	1.34
841.020	22.38	46.00	23.62	28.98	V	328	1.45

Results according to ICES-003 Issue 7 section 3.2.2 [4]

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Pol. (H/V)	Azimuth [deg]	Height [m]
106.740	23.27	43.50	20.23	17.67	V	242	1.01
375.000	35.78	47.00	11.22	20.94	H	74	2.10
400.020	34.24	47.00	12.76	21.75	H	200	1.54
475.020	33.32	47.00	13.68	23.57	V	246	1.00
793.680	22.24	47.00	24.76	28.25	H	134	1.34
841.020	22.38	47.00	24.62	28.98	V	328	1.45

Spurious emissions from 30 MHz to 1 GHz position 3:

Test plots:



Result tables:

Results according to FCC 47 CFR Part 15 section 15.109 (a), (b) [3]

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Pol. (H/V)	Azimuth [deg]	Height [m]
77.190	30.28	40.00	9.72	15.77	V	116	1.04
350.010	33.01	46.00	12.99	20.43	H	266	1.01
375.000	24.09	46.00	21.91	20.94	H	170	2.06
725.010	34.90	46.00	11.10	27.55	H	136	1.01
795.000	28.17	46.00	17.83	28.24	H	235	1.07
800.010	37.84	46.00	8.16	28.45	H	132	1.00

Results according to ICES-003 Issue 7 section 3.2.2 [4]

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Pol. (H/V)	Azimuth [deg]	Height [m]
77.190	30.28	40.00	9.72	15.77	V	116	1.04
350.010	33.01	47.00	13.99	20.43	H	266	1.01
375.000	24.09	47.00	22.91	20.94	H	170	2.06
725.010	34.90	47.00	12.10	27.55	H	136	1.01
795.000	28.17	47.00	18.83	28.24	H	235	1.07
800.010	37.84	47.00	9.16	28.45	H	132	1.00

Test result: Passed

Test equipment (please refer to chapter 7 for details)
3-11, 18

5.2.3.2 Test results (radiated 1 to 40 GHz)

Ambient temperature:	22 °C
Relative humidity:	23 %

Date:	25/26/27.02.2026
Tested by:	M. EPPINGER

Position of EUT: For tests between 1 GHz and the 5th harmonic, 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 setup and the cable guide refer to the pictures in annex A of this test report.

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

Remark: Each position was tested separately

Calculation:

Max Peak [dBμV/m] = Reading [dBμV] + Correction [dB/m]

Average [dBμV/m] = Reading [dBμV] + Correction [dB/m]

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

Margin [dB] = Limit [dBμV/m] – Max Peak | Average [dBμV/m]

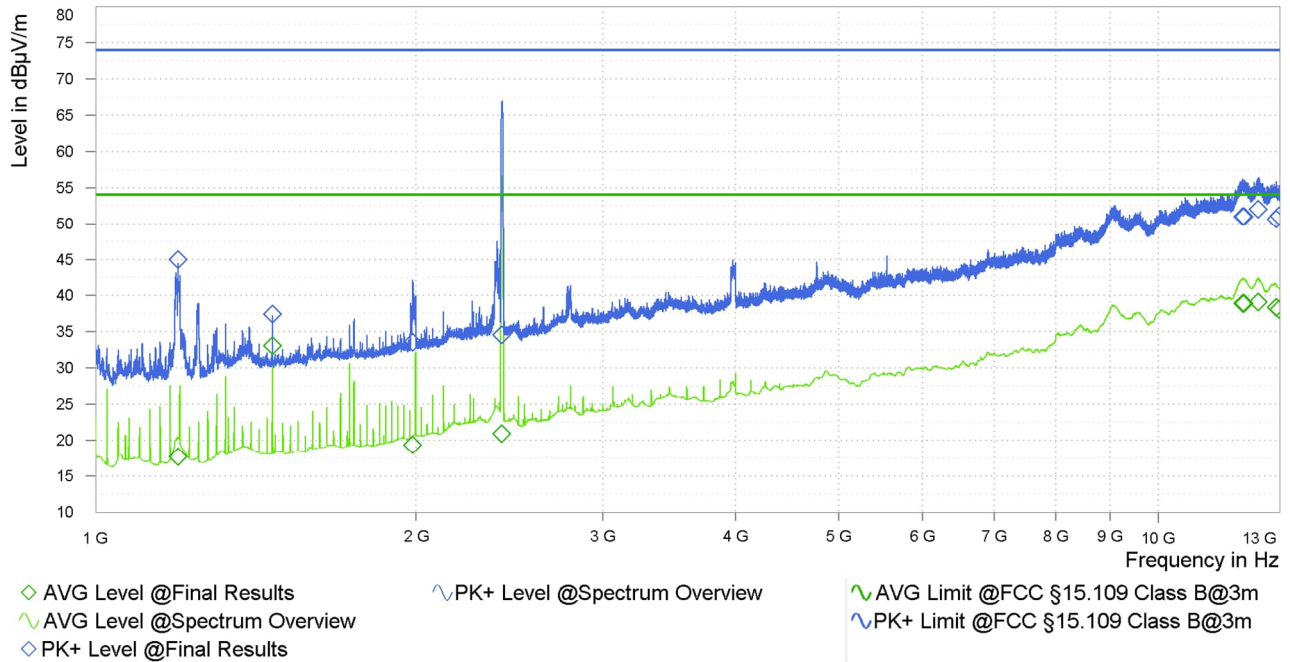
The curves in the diagram only represent the maximum measured value for each frequency point of all preliminary measurements, which were carried out with various EUT and antenna positions.

The top measured curve represents the peak measurement. The measured points marked with "◇" are frequency points for the final peak detector measurement. These values are indicated in the following table.

The bottom measured curve represents the average measurement. The measured points marked with "◇" are frequency points for the final average detector measurement.

Spurious emissions from 1 GHz to 13 GHz position 1:

Test plot:



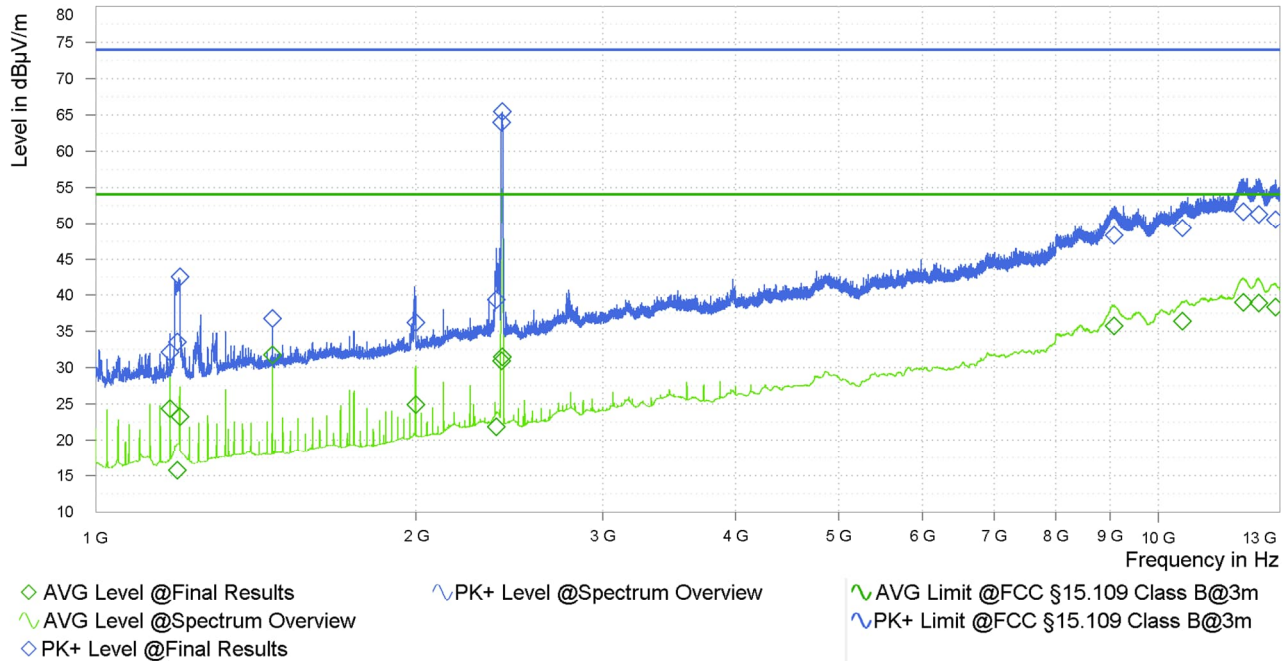
Result table:

Frequency [MHz]	Pk Level [dB(μV/m)]	Pk Limit [dB(μV/m)]	Pk Margin [dB]	AV Level [dB(μV/m)]	AV Limit [dB(μV/m)]	AV Margin [dB]	Corr. [dB/m]	Pol. [H/V]	Azimuth [deg]	Antenna Height [m]
1195.500	44.91	74.00	29.09	17.71	54.00	36.29	-9.60	H	-22	3.22
1466.750	37.48	74.00	36.52	33.04	54.00	20.96	-7.37	H	306	2.72
1988.250	33.52	74.00	40.48	19.37	54.00	34.63	-4.12	H	6	2.49
2411.250	34.57	(Fundamental)		20.98	(Fundamental)		-1.05	V	123	2.26
12007.250	51.00	74.00	23.00	38.96	54.00	15.04	22.11	V	151	3.42
12031.500	51.02	74.00	22.98	38.94	54.00	15.06	22.24	V	25	3.28
12402.000	52.01	74.00	21.99	39.12	54.00	14.88	22.16	H	246	2.91
12902.250	50.63	74.00	23.37	38.36	54.00	15.64	21.68	H	304	2.96
12983.000	51.06	74.00	22.94	38.10	54.00	15.90	21.82	H	287	2.96

The Emission in the 2.4 GHz band is a wanted fundamental emission from the radio part and will therefore not be rated in this test report

Spurious emissions from 1 GHz to 13 GHz position 2:

Test plot:



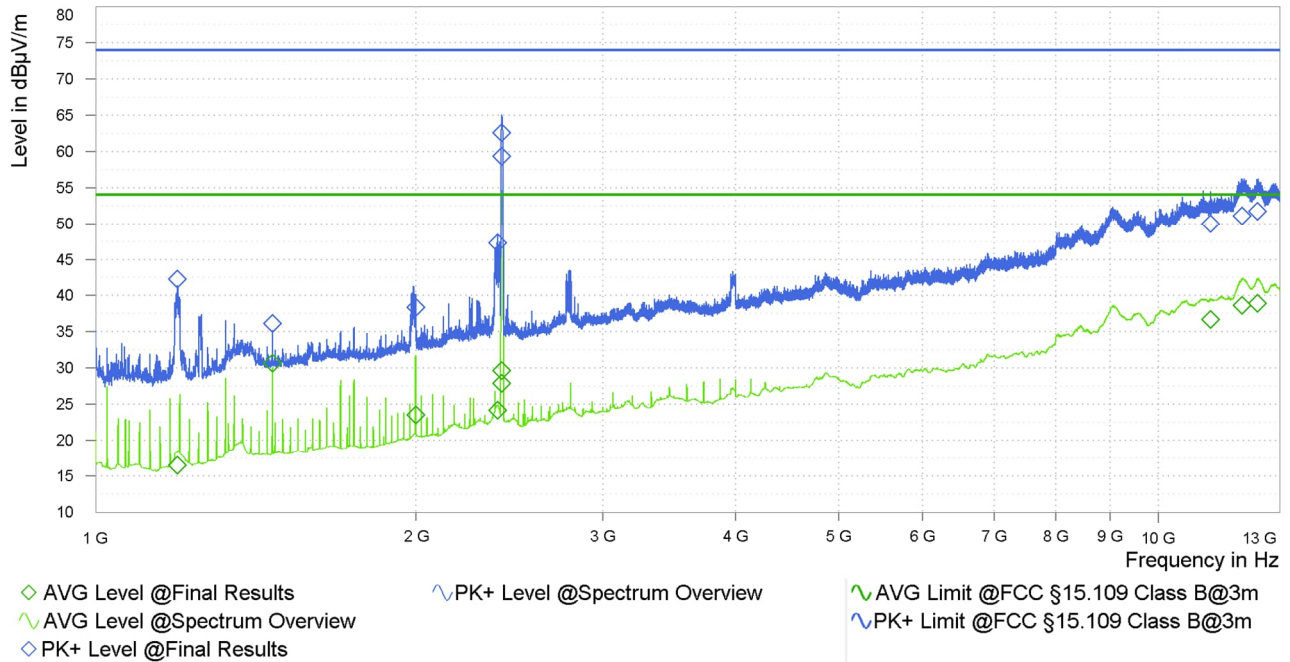
Result table:

Frequency [MHz]	Pk Level [dB(μV/m)]	Pk Limit [dB(μV/m)]	Pk margin [dB]	AV Level [dB(μV/m)]	AV Limit [dB(μV/m)]	AV Margin [dB]	Corr. [dB/m]	Pol. [H/V]	Azimuth [deg]	Antenna Height [m]
1175.000	32.16	74.00	41.84	24.33	54.00	29.67	-9.92	V	115	1.02
1193.000	33.56	74.00	40.44	15.71	54.00	38.29	-9.67	H	197	2.35
1200.000	42.51	74.00	31.49	23.23	54.00	30.77	-9.49	H	199	2.84
1466.750	36.78	74.00	37.22	31.78	54.00	22.22	-7.37	V	87	3.28
2000.000	36.28	74.00	37.72	24.97	54.00	29.03	-4.02	V	39	1.22
2382.000	39.37	74.00	34.63	21.84	54.00	32.16	-1.41	V	223	1.79
2411.250	63.97	(Fundamental)		30.93	(Fundamental)		-1.05	H	147	1.72
2414.750	65.40			31.49			-1.00	H	49	1.12
9080.750	48.29	74.00	25.71	35.76	54.00	18.24	18.26	V	267	3.45
10528.000	49.30	74.00	24.70	36.39	54.00	17.61	19.00	V	139	3.75
12012.000	51.60	74.00	22.40	38.99	54.00	15.01	22.13	V	239	1.00
12433.000	51.22	74.00	22.78	38.91	54.00	15.09	22.17	V	319	1.50
12881.500	50.56	74.00	23.44	38.38	54.00	15.62	21.71	V	223	3.48

The Emission in the 2.4 GHz band is a wanted fundamental emission from the radio part and will therefore not be rated in this test report

Spurious emissions from 1 GHz to 13 GHz position 3:

Test plot:



Result table:

Frequency [MHz]	Pk Level [dB(μV/m)]	Pk Limit [dB(μV/m)]	Pk Margin [dB]	AV Level [dB(μV/m)]	AV Limit [dB(μV/m)]	AV Margin [dB]	Corr. [dB/m]	Pol. [H/V]	Azimuth [deg]	Antenna Height [m]
1194.500	42.24	74.00	31.76	16.52	54.00	37.48	-9.63	V	131	3.58
1466.750	36.16	74.00	37.84	30.67	54.00	23.33	-7.37	V	73	2.59
2000.000	38.35	74.00	35.65	23.58	54.00	30.42	-4.02	H	163	2.99
2387.750	47.29	74.00	26.71	24.18	54.00	29.82	-1.35	V	117	2.81
2410.500	62.59	(Fundamental)		29.66	(Fundamental)		-1.06	V	6	1.35
2411.250	59.33			27.90			-1.05	V	15	1.32
11193.500	50.00	74.00	24.00	36.70	54.00	17.30	20.33	V	226	2.36
11981.000	51.09	74.00	22.91	38.64	54.00	15.36	21.83	H	85	2.80
12397.750	51.70	74.00	22.30	38.94	54.00	15.06	22.14	V	53	1.42

The Emission in the 2.4 GHz band is a wanted fundamental emission from the radio part and will therefore not be rated in this test report

Test result: Passed

Test equipment (please refer to chapter 7 for details)
1-2, 5-11, 18

5.3 AC power-line conducted emissions

5.3.1 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	5.1.3	-
☐	Not applicable, because ...	-	-

5.3.2 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
☒	7.3; 11.5; 11.8	Tabletop equipment testing	5.1.3	-
☐	7.3; 11.6; 11.8	Floor-standing equipment testing	-	-

The AC power adaptor provided by the test laboratory was used for the tests:

bel HC24-2.4-AG, delivering 24 V DC.

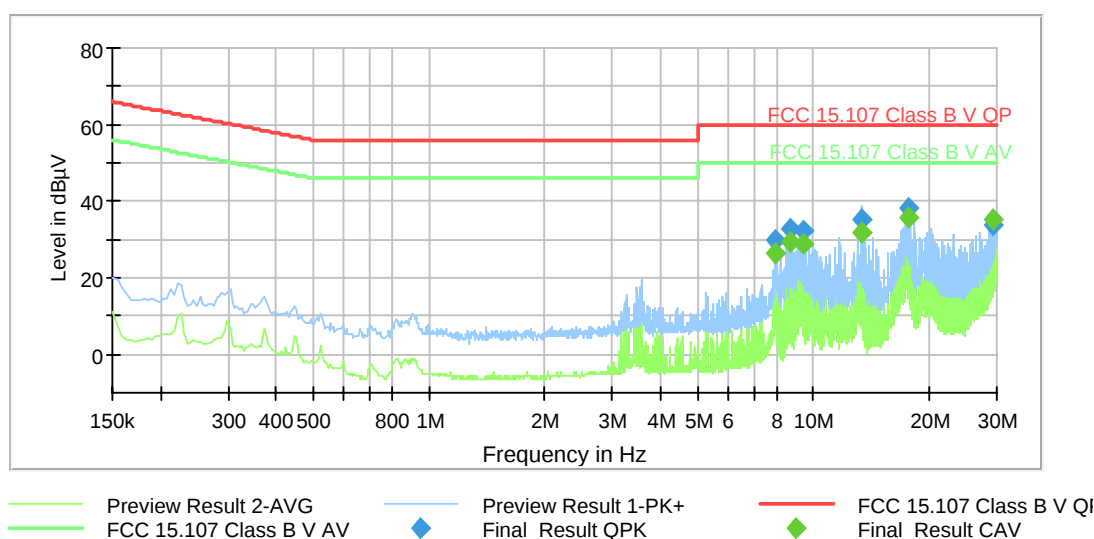
The power adaptor itself was supplied by 120V_{AC} 60Hz.

5.3.3 Test results (Conducted emissions on power supply lines)

Ambient temperature:	22 °C
Relative humidity:	43 %

Date:	27.02.2026
Tested by:	B. ROHDE

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 ◆.



Frequency	QuasiPeak	Average	Limit	Margin	Line	PE	Corr.
-----------	-----------	---------	-------	--------	------	----	-------

[MHz]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]			[dB]
7.922500	29.69	---	60.00	30.31	L1	FLO	10.5
7.923000	---	26.59	50.00	23.41	L1	FLO	10.5
8.717500	---	29.48	50.00	20.52	L1	GND	10.5
8.717500	32.65	---	60.00	27.35	L1	FLO	10.5
9.388500	---	28.93	50.00	21.07	L1	FLO	10.6
9.389000	32.32	---	60.00	27.68	L1	FLO	10.6
13.357500	35.13	---	60.00	24.87	L1	FLO	10.7
13.357500	---	31.96	50.00	18.04	N	FLO	10.8
17.693500	---	35.59	50.00	14.41	N	FLO	11.0
17.694000	38.27	---	60.00	21.73	N	FLO	11.0
29.234500	33.63	---	60.00	26.37	N	FLO	11.4
29.235000	---	35.15	50.00	14.85	N	FLO	11.4

Test result: Passed

Test equipment (please refer to chapter 7 for details)
12 - 17

6 Measurement Uncertainties

Conducted measurements		
Measurement method	Standard used for calculating measurement uncertainty	Expanded measurement uncertainty (95 %) U_{lab}
Conducted emissions from 150 kHz to 30 MHz with LISN	CISPR 16-4-2	2.8 dB

Radiated measurements		
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

7 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	Low Noise Amplifier 10 MHz - 18 GHz	LNA-30- 00101800-25- 10P	Narda-Miteq	2110917	482967	04.02.2026	02.2028
2	Log.-Per. antenna 850 MHz - 26.5 GHz	HL050	Rohde & Schwarz	100908	482977	10.10.2025	10.2028
3	Attenuator 6 dB	WA2-6	Weinschel	---	482793	Calibration not necessary	
4	Ultralog antenna 30 MHz - 6 GHz	HL562E	Rohde & Schwarz	101079	482978	24.04.2024	04.2027
5	EMC test software	Elektra V5.21	Rohde & Schwarz	---	483755	Calibration not necessary	
6	RF Switch Matrix	OSP220	Rohde & Schwarz	101391	482976	Calibration not necessary	
7	Turntable	TT3.0-3t	Maturo	825/2612/.01	483224	Calibration not necessary	
8	Antenna support tilt mast	BAM 4.5-P- 10kg	Maturo	222/2612.01	483225	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	06.02.2026	02.2028
12	LISN	NSLK8128	Schwarzbeck	8128161	480138	04.02.2026	02.2028
13	AC / DC power supply	AC6803A AC Power Source 2000VA	Keysight	JPVJ002509	482350	Calibration not necessary	
14	Software	EMC32 V10.60.20	Rohde & Schwarz	100061	481022	Calibration not necessary	
15	Shielded chamber M4	B83117-S1-X158	Siemens	190075	480088	Calibration not necessary	
16	EMI Receiver / Spectrum Analyser	ESIB 26	Rohde & Schwarz	100292	481182	06.02.2026	02.2028
17	Transient Filter Limiter	CFL 9206A	Teseq GmbH	38268	481982	05.02.2026	02.2028
18	Power supply	TOE8852 (DC)	Toellner Electronic Inst.	51712	480233	Calibration not necessary	

8 Test site Verification

Test equipment	PM. No.	Frequency range	Type of validation	According to	Val. Date	Val Due
Shielded chamber M4	480088	9 kHz – 30 MHz	GND-Plane	ANSI C63.4-2014	21.05.2025	21.06.2028
Semi anechoic chamber M276	483227	30 – 1000 MHz	NSA	ANSI C63.4-2014 ANSI C63.4a-2017	01.03.2023	28.02.2026
Semi anechoic chamber M276	483227	1 -18 GHz	SVSWR	CISPR 16-1-4 + Cor1:2010 + A1:2012 +A2:2017	28.02.2023	27.02.2026

9 Report History

Report Number	Date	Comment
F251885E10	29.06.2026	Initial test report
-	-	-
-	-	-

10 List of Annexes

Annex A	Test setup photos	3 pages
Annex B	Void	
Annex C	Void	
Annex D	Void	

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