

Test Report

Report Number:

F250250E1

Equipment under Test (EUT):

UHF Reader

TN-UHF-Q150-NA-EN

Applicant:

TURCK GmbH

Manufacturer:

Werner Turck GmbH & Co. KG



Deutsche
Akkreditierungsstelle
D-PL-17186-01-00

References

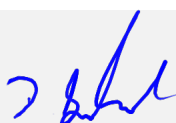
- [1] **ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024***, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
*Remark: This standard is not in the annex of the laboratory yet
- [2] **FCC CFR 47 Part 15**, Radio Frequency Devices
- [3] **558074 D01 15.247 Meas Guidance v05r02 (April 2019)**, GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
- [4] **RSS-247, Issue 4 (2025-07)** Digital Transmission Systems, Frequency Hopping Systems and Licence-Exempt Local Area Network Devices in 902-928 MHz, 2400-2483.5 MHz, 5150-5350 MHz, and 5470-5895 MHz bands
- [5] **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:



Daniel BRUSCHINSKI
16.06.2026

Signature

Reviewed and
approved by:



Manuel BASTERT
16.06.2026

Signature

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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.

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1 Identification

1.1 Applicant

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Country:	Germany
Name for contact purposes:	Dr. Matthias LINDE
Phone:	+49 2353 709 6198
eMail address:	matthias.linde@turck.com
Applicant represented during the test by the following person:	-

1.2 Manufacturer

Name:	Werner Turck GmbH & Co. KG
Address:	Goethestr. 7, 58553 Halver
Country:	Germany
Name for contact purposes:	Mr. Markus TEUBNER
Phone:	+49 2353 709 6124
eMail address:	markus.teubner@turck.com
Manufacturer represented during the test by the following person:	-

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: *	UHF Reader
Model name: *	TN-UHF-Q150-NA-EN
Model number: *	100018055
Order number: *	100018055
FCC ID: *	YQ7-TN-UHF-Q150
IC certification number: *	8821A-TNUHFQ150
PMN: *	TN-UHF-Q150-NA-EN
HVIN: *	2.0
FVIN: *	1.0.0.0

* Declared by the applicant

		EUT number	
		1	2
Serial number: *		0002480132	-
PCB identifier: *	PCB 1:	3692/2	-
	PCB 2:	7901/5	-
	PCB 3:	12927143	-
Hardware version: *		2.0	-
Software version: *		1.0.0.0	-

* 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: *	$U_{nom} = 24.0 \text{ V}_{DC}$	$U_{min} = 12.0 \text{ V}_{DC}$	$U_{max} = 30.0 \text{ V}_{DC}$
Temperature range: *	-30 °C to +50 °C		
Lowest / highest internal frequency:	12 MHz * / 927.250 MHz		

* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
DC power	5 pole M12 plug	4 mm laboratory plug	< 3 m	No
Ethernet 1 / PoE	4 pole M12 plug	RJ45	< 3 m	Yes
Ethernet 2	4 pole M12 plug	Left open	-	-
External antenna	RP-TNC male	50 Ω termination	-	-

Radio frequencies	
Channel 0	902.750 MHz
...	...
Channel 24	914.750 MHz
...	...
Channel 49	927.250 MHz

Radio mode	
Antenna type: *1*2	Internal antenna
Antenna name: *1	TN-UHF-Q150-ANT-RHCP-LHCP
Maximum antenna gain internal antenna (TN-UHF-Q150-ANT-RHCP-LHCP): *3	2.9 dBi
Maximum antenna gain external antenna (TIMES-7 A5060 SlimLine™ CP RAIN (UHF) RFID ANTENNA): *1	10.5 dBic
Antenna connector: *1	RP-TNC male
Type of modulation: *1	FHSS (GFSK)
Adaptive frequency agility: *1	No
Number of channels: *1	50

*1 Declared by the applicant

*2 The EUT may be used with external antennas which must be installed by professionals

*3 Based on antenna report F250250E5 by NMI TESTLAB GmbH

1.5.1 Ancillary Equipment / Equipment used for testing

Equipment used for testing	
Unmanaged ethernet switch *1 *2	TURCK TBEN-LL-SE-U1
I/O module for ethernet *1 *2	TURCK TBEN-L5-16DXP
PLC *1 *2	TURCK TBEN-L5-PLC-10
Test laptop *3	Fujitsu Lifebook U7510
AC adapter *3	bel HC24-2.4-AG

*1 Provided by the applicant

*2 These devices were not essential for the tests and only partly used

*3 Provided by the laboratory

1.6 Dates

Date of receipt of test sample:	11.11.2025
Start of test:	20.11.2025
End of test:	07.05.2026

2 Operational States

2.1 Description of function of the EUT

The EUT is used for contactless data exchange with RFID tags via UHF-RFID.

During all tests, the EUT was supplied with 24 V_{DC} by an external power supply.

The EUT was connected via Ethernet to the test laptop. In the browser in a web interface, the radio settings were set.

The following operation modes were set for the tests:

2.1.1 Operation modes

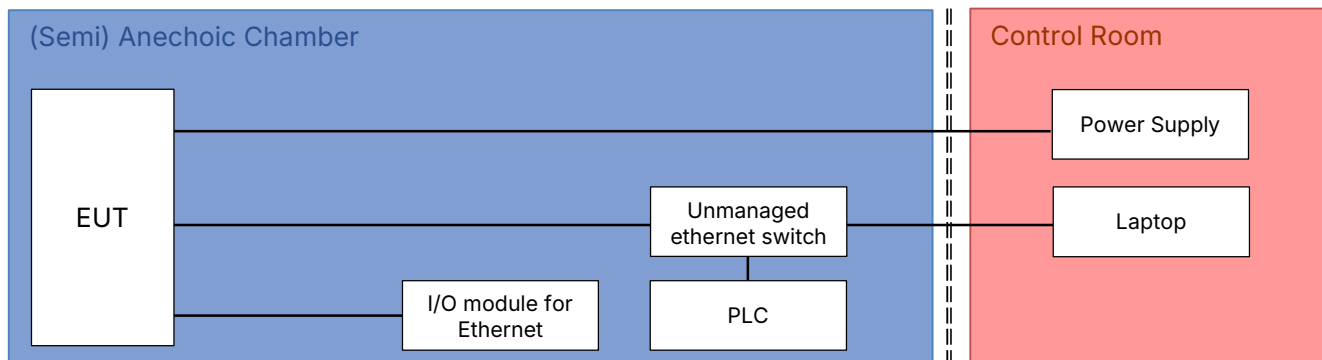
Operation mode	Frequency [MHz]	Channel / Band	Modulation	Power setting
1 * ¹	902.750	0	None	"27 dBm e.i.r.p."
2 * ¹	914.750	24	None	"27 dBm e.i.r.p."
3 * ¹	927.250	49	None	"27 dBm e.i.r.p."
4 * ¹	902.750	0	GFSK	"27 dBm e.i.r.p."
5 * ¹	914.750	24	GFSK	"27 dBm e.i.r.p."
6 * ¹	927.250	49	GFSK	"27 dBm e.i.r.p."
7 * ²	902.750	0	None	"23 dBm conducted"
8 * ²	914.750	24	None	"23 dBm conducted"
9 * ²	927.250	49	None	"23 dBm conducted"
10 * ²	902.750	0	GFSK	"23 dBm conducted"
11 * ²	914.750	24	GFSK	"23 dBm conducted"
12 * ²	927.250	49	GFSK	"23 dBm conducted"

*¹ The maximum selectable output power in the web interface is "27 dBm e.i.r.p.".

*² As declared by the applicant, the device is installed by professionals. As decided by the applicant, the maximum radiated output power of 27 dBm e.r.p. shall not be exceeded. Therefore, the professional installer has to select the antenna gain of the mounted antenna per software so that the conducted output power is reduced automatically. Of the antennas which are specified for the EUT, the highest antenna gain is 10.5 dBic which is equal to 5.35 dBd. Therefore, the maximum allowed conducted output power without exceeding 27 dBm e.r.p. is 21.65 dBm. This power setting is documented with operation modes 7 to 12.

2.2 Block diagrams

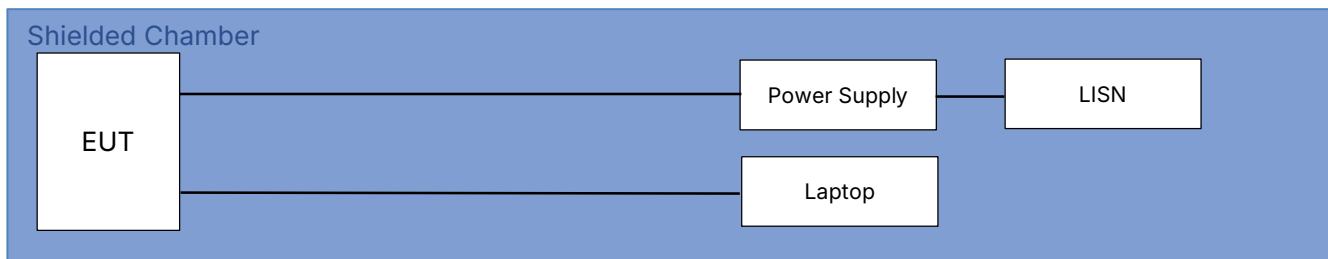
2.2.1 Block diagram (radiated setup 1)



2.2.2 Block diagram (radiated setup 2)



2.2.3 Block Diagram (AC powerline conducted)



3 Additional Information

The EUT was not labeled as required by FCC / IC.

For the radiated tests, partly the setup as shown in clause 2.1.2, and partly the setup in clause 2.1.3 of this test report was used because the PLC, the unmanaged switch and the I/O module are optional and not essential for the tests.

For the radiated tests, the external antenna port was terminated.

The conducted measurements in operation mode 1 - 6 were measured at the internal antenna port and in operation mode 7 - 12 at the external antenna port. Details are shown in annex A of this test report

4 Overview

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	RSS-247 [4] RSS-Gen [5]	Tested EUT	Status
Maximum peak conducted output power	902.0 – 928.0	15.247 (b) (2)	6.3.2 [4]	1	Passed
20 dB bandwidth	902.0 – 928.0	15.247 (a) (1)	6.2.2.1 [4]	1	Passed
99 % bandwidth	902.0 – 928.0	-	6.7 [5]	1	Passed
Carrier frequency separation	902.0 – 928.0	15.247 (a) (1)	6.2.1 [4]	1	Passed
Number of hopping channels	902.0 – 928.0	15.247 (a) (1) (i)	6.2.2.1 [4]	1	Passed
Dwell time	902.0 – 928.0	15.247 (a) (1) (i)	6.2.2.1 [4]	1	Passed
Maximum unwanted emissions	0.009 – 10,000*	15.247 (d) 15.205 (a) 15.209 (a)	5.5 [4] 8.9 [5]	1	Passed*
Conducted emissions at antenna port	0.150 - 10,000	15.247 (d) 15.205 (a) 15.209 (a)	5.5 [4] 8.9 [5]	1	Passed
Antenna requirement	-	15.203 15.247 (b)	6.8 [5]	1	Passed
Conducted emissions on supply line	0.15 – 30	15.207 (a)	8.8 [5]	1	Passed

*: The highest internal radio frequency of the EUT is 927.250 MHz.

Therefore, the radiated emission measurement must be carried out up to 10th of the highest radio clock frequency, in this case 10 GHz.

5 Results

5.1 Test setups

5.1.1 Radiated: 9 kHz to 30 MHz

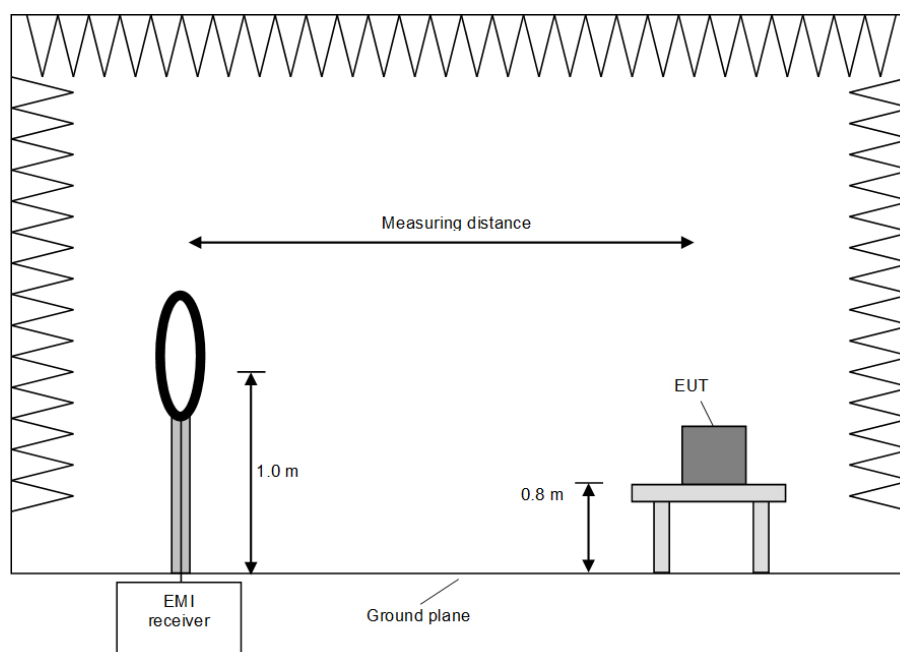
5.1.1.1 Preliminary measurement 9 kHz to 30 MHz

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



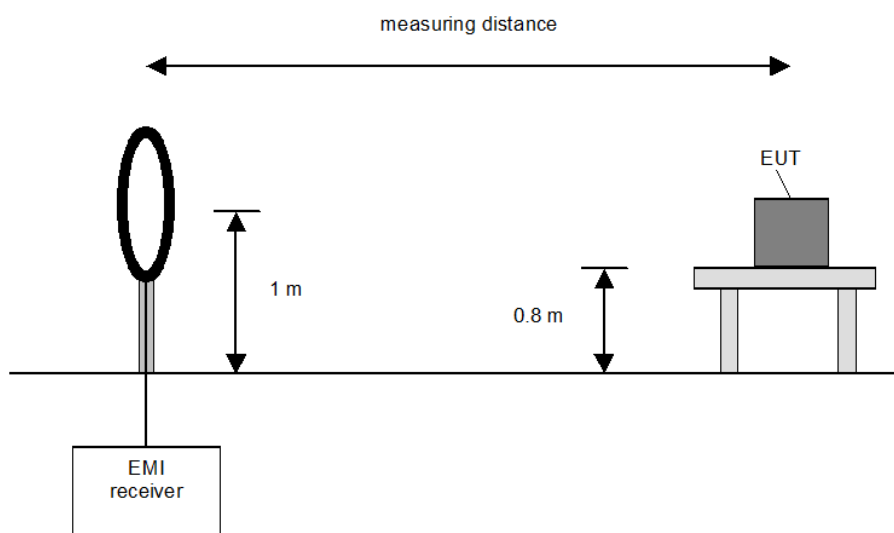
5.1.1.2 Final measurement 9 kHz to 30 MHz

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 to 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



5.1.2 Radiated: 30 MHz to 1 GHz

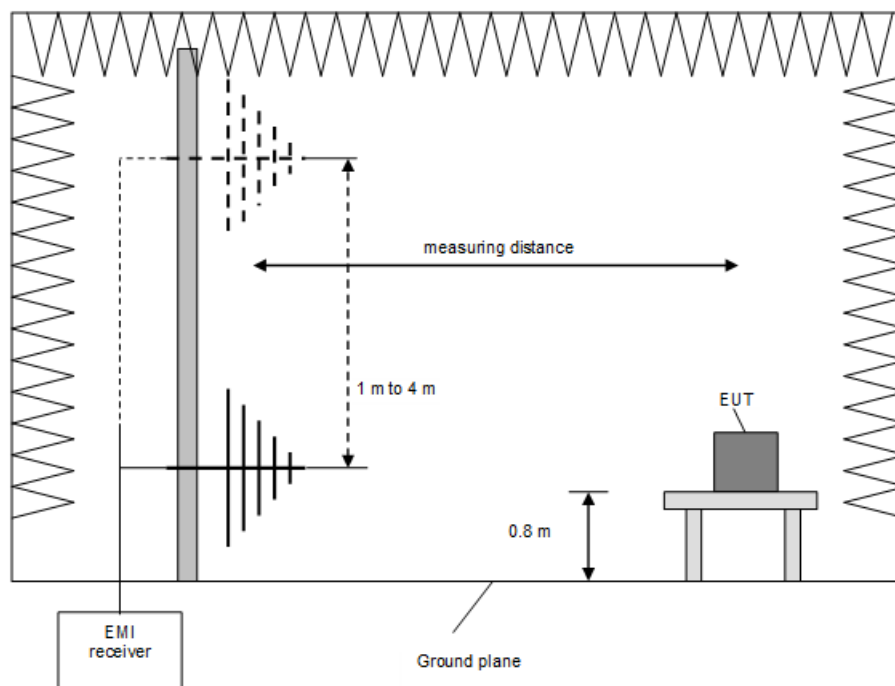
5.1.2.1 Preliminary and final measurement 30 MHz to 1 GHz

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.

5.1.3 Radiated: 1 GHz to 40 GHz

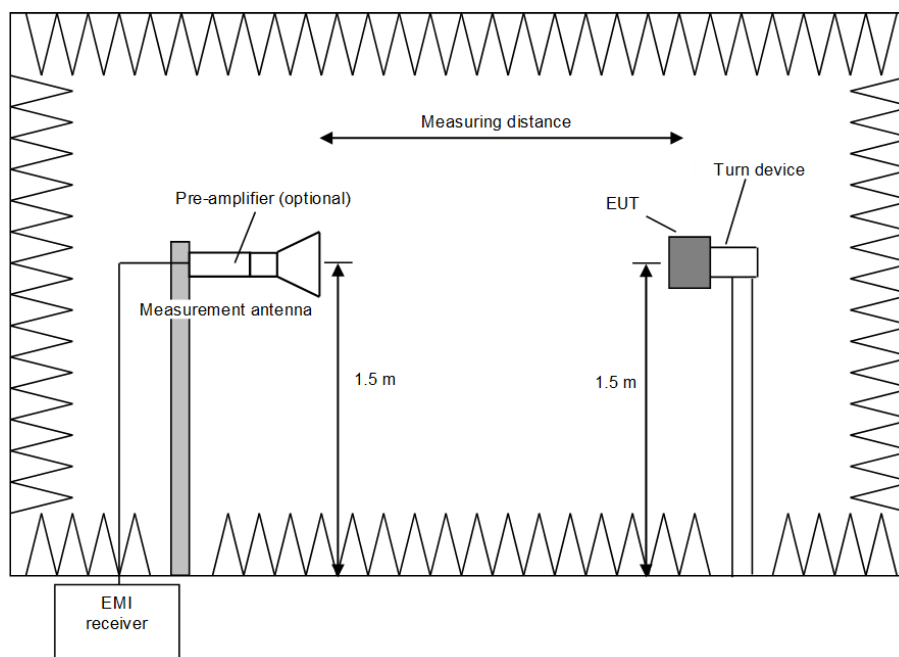
5.1.3.1 Preliminary and final measurement 1 to 40 GHz

The preliminary and final measurements are performed in a fully anechoic chamber at a measuring distance of 3 meters. Table-top devices are set up on a non-conducting turn device at the height of 1.5 m. 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 ° and the measuring antenna is set to horizontal and vertical polarization to find the maximum level of emissions. After these steps, the measurement is repeated after reorientating the EUT in 30 ° steps.

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
Final measurement	1 - 40 GHz	-	1 MHz	100 ms	Peak Average



Procedure preliminary measurement:

The following procedure is used:

- 1) Monitor the frequency range at horizontal polarisation of the measuring antenna and an EUT / turntable azimuth of 0°.
- 2) Rotate the EUT by 360° to maximize the detected signals.
- 3) Repeat steps 1 to 2 with the vertical polarisation of the measuring antenna.
- 4) Repeat steps 1 to 3 with the EUT reorientated by an angle of 30° (60°, 90°, 120° and 150°), according to 6.6.5.4 in [1].
- 5) The highest values for each frequency are saved by the software, including the measuring antenna polarization, the turntable azimuth and the turn device elevation for that value.

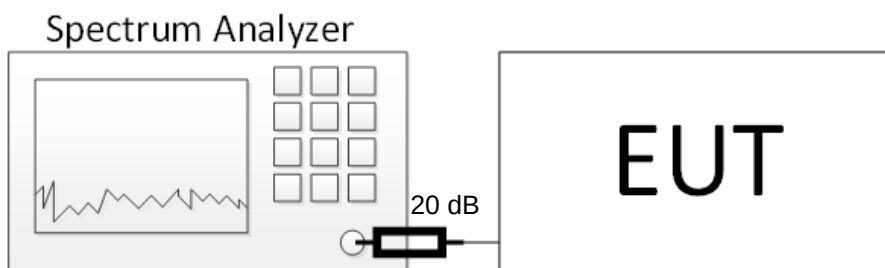
Procedure final measurement:

The following procedure is used:

- 1) Set the turntable and the turn device to the position which leads to the highest emission for the first frequency identified in the preliminary measurements.
- 2) Set the measurement antenna to the polarisation which leads to the highest emission for the first frequency identified in the preliminary measurements.
- 3) Set the spectrum analyser to EMI mode with Peak and Average detector activated.
- 4) 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.
- 5) The final measurement is performed at the worst-case turntable azimuth.
- 6) Repeat steps 1 to 5 for each frequency detected during the preliminary measurements.

5.1.4 Conducted: Antenna port

Test setup (conducted)		
Used	Antenna connector	Comment
☐	Temporary antenna connector	As provided by the applicant
☒	Normal antenna connector	-



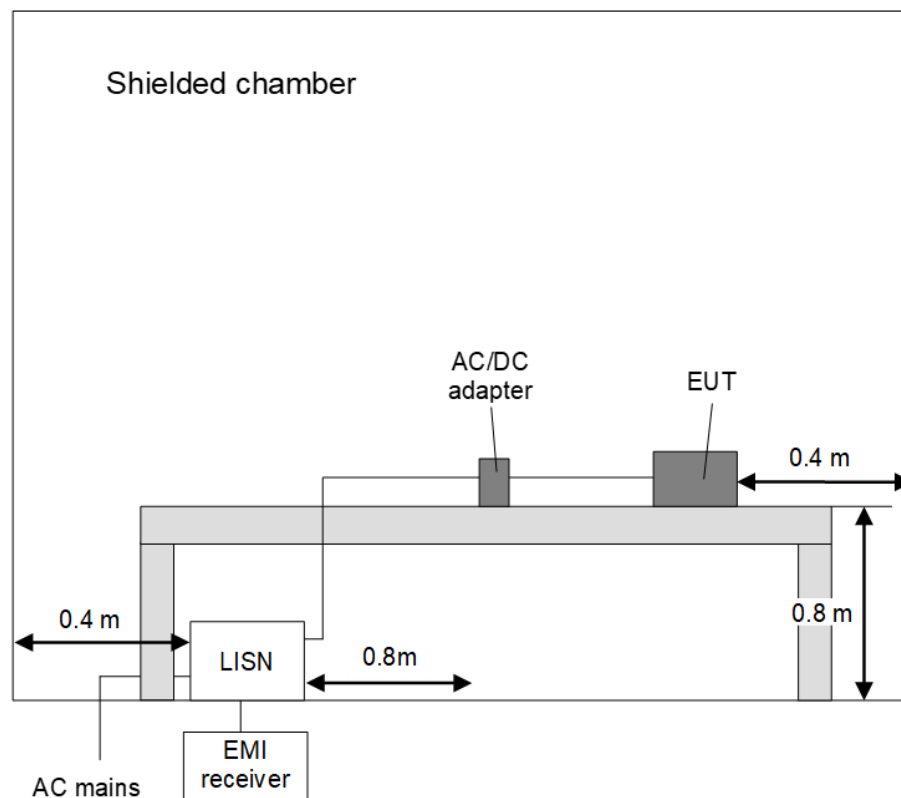
The 20 dB external attenuation is considered in all relevant plots

5.1.5 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 Transmit antenna performance considerations

The EUT has an internal antenna and a RP-TNC male connector for external antennas. As declared by the applicant, the device is intended for professional installation. Furthermore, the antenna specifications for the external antennas are defined in the user manual.

Test setup (Transmit antenna performance considerations)		
Antenna type	Antenna gain $\leq 6\text{dBi}$	Comment
Internal antenna	☒	No output power reduction necessary
External antennas	☐	As declared by the applicant, external antennas with a maximum antenna gain of 10.5 dBi may be used. Transformation of dBi to dBi: $G(\text{dBi}) = G(\text{dBic}) - 3.0 \text{ dB}$ $10.5 \text{ dBic} - 3.0 \text{ dB} = 7.5 \text{ dBi}$ Calculation of output power limit according [1], equation (35): $P_{\text{out}} = P_{\text{Limit}} - (G_{\text{Tx}} - 6)$ where P_{out} = Maximum conducted output power in dBm P_{Limit} = Output power limit in dBm G_{Tx} = Maximum antenna transmitting directional gain in dBi $30 \text{ dBm} - (7.5 \text{ dBi} - 6.0 \text{ dBi}) = 28.5 \text{ dBm}$

As declared by the applicant, the EUT is an industrial device and installed by professionals. Additionally, as declared by the applicant, the maximum radiated output power $P_{\text{e.r.p.}}$ including tune-up range must not exceed 27 dBm. The EUT can be used with the internal antenna or with different external antennas which are specified by the applicant. The professional installer must indicate the antenna gain of the used antenna per software and the conducted output power is reduced automatically so that the maximum radiated output power $P_{\text{e.r.p.}}$ including tune-up range does not exceed 27 dBm.

5.3 20 dB bandwidth

5.3.1 Test setup (20 dB bandwidth)

Test setup			
Used	Setup	See sub-clause	Comment
☐	Radiated: 30 MHz to 1 GHz	5.1.2	-
☒	Conducted: Antenna port	5.1.4	-

5.3.2 Test method (20 dB bandwidth)

Test method (20 dB bandwidth)				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☒	6.9.2	Occupied bandwidth - relative measurement procedure	No limitations	-

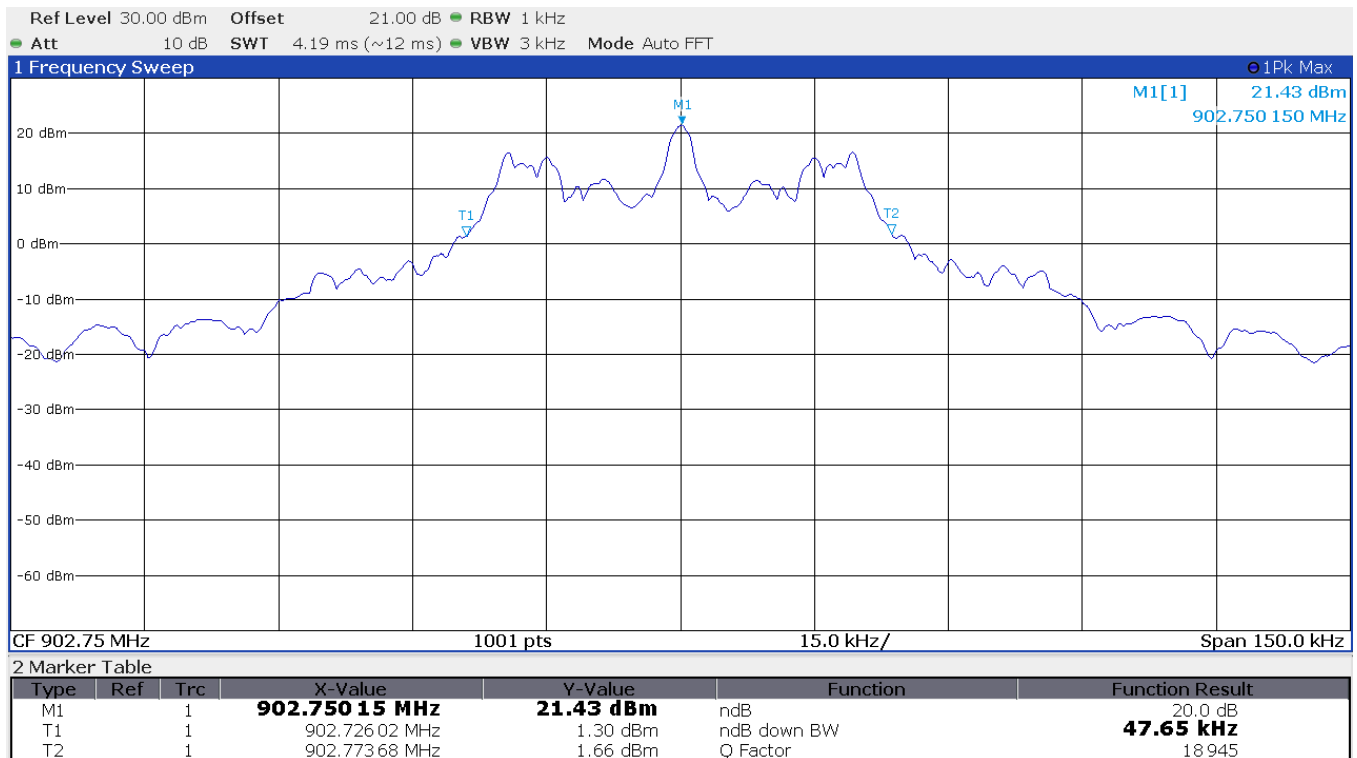
The test results are presented on the following page.

5.3.3 Test results (20 dB bandwidth)

Ambient temperature:	20 °C - 22 °C
Relative humidity:	18 % - 41 %

Date:	20.02.2026 / 07.05.2026
Tested by:	M. BASTERT / D. BRUSCHINSKI

Worst case plot (operation mode 4):



Operation mode	20 dB bandwidth [kHz]
4	47.65
5	47.65
6	47.50
10	47.50
11	47.65
12	47.35

Test result: Passed

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

5.4 Occupied bandwidth – power bandwidth (99%)

5.4.1 Test Setup (Occupied bandwidth – power bandwidth (99%))

Test setup (Occupied bandwidth – power bandwidth (99%))			
Used	Setup	See sub-clause	Comment
☐	Radiated: 30 MHz to 1 GHz	5.1.2	-
☒	Conducted: Antenna port	5.1.4	-

5.4.2 Test method (Occupied bandwidth – power bandwidth (99%))

Test method (Occupied bandwidth – power bandwidth (99%))				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☐	6.9.2	Relative measurement procedure	-	n-dB down
☒	6.9.3	Power bandwidth (99%)	*1	99% power function

*1 See RSS-GEN Issue 5 (2018-05) sub-clause 6.7 for details.

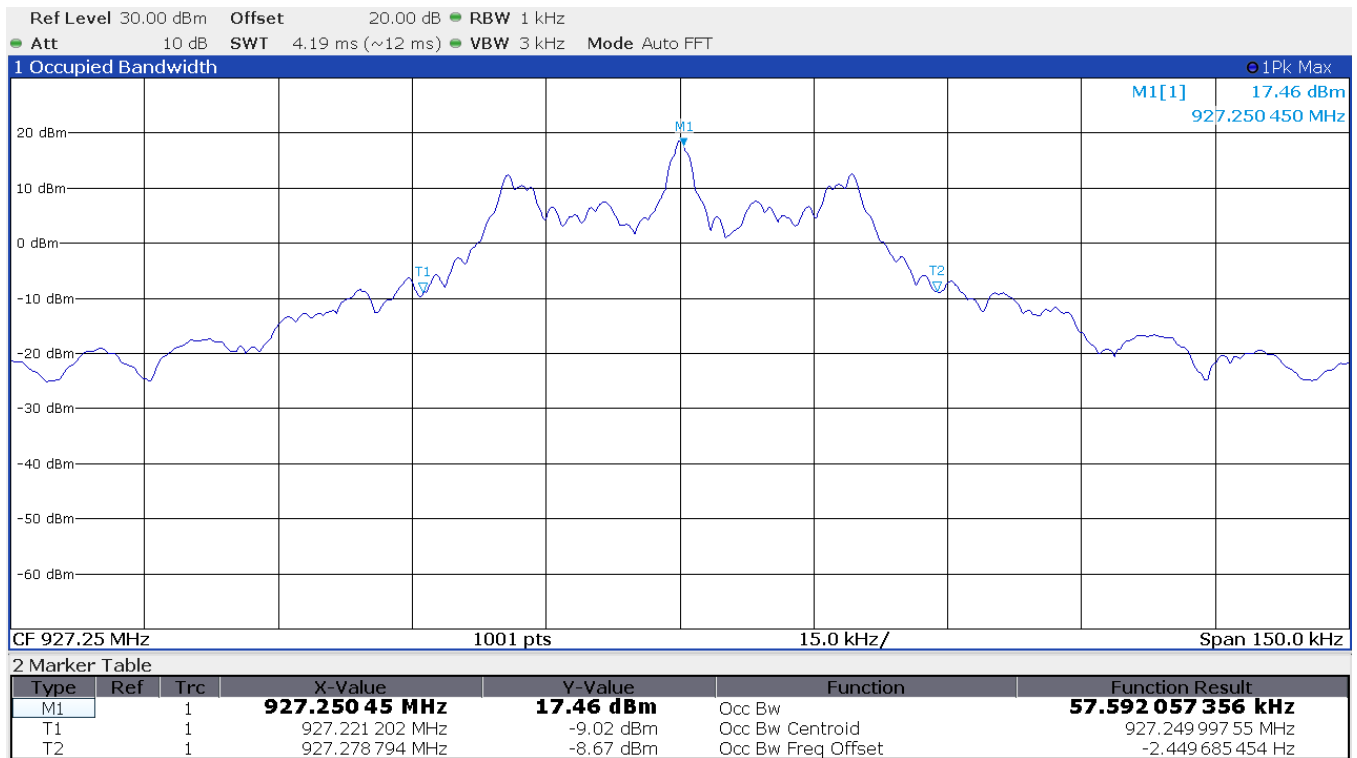
The test results are presented on the following page.

5.4.3 Test results (Occupied bandwidth – power bandwidth (99%))

Ambient temperature:	20 °C - 22 °C
Relative humidity:	18 % - 41 %

Date:	20.02.2026 / 07.05.2026
Tested by:	M. BASTERT / D. BRUSCHINSKI

Worst case plot (operation mode 12):



Operation mode	99% bandwidth [kHz]
4	57.489
5	55.800
6	53.874
10	53.261
11	56.911
12	57.592

Test result: Passed

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

5.5 Carrier frequency separation

5.5.1 Test setup (Carrier frequency separation)

Test setup (Carrier frequency separation)			
Used	Setup	See sub-clause	Comment
☐	Radiated: 30 MHz to 1 GHz	5.1.2	-
☒	Conducted: Antenna port	5.1.4	-

5.5.2 Test method (Carrier frequency separation)

Test method (Carrier frequency separation)				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☒	7.8.2	Carrier frequency separation	EUT hopping	-

The test results are presented on the following page.

5.5.3 Test results (Carrier frequency separation)

Ambient temperature:	20 °C
Relative humidity:	18 %

Date:	20.02.2026
Tested by:	M. BASTERT

Measurement plot (operation mode 4):



Operation mode	Channel frequency [MHz]	Channel separation [kHz]	Minimum limit * [kHz]
4	902.75	500.50	47.65
5	914.75	500.50	47.65
6	927.25	500.50	47.50

* The limit according to [2] is the 20 dB bandwidth or 25 kHz, whichever is greater. In this case, the limit is the 20 dB bandwidth.

Test result: Passed

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

5.6 Number of hopping frequencies

5.6.1 Test setup (Number of hopping frequencies)

Test setup (Number of hopping frequencies)			
Used	Setup	See sub-clause	Comment
☐	Radiated: 30 MHz to 1 GHz	5.1.2	-
☒	Conducted: Antenna port	5.1.4	-

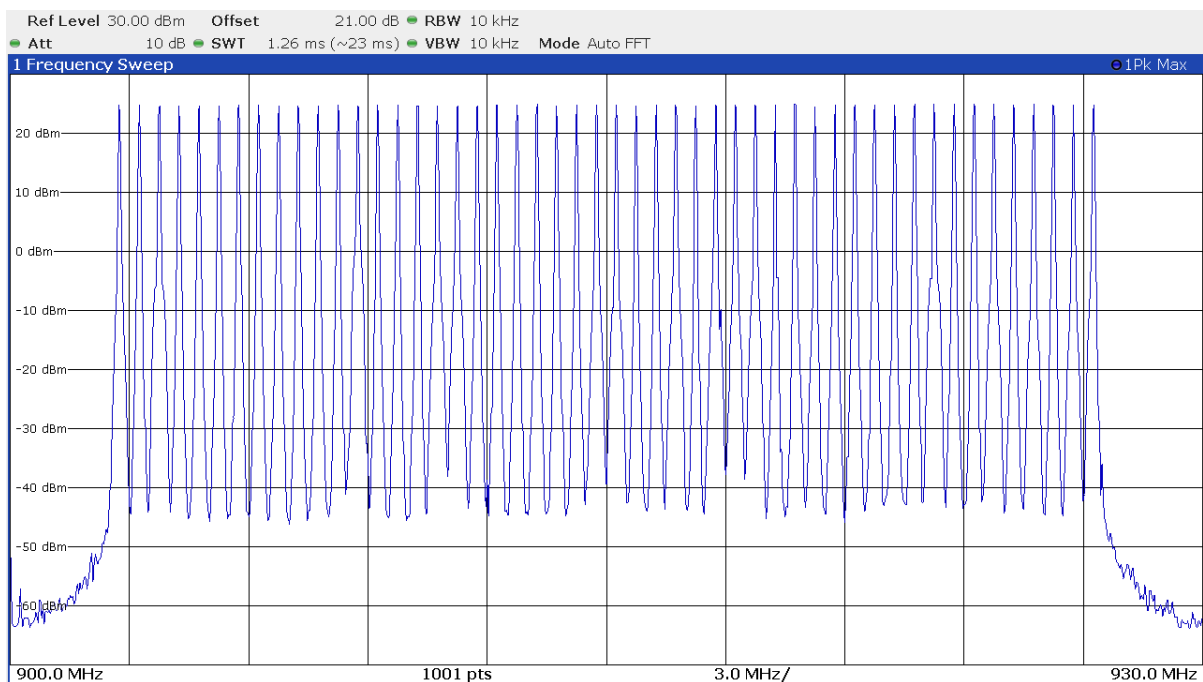
5.6.2 Test method (Number of hopping frequencies)

Test method (Number of hopping frequencies)				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☒	7.8.3	Number of hopping frequencies	EUT hopping	-

5.6.3 Test results (Number of hopping frequencies)

Ambient temperature:	20 °C
Relative humidity:	18 %

Date:	20.02.2026
Tested by:	M. BASTERT



Number of hopping frequencies	Limit (minimum)
50	≥ 50

Test result: Passed

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

5.7 Time of occupancy (dwell time)

5.7.1 Test setup (Time of occupancy (dwell time))

Test setup (Time of occupancy (dwell time))			
Used	Setup	See sub-clause	Comment
☐	Radiated: 30 MHz to 1 GHz	5.1.2	-
☒	Conducted: Antenna port	5.1.4	-

5.7.2 Test method (Time of occupancy (dwell time))

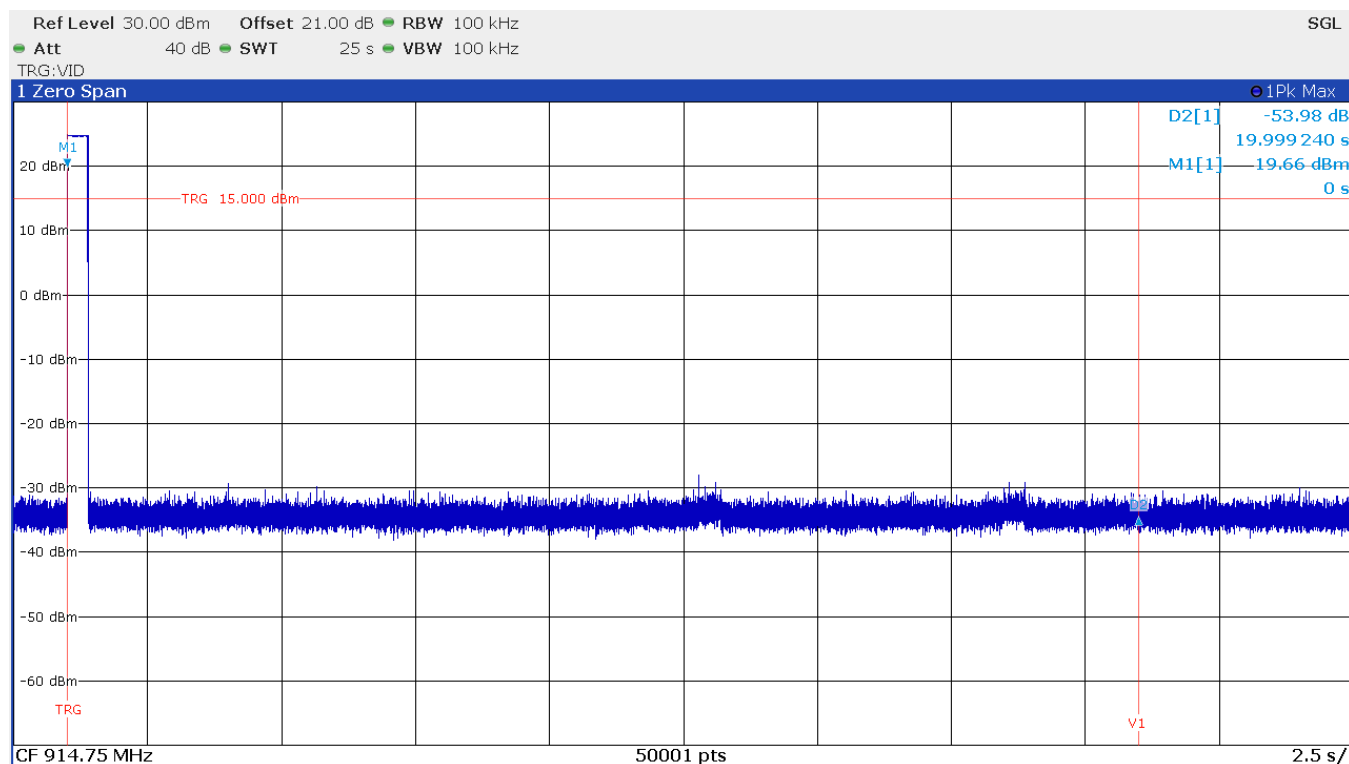
Test method (Time of occupancy (dwell time))				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☒	7.8.4	Time of occupancy (dwell time)	EUT hopping	-

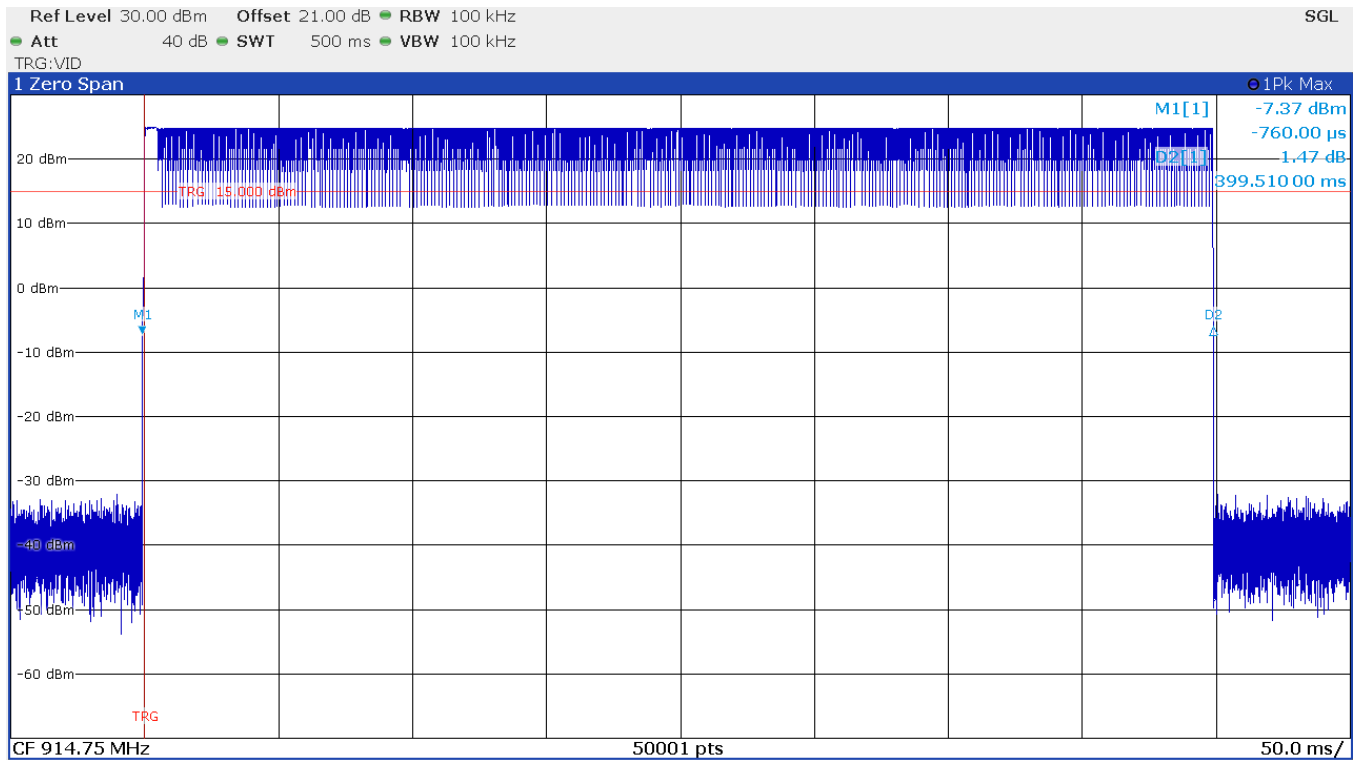
5.7.3 Test results (Time of occupancy (dwell time))

Ambient temperature:	20 °C
Relative humidity:	18 %

Date:	20.02.2026
Tested by:	M. BASTERT

Plots operation mode 5:





Operation mode	Number of pulses	Dwell time [ms]	Limit [ms]
5	1	399.5	400.0

Test result: Passed

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

5.8 FHS fundamental emission output power

5.8.1 Test setup (FHS fundamental emission output power)

Test setup (FHS fundamental emission output power)			
Used	Setup	See sub-clause	Comment
☐	Radiated: 30 MHz to 1 GHz	5.1.2	-
☒	Conducted: Antenna port	5.1.4	-

5.8.2 Test method (FHS fundamental emission output power)

Test method (FHS fundamental emissions output power)				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☒	7.8.5	Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices	No limitations	-

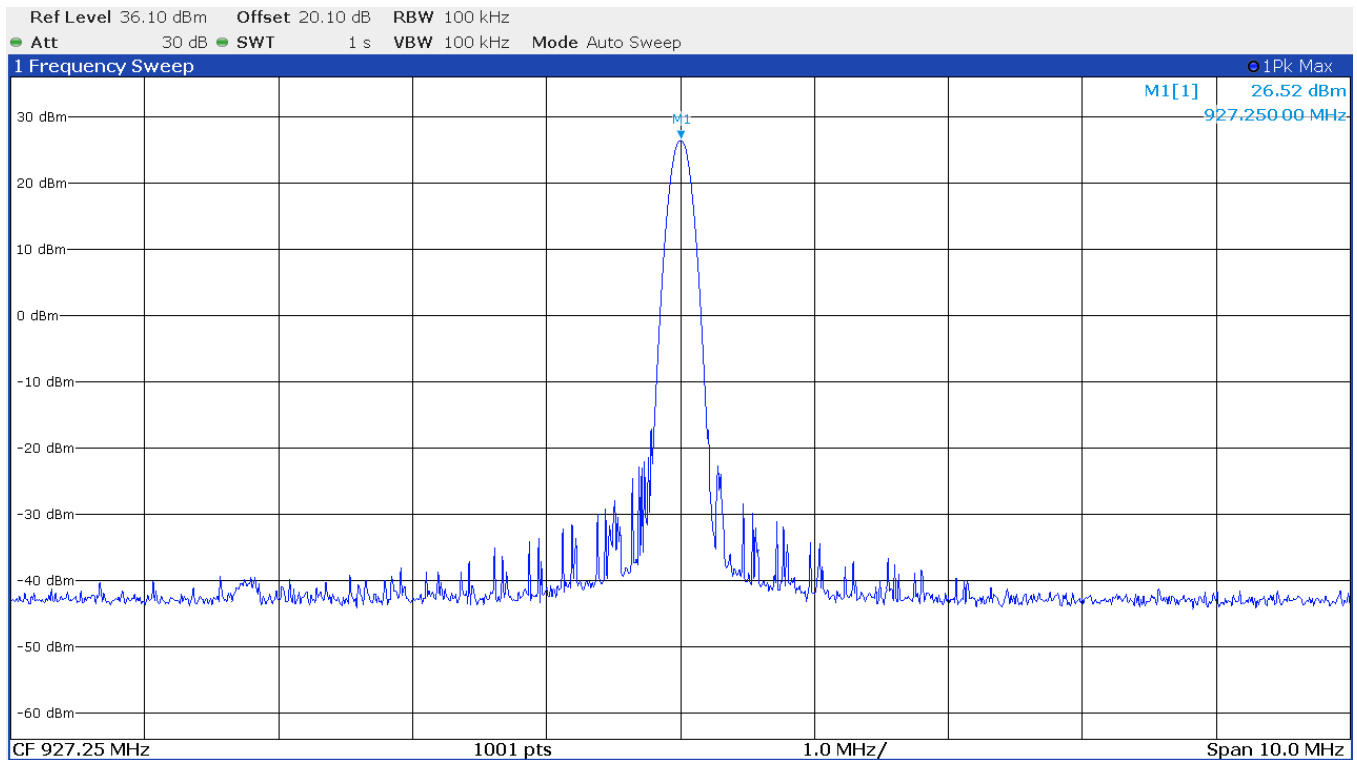
The test results are presented on the following page.

5.8.3 Test results (FHS fundamental emission output power)

Ambient temperature:	20 °C - 22 °C
Relative humidity:	18 % - 41 %

Date:	20.02.2026 / 07.05.2026
Tested by:	M. BASTERT / D. BRUSCHINSKI

Worst case plot (operation mode 3):



Operation mode	Result [dBm]	Limit * [dBm]	Antenna gain [dBi]	Result [dBm e.i.r.p.]	Limit [dBm e.i.r.p.]
1	26.35	28.50	2.90	29.25	36.00
2	26.47	28.50	2.90	29.37	36.00
3	26.52	28.50	2.90	29.42	36.00
7	21.17	28.50	7.50	28.67	36.00
8	21.02	28.50	7.50	28.52	36.00
9	20.87	28.50	7.50	28.37	36.00

* The limit is calculated in clause 5.2 of this test report.

Remark: The external attenuation of the cable and the attenuator were considered with the offset at the analyzer.

Test result: Passed

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

5.9 Conducted emissions at antenna port

5.9.1 Test setup (Conducted emissions at antenna port)

Test setup (Conducted emissions at antenna port)			
Used	Setup	See sub-clause	Comment
☐	Radiated: 30 MHz to 1 GHz	5.1.2	-
☒	Conducted: Antenna port	5.1.4	-

5.9.2 Test method (Conducted emissions at antenna port)

Test method (FHS fundamental emissions output power)				
Used	Sub-Clause [1]	Name of method	Applicability	Comment
☒	11.12.2	Antenna-port measurements	No limitations	-

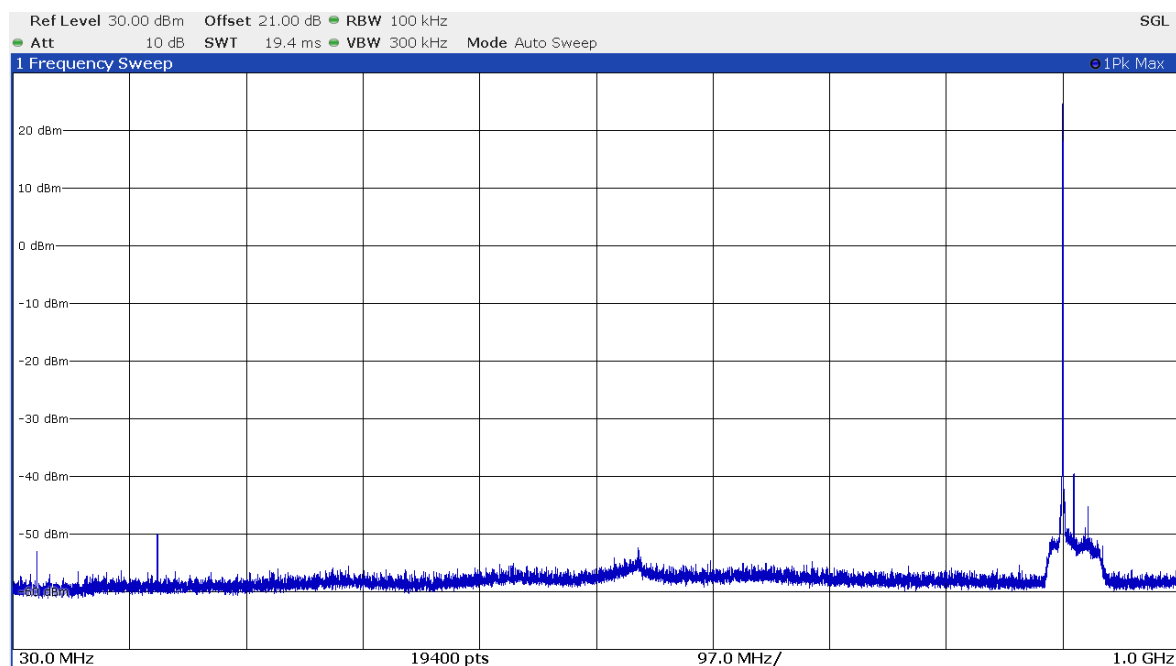
The test results are presented on the following pages.

5.9.3 Test results (Conducted emissions at antenna port)

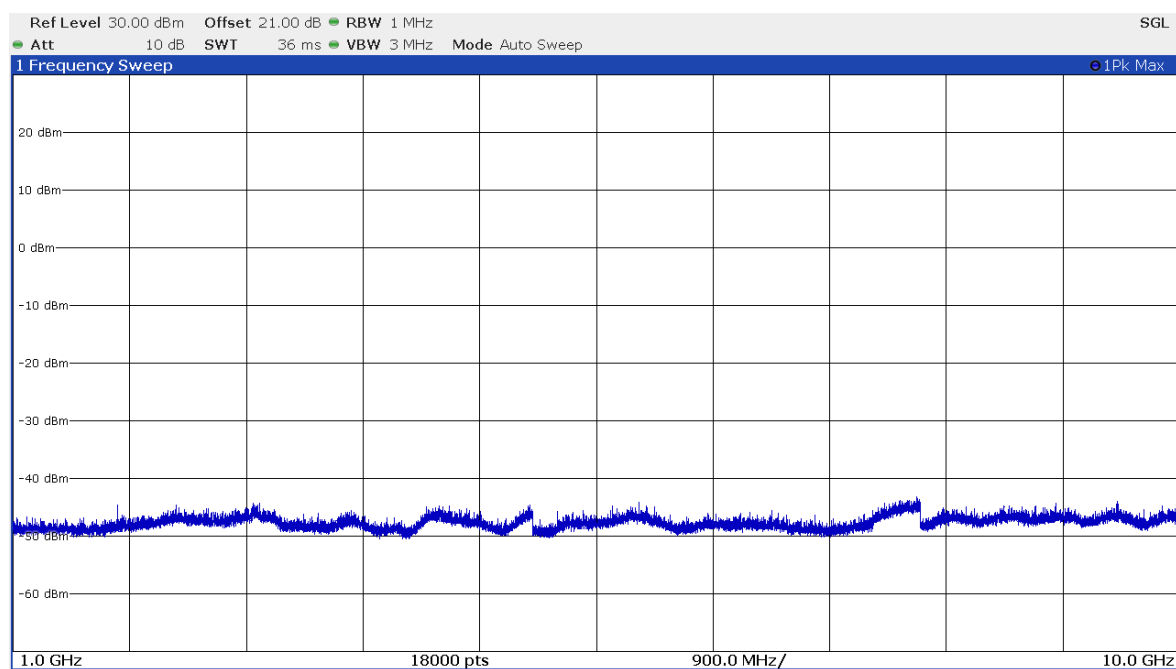
Ambient temperature:	20 °C
Relative humidity:	18 %

Date:	20.02.2026
Tested by:	M. BASTERT

Worst case plot 30 MHz - 1 GHz (operation mode 4):



Worst case plot 1 GHz - 10 GHz (operation mode 4):



Result table:

Spurious emissions (operation mode 4)										
Operating channel	Frequency [MHz]	Reading [dBm]	Max. antenna gain * ¹ [dBi]	Ground reflection factor [dB]	Calculated EIRP [dBm]	Calculated field strength [dBμV/m]	Min. limit [dBμV/m]	Margin [dB]	Result	Restricted Band
0 (902.750 MHz)	49.975	-53.0	7.5	4.7	-40.8	54.4	109.2 * ²	54.8	Passed	No
	150.025	-49.9	7.5	4.7	-37.7	57.5	74.0	16.5	Passed	Yes
	550.025	-52.2	7.5	4.7	-40.0	55.2	109.2 * ²	54.0	Passed	No
	902.775	24.7	7.5	4.7	36.9	132.1	Wanted signal, no spurious emission			
	1805.475	-48.9	7.5	4.7	-36.7	58.5	109.2 * ²	50.7	Passed	No
	2708.275	-53.6	7.5	4.7	-41.4	53.8	109.2 * ²	55.4	Passed	No
	2849.486	-50.8	7.5	-	-43.3	51.9	74.0	22.1	Passed	Yes
	5827.638	-53.9	7.5	-	-46.4	48.8	109.2 * ²	60.4	Passed	No
	7970.564	-53.8	7.5	-	-46.3	48.9	109.2 * ²	60.3	Passed	No
Spurious emissions (operation mode 5)										
Operating channel	Frequency [MHz]	Reading [dBm]	Max. antenna gain * ¹ [dBi]	Ground reflection factor [dB]	Calculated EIRP [dBm]	Calculated field strength [dBμV/m]	Min. limit [dBμV/m]	Margin [dB]	Result	Restricted Band
24 (914.750 MHz)	50.025	-52.7	7.5	4.7	-40.5	54.7	109.2 * ²	54.5	Passed	No
	150.025	-49.5	7.5	4.7	-37.3	57.9	74.0	16.1	Passed	Yes
	550.025	-52.1	7.5	4.7	-39.9	55.3	109.2 * ²	53.9	Passed	No
	551.275	-53.1	7.5	4.7	-40.9	54.3	109.2 * ²	54.9	Passed	No
	914.775	24.7	7.5	4.7	36.9	132.1	Wanted signal, no spurious emission			
	1829.4503	-46.9	7.5	-	-39.4	55.8	109.2 * ²	53.4	Passed	No
	1829.525	-49.0	7.5	-	-41.5	53.7	109.2 * ²	55.5	Passed	No
	7922.752	-53.6	7.5	-	-46.1	49.1	109.2 * ²	60.1	Passed	No
	7970.175	-53.0	7.5	-	-45.5	49.7	109.2 * ²	59.5	Passed	No
Spurious emissions (operation mode 6)										
Operating channel	Frequency [MHz]	Reading [dBm]	Max. antenna gain * ¹ [dBi]	Ground reflection factor [dB]	Calculated EIRP [dBm]	Calculated field strength [dBμV/m]	Min. limit [dBμV/m]	Margin [dB]	Result	Restricted Band
49 (927.250 MHz)	50.025	-52.3	7.5	4.7	-40.1	55.1	109.2 * ²	54.1	Passed	No
	150.025	-50.0	7.5	4.7	-37.8	57.4	74.0	16.6	Passed	Yes
	550.025	-52.5	7.5	4.7	-40.3	54.9	109.2 * ²	54.3	Passed	No
	927.275	25.1	7.5	4.7	37.3	132.5	Wanted signal, no spurious emission			
	1854.475	-48.6	7.5	-	-41.1	54.1	109.2 * ²	55.1	Passed	No
	1854.555	-46.1	7.5	-	-38.6	56.6	109.2 * ²	52.6	Passed	No
	4205.725	-54.3	7.5	-	-46.8	48.4	74.0	25.6	Passed	Yes
	5001.248	-51.2	7.5	-	-43.7	51.5	74.0	22.5	Passed	Yes
	7909.772	-53.6	7.5	-	-46.1	49.1	109.2 * ²	60.1	Passed	No
Measurement uncertainty				±2.7 dB						

*¹: As declared by the applicant, this is the maximum antenna gain of external antennas which may be used with the EUT.

*²: Limit (20 dBc) = Radiated field strength (measured in clause 5.10.3.2) - 20 dB

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

5.10 Radiated emissions

5.10.1 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 / 1 GHz to 40 GHz	5.1.1 / 5.1.2 / 5.1.3	-
☐	Conducted: Antenna port	5.1.4	-

5.10.2 Test method (Maximum unwanted emissions)

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

5.10.3 Test results (Maximum unwanted emissions)

5.10.3.1 Test results preliminary measurement 9 kHz to 30 MHz

Ambient temperature:	22 °C
Relative humidity:	24 %

Date:	17.02.2026
Tested by:	Y. KHALEK

Position of EUT: For tests for f 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 setup and the cable guide refer to the pictures in annex A of this 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: All 3 orthogonal planes were tested separately.

Calculations:

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

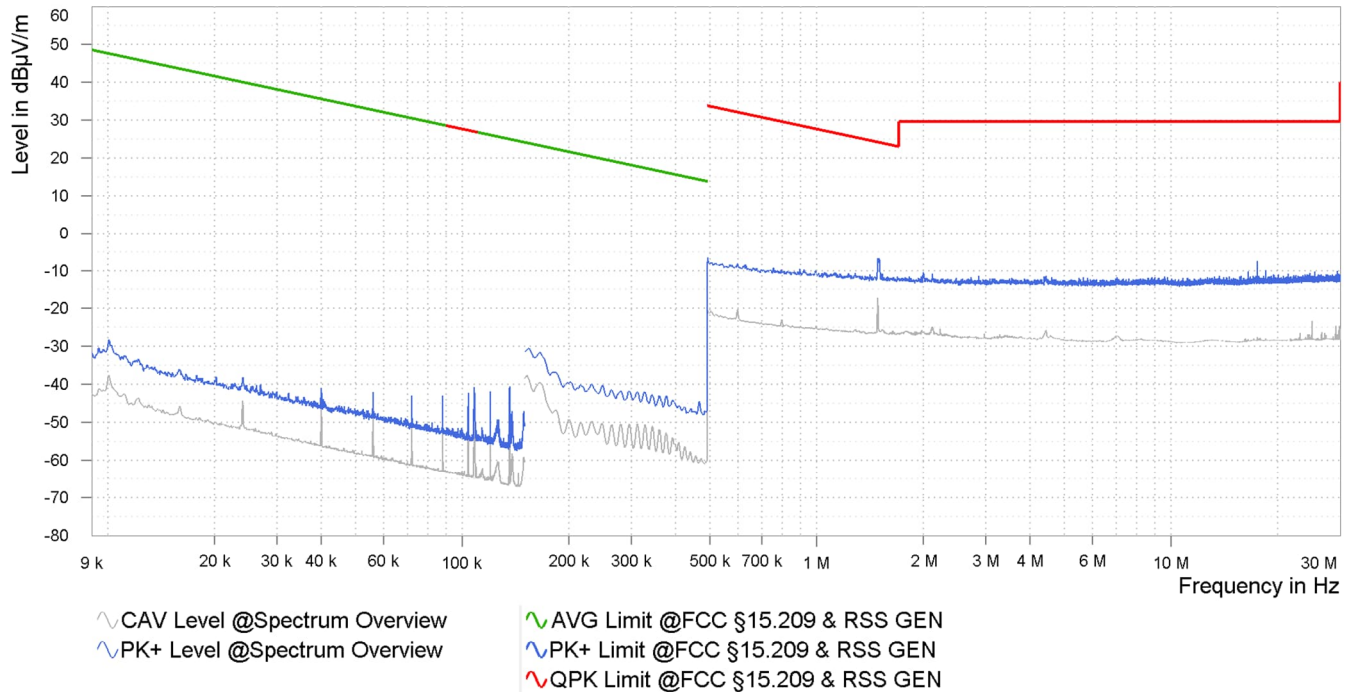
Result @ norm. dist. [dBμA/m] = Result @ norm. dist. [dBμV/m] – 20 x log₁₀ (377 Ω)

Margin [dB] = Limit [dB(μV|μA)/m] - Result [dB(μV|μA)/m]

The test results are presented on the following page.

Measurement plot:

Spurious emissions from 9 kHz to 30 MHz (operation mode 1 - position 2):



Remark: No emissions closer than 20 dB to the limit were found, so no final measurement was carried out.

Test result: Passed

Test equipment (please refer to chapter 7 for details)

2 - 8

5.10.3.2 Test results (30 MHz – 1 GHz)

Ambient temperature:	21 °C - 22 °C
Relative humidity:	15 % - 29 %

Date:	28.11.2025 / 23.01.2026 / 26.01.2026
Tested by:	S. KREHS / D. BRUSCHINSKI

Position of EUT: For tests for f 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 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]

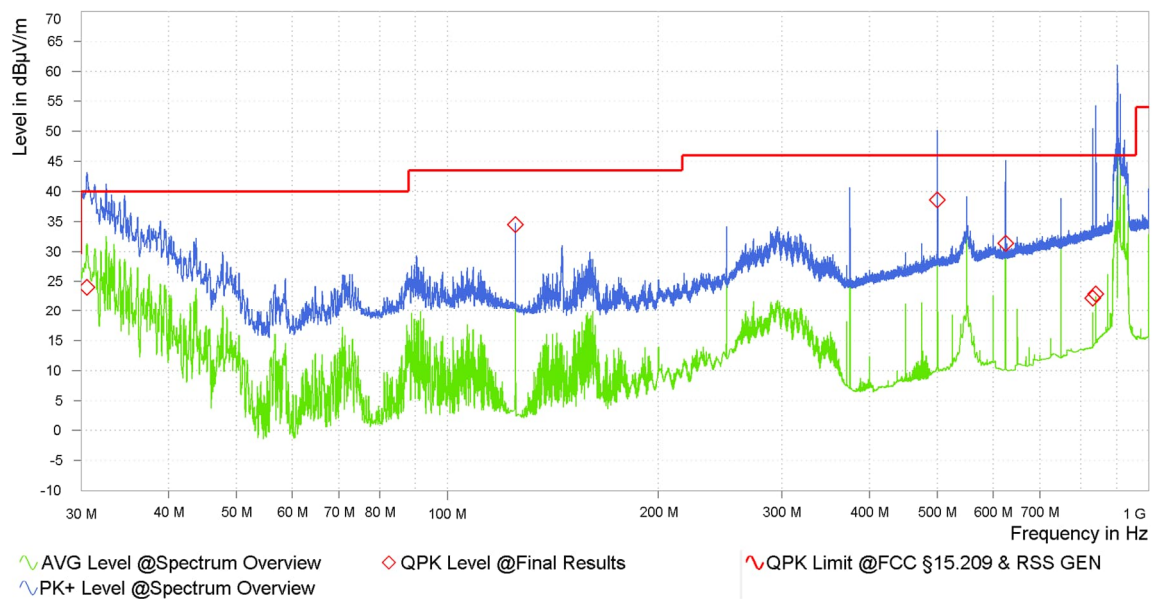
Correction [dB/m] = AF [dB/m] + Cable attenuation [dB] + optional preamp gain [dB]

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.

Worst case plot:

Spurious emissions from 30 MHz to 1 GHz (operation mode 1 - position 2):



Remark: The emissions at 914.75 MHz are caused by the wanted signal, no final measurement is required. The fundamental is attenuated with a notch filter.

Result tables:

Operation mode 1, position 1:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
34.620	35.13	40.00	4.87	23.79	V	309	2.42

Operation mode 1, position 2:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
30.600	24.07	40.0	15.93	26.29	H	188	4.22
125.010	34.51	43.5	8.99	17.11	H	294	3.25
500.010	38.55	46.0	7.45	24.19	H	294	3.25
625.020	31.31	46.0	14.69	25.99	V	102	1.44
832.350	22.22	46.0	23.78	28.91	V	56	1.78
841.470	22.93	46.0	23.07	28.98	V	102	1.44

Operation mode 1, position 3:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
47.790	15.73	40.0	24.27	15.03	V	343	1.03
49.230	10.69	40.0	29.31	14.19	V	13	1.07
207.210	19.24	43.5	24.26	16.16	H	159	1.54
273.120	29.99	46.0	16.01	18.06	H	59	1.06
375.000	30.00	46.0	16.00	20.94	H	131	1.01
500.010	27.32	46.0	18.68	24.19	V	131	1.01
550.020	29.37	46.0	16.63	24.79	V	135	1.14

Operation mode 2, position 1:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
30.630	39.91	40.0	0.09	26.28	V	370	3.98
36.150	25.49	40.0	14.51	22.83	V	251	2.02
37.530	26.45	40.0	13.55	21.94	V	195	2.46
38.970	29.53	40.0	10.47	21.01	V	194	2.49
39.480	28.56	40.0	11.44	20.67	V	243	2.13
40.110	28.70	40.0	11.30	20.26	V	197	2.49

Operation mode 2, position 2:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
30.600	21.86	40.0	18.14	26.29	V	357	1.45
106.710	22.21	43.5	21.29	17.67	H	97	2.94
306.780	26.26	46.0	19.74	19.10	H	149	1.00
375.000	26.10	46.0	19.90	20.94	H	285	1.02
549.990	27.31	46.0	18.69	24.79	H	71	1.67
625.020	31.44	46.0	14.56	25.99	H	243	1.39

Operation mode 3, position 1:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
30.690	39.31	40.00	0.69	26.24	V	357	4.15
31.410	37.01	40.00	2.99	25.78	V	357	4.18
34.620	34.68	40.00	5.32	23.79	V	357	2.26
375.030	38.04	46.00	7.96	20.94	H	355	1.01

Operation mode 3, position 2:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
30.630	22.26	40.0	17.74	26.28	H	191	1.60
82.050	19.63	40.0	20.37	16.43	V	225	1.51
316.290	27.74	46.0	18.26	19.41	H	133	1.04
375.000	28.02	46.0	17.98	20.94	H	265	1.01
550.020	27.92	46.0	18.08	24.79	H	67	1.47
625.020	30.06	46.0	15.94	25.99	H	47	2.55

Operation mode 3, position 3:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Height [m]
30.600	22.34	40.0	17.66	26.29	V	101	1.29
207.060	22.36	43.5	21.14	16.15	V	295	1.00
273.120	30.12	46.0	15.88	18.06	H	65	1.37
297.810	27.87	46.0	18.13	18.73	H	123	1.13
375.000	30.36	46.0	15.64	20.94	H	127	1.03
550.020	27.52	46.0	18.48	24.79	V	299	1.09

Test result: Passed

Test equipment (please refer to chapter 7 for details)
2 - 7, 9 - 12

5.10.3.3 Test results (radiated 1 to 40 GHz)

Ambient temperature:	22 °C
Relative humidity:	22 %

Date:	20.11.2025
Tested by:	S. KREHS

Position of EUT: For tests for f between 1 GHz and the 10th harmonic, the EUT was set-up on a positioner device with a height of 150 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 of this test report.

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

Remark: -

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] + DCCF* [dB]
* (if applicable – only for Average values, that are fundamental related)

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

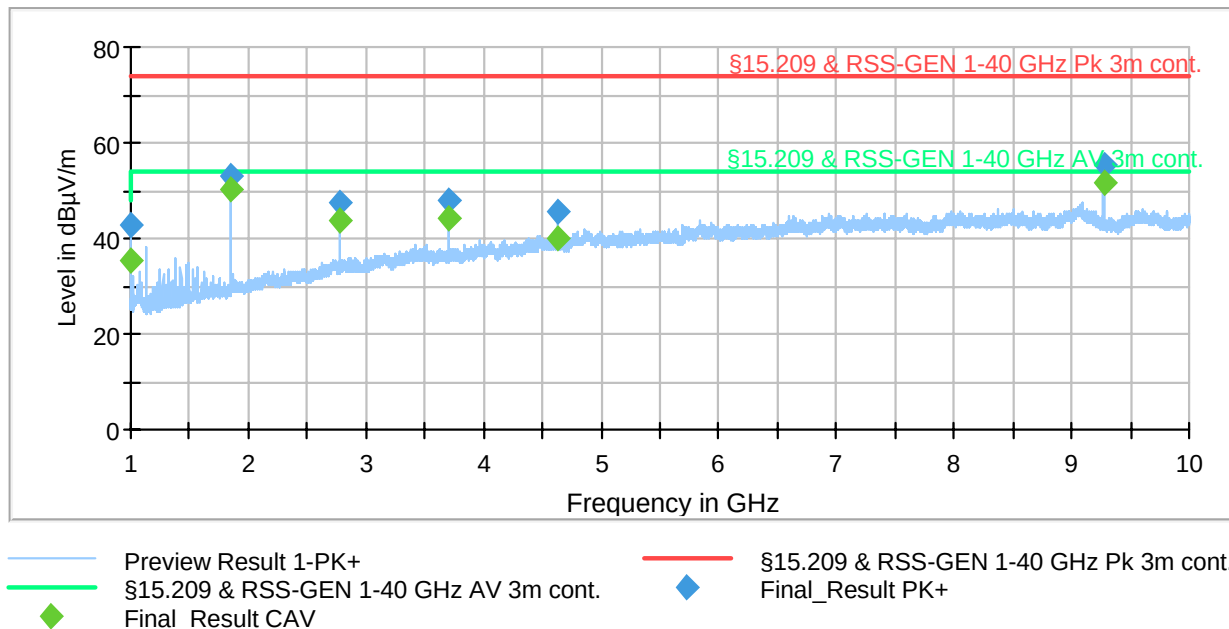
The curves in the diagram only represent the maximum measured value for each frequency point of all preliminary measurements, which were carried out with various EUT and antenna positions.

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.

The test results are presented on the following pages.

Worst case plot:

Spurious emissions from 1 GHz to 10 GHz (operation mode 3):



Result tables:

Operation mode 1:

Frequency [MHz]	MaxPeak [dB(μV/m)]	Average [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Pol [H/V]	Azimuth [deg]	Elevation [deg]	Correction [dB/m]
1000.000	42.0	-	74.0	32.0	H	136	120	-18.2
1000.000	-	36.4	54.0	11.6	H	136	120	-18.2
1124.923	39.8	-	74.0	34.2	H	314	60	-17.4
1124.923	-	32.9	54.0	21.1	H	314	60	-17.4
1805.641	54.2	-	74.0	19.8	V	352	0	-13.2
1805.641	-	51.3	54.0	2.7	V	352	0	-13.2
2708.100	44.6	-	74.0	29.4	H	176	150	-8.0
2708.100	-	40.8	54.0	13.2	H	176	150	-8.0
3610.901	48.6	-	74.0	25.4	H	345	0	-6.2
3610.901	-	45.0	54.0	9.0	H	345	0	-6.2
4513.649	43.3	-	74.0	30.7	V	141	150	-2.8
4513.649	---	36.8	54.0	17.2	V	141	150	-2.8
4891.413	40.2	-	74.0	33.8	H	292	0	-1.2
4891.413	---	27.0	54.0	27.0	H	292	0	-1.2
9930.154	48.0	-	74.0	26.0	V	336	0	7.3
9930.154	-	40.7	54.0	13.3	V	336	0	7.3

Operation mode 2:

Frequency [MHz]	MaxPeak [dB(μV/m)]	Average [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Pol [H/V]	Azimuth [deg]	Elevation [deg]	Correction [dB/m]
1000.000	42.5	-	74.0	31.5	H	134	60	-18.2
1000.000	-	37.0	48.0	11.0	H	134	60	-18.2
1829.368	54.2	-	74.0	19.8	V	348	0	-13.2
1829.368	-	51.5	54.0	2.5	V	348	0	-13.2
2744.187	45.3	-	74.0	28.7	H	305	60	-7.7
2744.187	-	41.4	54.0	12.6	H	305	60	-7.7
3658.832	47.7	-	74.0	26.3	V	359	60	-6.1
3658.832	-	43.7	54.0	10.3	V	359	60	-6.1
4573.879	46.2	-	74.0	27.8	V	37	30	-2.6
4573.879	-	40.8	54.0	13.2	V	37	30	-2.6
9147.514	50.2	-	74.0	23.8	H	0	0	8.2
9147.514	-	44.4	54.0	9.6	H	0	0	8.2

Operation mode 3:

Frequency [MHz]	MaxPeak [dB(μV/m)]	Average [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Pol [H/V]	Azimuth [deg]	Elevation [deg]	Correction [dB/m]
1000.000	42.8	-	74.0	31.2	H	319	90	-18.2
1000.000	-	35.4	48.0	12.6	H	319	90	-18.2
1854.332	53.0	-	74.0	21.0	V	0	0	-13.0
1854.332	-	50.3	54.0	3.7	V	0	0	-13.0
2781.649	47.6	-	74.0	26.4	H	221	120	-7.9
2781.649	-	43.9	54.0	10.1	H	221	120	-7.9
3709.141	48.0	-	74.0	26.0	H	202	150	-6.1
3709.141	-	44.1	54.0	9.9	H	202	150	-6.1
4636.151	45.8	-	74.0	28.2	V	318	0	-2.6
4636.151	-	40.1	54.0	13.9	V	318	0	-2.6
9272.595	55.4	-	74.0	18.7	H	0	0	6.8
9272.595	-	51.7	54.0	2.3	H	0	0	6.8

Test result: Passed

Test equipment (please refer to chapter 7 for details)
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5.11 AC power line conducted emissions

5.11.1 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	5.1.5	-
☐	Not applicable, because ...	-	-

5.11.2 Test method (Conducted emissions on power supply lines)

Test setup (Conducted emissions on power supply lines)				
Used	Clause [3]	Name of method	Sub-clause	Comment
☒	6.2.3.2	Tabletop equipment testing	-	-
☐	6.2.3.3	Floor-standing equipment testing	-	-

The AC power adapter as shown in clause 1.5.1 of this test report was used for the test.
The power adapter was supplied by 120 V_{AC} 60Hz.

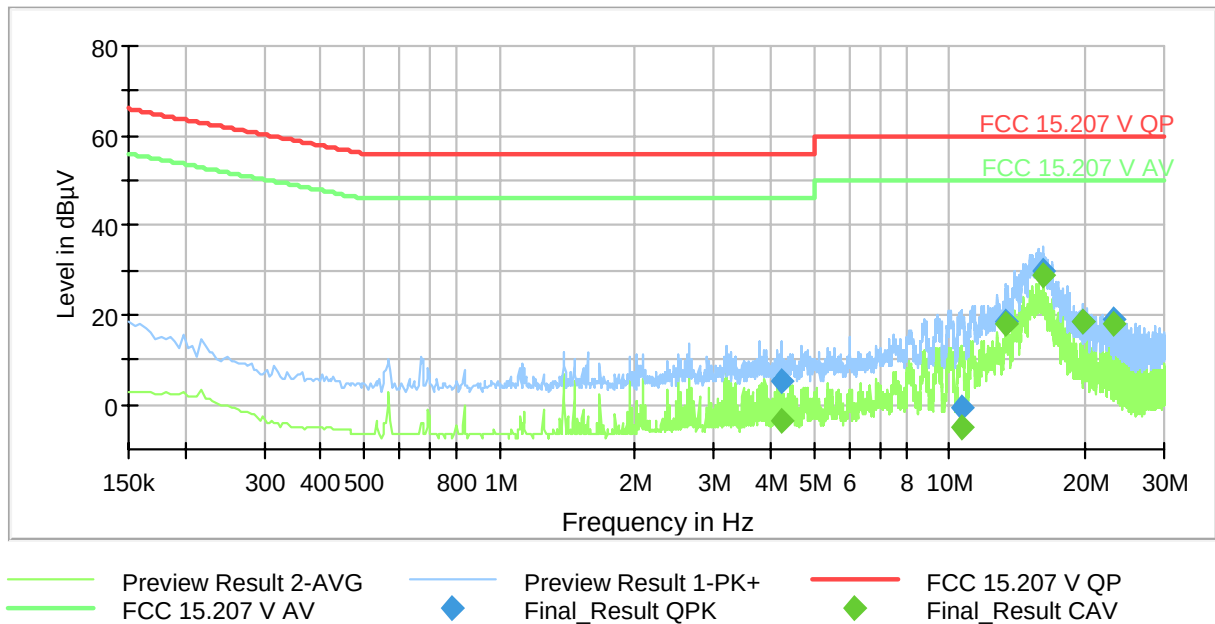
5.11.3 Test results (Conducted emissions on power supply lines)

Ambient temperature:	21 °C	Date:	04.03.2026
Relative humidity:	37 %	Tested by:	D. BRUSCHINSKI

The curves in the diagram on the next page 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 ◆.

The test results are presented on the next page.

Measurement plot:



Result table:

Frequency [MHz]	QuasiPeak [dB(μV)]	Average [dB(μV)]	Limit [dB(μV)]	Margin [dB]	Line	PE	Corr. [dB]
4.2400	5.41	-	56.0	50.59	L1	GND	10.3
4.2405	-	-3.63	46.0	49.63	L1	GND	10.3
10.6305	-	-4.92	50.0	54.92	L1	FLO	10.6
10.6325	-0.84	-	60.0	60.84	L1	GND	10.6
13.4185	18.52	-	60.0	41.48	N	GND	10.8
13.4190	-	18.12	50.0	31.88	L1	GND	10.7
16.2275	29.65	-	60.0	30.35	N	GND	10.9
16.2280	-	28.95	50.0	21.05	N	GND	10.9
19.7085	18.42	-	60.0	41.58	N	GND	11.1
19.7090	-	18.36	50.0	31.64	N	GND	11.1
23.1280	18.82	-	60.0	41.18	N	GND	11.1
23.1280	-	17.94	50.0	32.06	N	FLO	11.1

Test result: Passed

Test equipment (please refer to chapter 7 for details)

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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 using a spectrum analyzer		
< 3.6 GHz	ETSI TR 100 028	2.3 dB
3.6 – 8 GHz	ETSI TR 100 028	2.8 dB
8 – 22 GHz	ETSI TR 100 028	3.2 dB
22 – 40 GHz	ETSI TR 100 028	3.6 dB
Power measurements		
Power meter	ETSI TR 100 028	0.9 dB
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	Signal & spectrum analyser	FSW43	Rohde & Schwarz	102954	483957	04.02.2026	02.2027
2	EMC test software	Elektra V5.21	Rohde & Schwarz	-	483755	Calibration not necessary	
3	RF switch matrix	OSP220	Rohde & Schwarz	101391	482976	Calibration not necessary	
4	Turntable	TT3.0-3t	Maturo	825/2612/.01	483224	Calibration not necessary	
5	Semi anechoic chamber M276	SAC5-2	Albatross Projects	C62128-A540-A138-10-0006	483227	Calibration not necessary	
6	EMI receiver / Spectrum analyser	ESW44	Rohde & Schwarz	101828	482979	06.02.2026	02.2028
7	Controller	NCD	Maturo	474/2612.01	483226	Calibration not necessary	
8	Loop antenna	FMZB 1519-60D	Schwarzbeck	00215	484105	25.11.2025	11.2027
9	Attenuator 6 dB	WA2-6	Weinschel	-	482793	Calibration not necessary	
10	Ultralog antenna 30 MHz - 6 GHz	HL562E	Rohde & Schwarz	101079	482978	24.04.2024	04.2027
11	Antenna support tilt mast	BAM 4.5-P-10kg	Maturo	222/2612.01	483225	Calibration not necessary	
12	Tunable notch filter	WRCA800/960-0.2/40-6EEK	Wainwright Instruments	15	480414	Calibration not necessary	
13	Fully anechoic chamber M20	B83117-E2439-T232	Albatross Projects	103	480303	Calibration not necessary	
14	Turntable	DS420 HE	Deisel	420/620/00	480315	Calibration not necessary	
15	Antenna support	AS620P	Deisel	620/375	480325	Calibration not necessary	
16	Multiple Control Unit	MCU	Maturo	MCU/043/971107	480832	Calibration not necessary	
17	Log.-Per. Antenna 850 MHz - 26.5 GHz	HL050	Rohde & Schwarz	100438	481170	Calibration not necessary	
18	Software	EMC32 V10.60.20	Rohde & Schwarz	-	483261	Calibration not necessary	
19	Preamplifier 100 MHz - 16 GHz	AFS6-00101600-23-10P-6-R	Narda MITEQ	2011215	482333	03.02.2026	02.2028
20	RF-cable	Sucoflex 106B	Suhner	0563/6B / Kabel 3	480670	Calibration not necessary	
21	RF-cable	Sucoflex 106B	Suhner	0709/6B / Kabel 38	481328	Calibration not necessary	
22	RF cable	Sucoflex 104	Huber+Suhner	517402	482392	Calibration not necessary	
23	RF-Cable	Sucoflex 106B	Suhner	0708/6B / Kabel 40	481330	Calibration not necessary	
24	Positioner	TDF 1.5- 10Kg	Maturo	15920215	482034	Calibration not necessary	
25	EMI receiver / Spectrum analyser	ESW44	Rohde & Schwarz	101635	482467	29.10.2025	02.2028
26	LISN	NSLK8128	Schwarzbeck	8128161	480138	04.02.2026	02.2028
27	AC / DC power supply	AC6803A AC Power Source 2000VA	Keysight	JPVJ002509	482350	Calibration not necessary	

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
28	Software	EMC32 V10.60.20	Rohde & Schwarz	100061	481022	Calibration not necessary	
29	Shielded chamber M4	B83117-S1-X158	Siemens	190075	480088	Calibration not necessary	
30	EMI receiver / Spectrum analyser	ESIB 26	Rohde & Schwarz	100292	481182	06.02.2026	02.2028
31	Transient filter limiter	CFL 9206A	Teseq	38268	481982	05.02.2026	02.2028

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
Fully anechoic chamber M20	480303	1 -18 GHz	SVSWR	CISPR 16-1-4 Amd. 1	04.02.2025	03.02.2028

9 Report History

Report Number	Date	Comment
F250250E1	16.06.2026	Initial test report
-	-	-
-	-	-

10 List of Annexes

Annex A Test setup photos

14 pages

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