PHOENIX TESTLAB

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Test Report

Report Number:

F231570E5

Equipment under Test (EUT):

ZONESCAN AI Leak Logger and Programming JIG

Applicant:

Gutermann Technology GmbH

Manufacturer:

Gutermann Technology GmbH

ilac-MRA

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-17186-01-00

References

[1] **ANSI C63.4:2014** 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

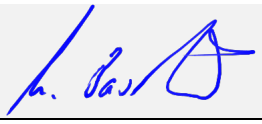
[3] **FCC 47 CFR Part 15:** Radio Frequency Devices (Subpart B)

[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 and written by:		Mohamed Yassine Khalek 19.03.2024
	Signature	
Reviewed and approved by:		Manuel BASTERT 19.03.2024
	Signature	

This test report is only valid in its original form.

The test results herein refer only to the tested sample. PHOENIX 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 PHOENIX TESTLAB Logo and the TEST REPORT NUMBER.

Contents: Page

1 Identification

1.1 Applicant

Name:	Gutermann Technology GmbH
Address:	Gottlieb Daimler Str. 10, 88214 Ravensburg
Country:	Germany
Person for contact purposes:	Mr. Carles ESTELLERS CASAS
Phone:	+49 751-359016-89
eMail address:	carles.estellers@gutermann-water.com
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	Gutermann Technology GmbH
Address:	Gottlieb Daimler Str. 10, 88214 Ravensburg
Country:	Germany
Name for contact purposes:	Mr. Carles ESTELLERS CASAS
Phone:	+49 751-359016-89
eMail address:	carles.estellers@gutermann-water.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) in compliance with DIN EN ISO/IEC 17025 under Reg. No. D-PL-17186-01-06 and D-PL-17186-01-05, FCC Test Firm Designation Number DE0004, FCC Test Firm Registration Number 469623, CAB Identifier DE0003 and ISED# 3469A.

1.4 EUT (Equipment under Test)

Type of equipment: *	ZONESCAN AI Leak Logger	ZONESCAN AI Programming Jig
Type / PMN: *	ZSAI Logger	ZSAI Jig
Product number: *	NA	NA
Serial number: *	500000064	Prototype
FCC ID: *	ZSS-ZSAIL20	ZSS-ZSAIJIG
EUT marking: *	ZSNB-L20	ZSAI-JIG10
PCB identifier: *	ZSNB210B	ZSNB40B
Hardware version: *	NA	NA
Software version: *	NBAI01	NA
Contains FCC ID: *	ZSS-ZSAIBC660K	NA
Contains IC ID: *	9789A-ZSAIBC660K	NA

* Declared by the applicant

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

Logger	
Power supply EUT: *	Battery powered
Supply voltage EUT: *	U = 3.6 V
Temperature range: *	-30 °C to +70 °C
Highest internal clock / generated frequency: *	1915 MHz

* Declared by the applicant

Programming JIG	
Power supply EUT: *	DC via USB
Supply voltage EUT: *	U_{nom} = 5 V
Temperature range: *	-30 °C to +70 °C

* Declared by the applicant

Ports / Connectors				
Identification			Length during test	Shielding (Yes / No)
	EUT	Ancillary		
Antenna / programming port	SMA plug	Clamp	0.25 m	Yes
USB Connector	closed	USB A	0.5 m	Yes

*1 Provided by the laboratory
*2 Provided by the applicant

Equipment used for testing	
Laptop PC:*1	Lenovo IdeaPad 3 15ITL6
Lenovo power adapter	ADLX65CLGE2A P/N: SA10MA2740
-	-

*1 Provided by the applicant
*2 Provided by the laboratory

Ancillary equipment	
Antenna	ANT-BASE-06 with ANT-ROD-76
-	-
-	-

*1 Provided by the applicant

1.6 Dates

Date of receipt of test sample:	15.01.2024
Start of test:	29.01.2024
End of test:	29.01.2024

2 Operational States

Description of function of the EUT:

The EUT is a Logger that allows to find leaks in water pipes underground. The logger will measure the noise of the pipe every night and transmit the data with narrow band modem (NB-IoT). The data will be processed by Gutermann servers to present the leaks in ZONESCAN.NET.
The sensor element of the logger is built around a neodymium magnet, and this attaches the logger magnetically to the pipe.
The logger is deployed underground, to maximize its connectivity an optimized antenna is needed. Because different telecom operators use different bands around the world, an antenna must be chosen to match the application.
The programming jig for the ZONESCAN AI Logger used as a tool to set up the device using a USB connection to a PC. The jig connects with a clamp on the antenna.

The following states were defined as the operating conditions:

During all tests the EUT was connected to a laptop via the programming jig through a USB port. With a software tool “StartLaborTest” the communication was started.

The Software was continuously showing the different sensor values and activity as ADC RMS, 3D Motion sensor, Temperature, Humidity, Fuel Gauge.
.

Test setup

3 Additional Information

General information:

Both the Zonescan AI Logger and the Programming JIG were not appropriately labeled as required by FCC/ISED.

Classification of cables:

- none

Maximum length of cables, declared by the manufacturer:

- no maximum length declared

Type of cables, declared by the manufacturer:

- no special type of cable declared

Deviation of the standard or test plan:

- no deviation

Special EMC measures, as a result of the tests:

- none

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 0.5 to 5 MHz 5 to 30 MHz	66 to 56 dB(µV) QP* 56 to 46 dB(µV) AV* 56 dB(µV) QP 46 dB(µV) AV 60 dB(µV) QP 50 dB(µV) AV	ANSI C63.4	-	Passed
*: Decreases with the logarithm of the frequency					

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

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 88 to 216 MHz 216 to 230 MHz 230 to 960 MHz 960 to 1000 MHz above 1000 MHz	40.0 dB(µV/m) QP at 3 m 43.5 dB(µV/m) QP at 3 m 46.0 dB(µV/m) QP at 3 m 47.0 dB(µV/m) QP at 3 m 54.0 dB(µV/m) QP at 3 m 54 dB(µV/m) AV at 3 m and 74 dB(µV/m) PK at 3 m	ANSI C63.4	-	Passed

Remark: As declared by the applicant the highest internal clock frequency is 1.9149 GHz.
Therefore, the radiated emission measurement must be carried out up to 5th of the highest internal clock frequency.

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

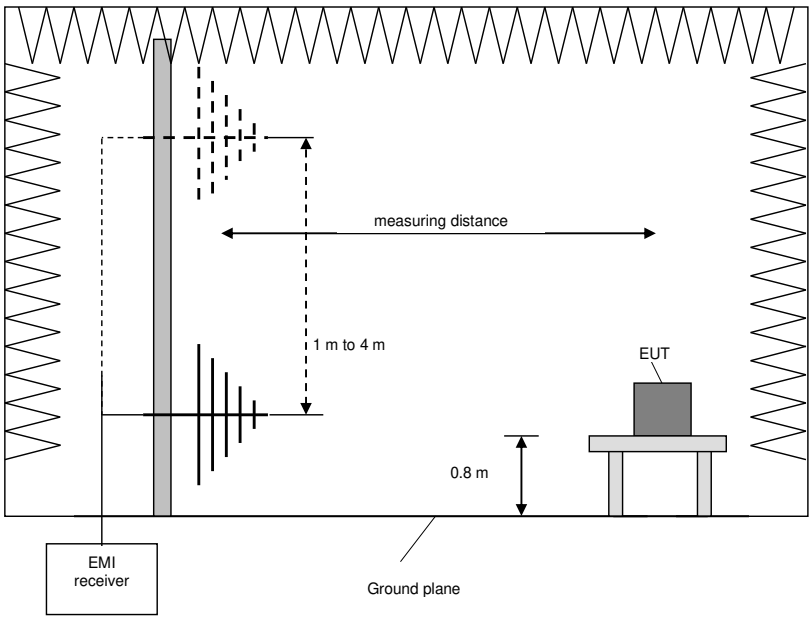
5.1.1.1 Preliminary and final measurement 30 MHz to 1 GHz

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

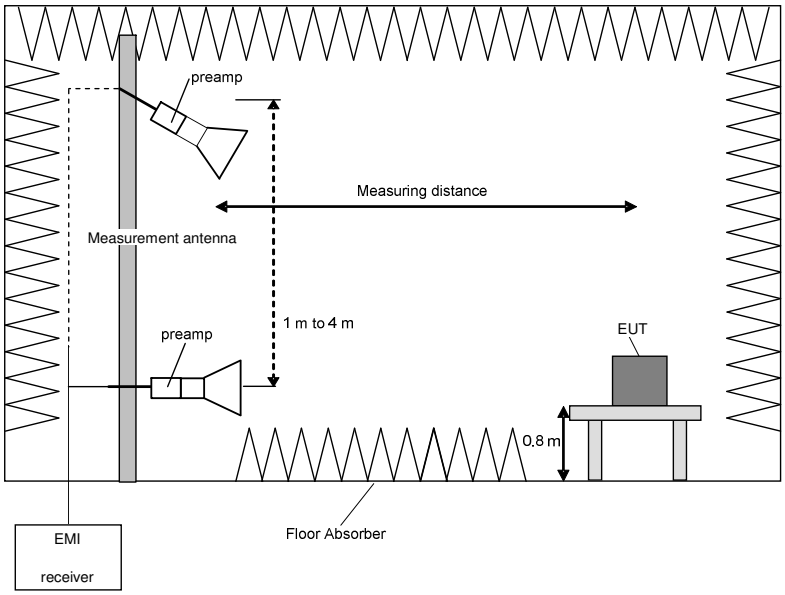
5.1.2.1 Preliminary and final measurement 1 to 40 GHz

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:

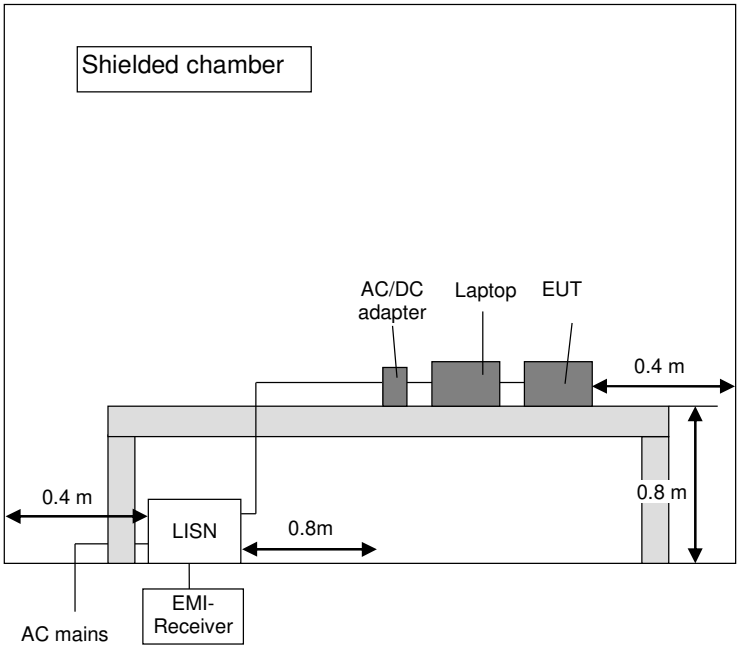
1) Select the highest frequency peaks (lowest margin to the limit) for the final measurement.
2) The software determines the exact peak frequencies by doing a partial scan with reduced step size of the pre-scan of the selected peaks.
3) If the EUT is portable or ceiling mounted, find the worst-case EUT 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 appropriable 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:	20 %

Date:	29.01.2024
Tested by:	Y. KHALEK

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 detail information of test set-up and the cable guide refer to the pictures in the annex A in the test report.

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

Remark: None

Calculations:

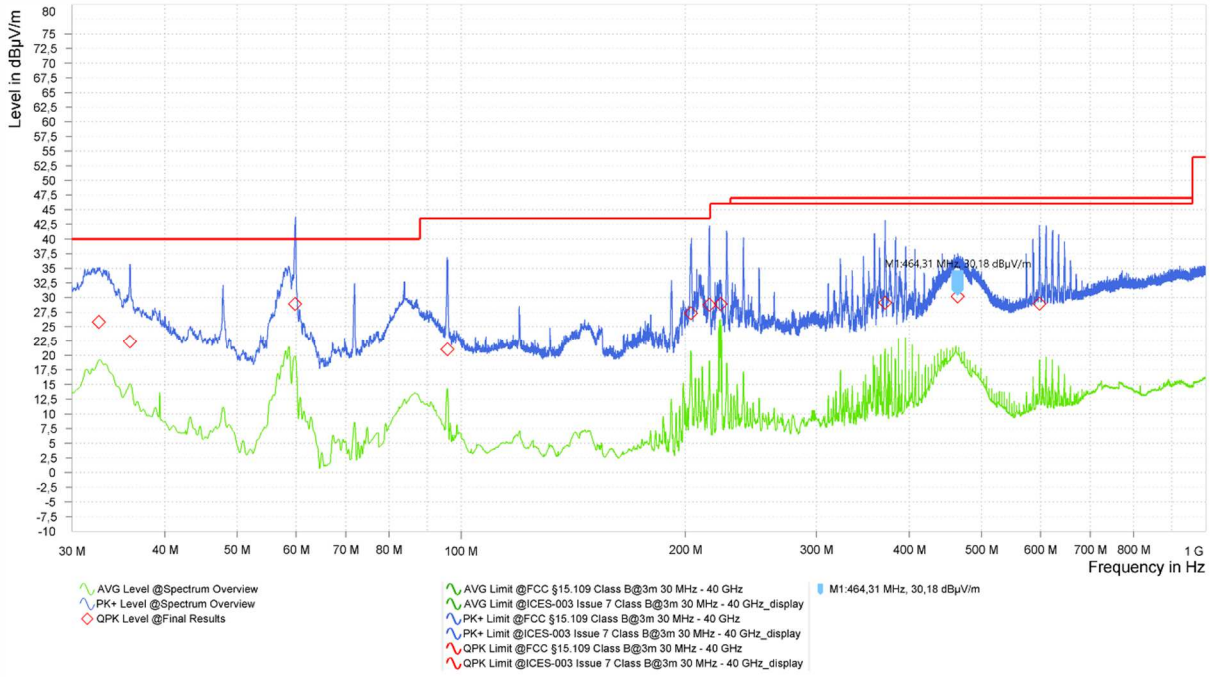
Result [dBµV/m] = Reading [dBµV] + Correction [dB/m]

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:



Result tables:

Result 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]	Height [m]	Azimuth [deg]	Pol. (H/V)	Meas. time [ms]
32.61	25.82	40.0	14.18	24.33	1.13	266	V	1000
35.91	22.41	40.0	17.59	22.42	1.02	327	V	1000
59.82	28.92	40.0	11.08	12.19	3.47	198	H	1000
95.82	21.03	43.5	22.47	16.95	2.72	226	H	1000
203.55	27.31	43.5	16.19	15.81	1.57	358	H	1000
215.52	28.77	43.5	14.73	16.01	1.48	177	H	1000
223.20	28.91	46.0	17.09	15.90	1.01	142	H	1000
371.13	29.12	46.0	16.88	20.85	2.26	87	H	1000
464.31	30.18	46.0	15.82	23.35	1.14	200	V	1000
598.29	28.95	46.0	17.05	25.60	1.44	100	H	1000

Result 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]	Height [m]	Azimuth [deg]	Pol. (H/V)	Meas. time [ms]
32.61	25.82	40.0	14.18	24.33	1.13	266	V	1000
35.91	22.41	40.0	17.59	22.42	1.02	327	V	1000
59.82	28.92	40.0	11.08	12.19	3.47	198	H	1000
95.82	21.03	43.5	22.47	16.95	2.72	226	H	1000
203.55	27.31	43.5	16.19	15.81	1.57	358	H	1000
215.52	28.77	43.5	14.73	16.01	1.48	177	H	1000
223.20	28.91	47.0	18.09	15.90	1.01	142	H	1000
371.13	29.12	47.0	17.88	20.85	2.26	87	H	1000
464.31	30.18	47.0	16.82	23.35	1.14	200	V	1000
598.29	28.95	47.0	18.05	25.60	1.44	100	H	1000

Test result: Passed

Test equipment (please refer to chapter 7 for details)
1 – 9

5.2.3.2 Test results (radiated 1 to 40 GHz)

Ambient temperature:	22 °C
Relative humidity:	20 %

Date:	29.01.2024
Tested by:	Y. KHALEK

Position of EUT: For tests for f 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 detail information of test set-up and the cable guide refer to the pictures in the annex A in the test report.

Remark: None

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

Calculation:

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

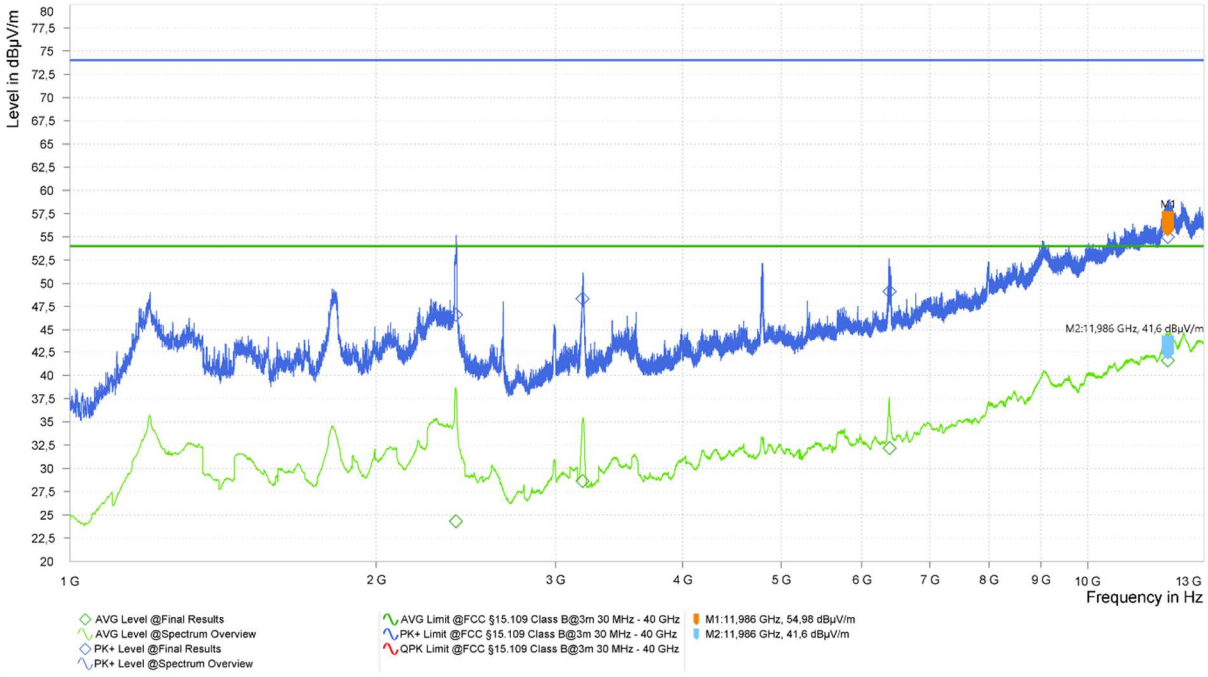
Average [dBµV/m] = Reading [dBµV] + Correction [dB/m]

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.

Spurious emissions from 1 GHz to 13 GHz:



Result:

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [ms]
2395.25	46.62	74.0	27.38	24.32	54.0	29.68	-0.46	H	351	3.50	100.0
3190.25	48.33	74.0	25.67	28.63	54.0	25.37	3.38	V	106	1.25	100.0
6387.75	49.12	74.0	24.88	32.17	54.0	21.83	12.66	V	303	2.72	100.0
11985.75	54.98	74.0	19.02	41.60	54.0	12.40	23.33	H	249	1.25	100.0

Test result: Passed

Test equipment (please refer to chapter 7 for details)
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5.3 AC powerline 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
☒	6.2	Tabletop equipment testing	5.1.3	Provided AC switching power adaptor
☐	6.2	Floor-standing equipment testing	-	-

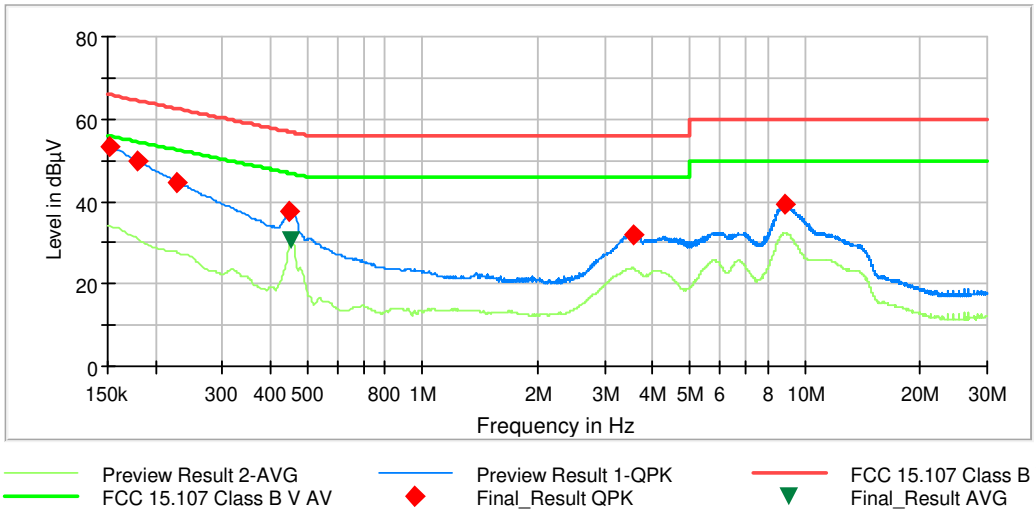
The AC power adaptor provided by the applicant was used for the tests:
Lenovo ADLX65CLGE2A (P/N: SA10MA2740)
The power adaptor itself was supplied by 120 V_{AC} 60 Hz.

5.3.3 Test results (Conducted emissions on power supply lines)

Ambient temperature:	22 °C
Relative humidity:	20 %

Date:	15.01.2024
Tested by:	Y. KHALEK

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 (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (s)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.15225	53.40	---	65.88	12.48	15.0	9.0	L1	GND	19.9
0.17925	49.93	---	64.52	14.59	15.0	9.0	N	GND	19.8
0.22650	44.76	---	62.58	17.82	15.0	9.0	N	GND	19.7
0.44925	37.51	---	56.89	19.38	15.0	9.0	N	GND	19.7
0.45375	---	30.42	46.81	16.39	15.0	9.0	N	GND	19.7
3.55425	31.80	---	56.00	24.20	15.0	9.0	L1	GND	20.1
8.88225	39.27	---	60.00	20.73	15.0	9.0	L1	GND	20.3

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}
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	Attenuator 6 dB	WA2-6	Weinschel	-	482793	Calibration not necessary	
2	Ultralog Antenna	HL562E	Rohde & Schwarz	101079	482978	18.03.2021	03.2024
3	RF Switch Matrix	OSP220	Rohde & Schwarz	-	482976	Calibration not necessary	
4	Turntable	TT3.0-3t	Maturo	825/2612/.01	483224	Calibration not necessary	
5	Antenna support	BAM 4.5-P-10kg	Maturo	222/2612.01	483225	Calibration not necessary	
6	Controller	NCD	Maturo	474/2612.01	483226	Calibration not necessary	
7	Semi Anechoic Chamber M276	SAC5-2	Albatross Projects	C62128-A540-A138-10-0006	483227	Calibration not necessary	
8	Software M276	Elektra version 5.02	Rohde & Schwarz	101381	483755	Calibration not necessary	
9	EMI Test receiver	ESW44	Rohde & Schwarz	101828	482979	08.12.2023	02.2024
10	Low Noise Amplifier 100 MHz - 18 GHz	LNA-30-00101800-25-10P	Narda-Miteq	2110917	482967	18.02.2022	02.2024
11	Log.-Per. antenna	HL050	Rohde & Schwarz	100908	482977	22.09.2022	09.2025
12	LISN	NSLK8128RC	Schwarzbeck	0412	483186	15.02.2022	02.2024
13	AC power source	AC6803A AC	Keysight	JPVJ002509	482350	Calibration not necessary	
14	Software	EMC32 version 10.60.10	Rohde & Schwarz	100619	483182	Calibration not necessary	
15	Shielded chamber M155	SK3	Albatross Projects		482786	Calibration not necessary	
16	EMI Receiver / Spectrum Analyser	ESR7	Rohde & Schwarz	101939	482558	15.02.2022	02.2024
17	Transient Filter Limiter	CFL 9206A	Teseq	38268	483263	14.02.2022	02.2024

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	12.05.2020	11.05.2023
Semi anechoic chamber M276	483227	30 – 1000 MHz	NSA/RSM	CISPR 16-1-4 + Cor1:2010 + A1:2012 +A2:2017	03.03.2021	02.03.2023
Semi anechoic chamber M276	483227	1 -18 GHz	SVSWR	CISPR 16-1-4 + Cor1:2010 + A1:2012 +A2:2017	25.02.2021	24.02.2023

9 Report History

Report Number	Date	Comment
F231570E5	19.03.2024	Initial Test Report
-	-	-
-	-	-

10 List of Annexes

Annex A Test Setup Photos 3 pages