



EA MLA ПОТПИСНИК
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ИНСТИТУТ ЗА АКРЕДИТАЦИЈА НА РЕПУБЛИКА СЕВЕРНА МАКЕДОНИЈА

Institute for Accreditation of the Republic of North Macedonia

СЕРТИФИКАТ ЗА АКРЕДИТАЦИЈА

Бр. ЛК- 011

Accreditation Certificate No. LC-011

НТТ – High Tech Tests

е акредитиран од

Институтот за акредитација на Република Северна Македонија

Со овој Сертификат се потврдува дека се исполнети барањата на стандардот:

МКС EN ISO/IEC 17025:2018

за дејностите кои се опишани во прилогот на овој Сертификат кој е означен со ист број.

This above-named entity is accredited by the Institute for Accreditation of the Republic of North Macedonia.

*By this Certificate the fulfilment of the requirements of the standard
MKS ISO/IEC 17025:2018*

*is acknowledged for the field of accreditation in its full scope as described in the Annex to this
Certificate marked with the same number.*

Директор

Director

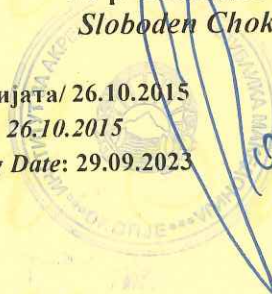
М-р Слободен Чокревски
Sloboden Chokrevski, Msc

Дата на додела на акредитацијата/ 26.10.2015

Date of the initial accreditation: 26.10.2015

Дата на реиздавање/Reissuing Date: 29.09.2023

Важи до/ Valid until: 25.10.2027



**Прилог кон сертификатот за акредитација на
лабораторија за калибрација
*Annex to the Accreditation Certificate of
Calibration Laboratory*
Бр. ЛК-011 / No. LC-011**

Датум: 29.09.2023
Date: 29.09.2023

Го заменува прилогот од: 30.11.2022
Replace the annex from: 30.11.2022

1. АКРЕДИТИРАНО ТЕЛО

Accredited body

HTT – High Tech Tests

2. ЛОКАЦИЈА

Location

*Municipal Unit No. 7, Street “Andrea Kushi”,
Building No.27, Apt. No. 5, Postal Code 1023,
Tirana, ALBANIA*

3. СТАНДАРД

Standard

MKS EN ISO/IEC 17025 : 2018

MKS EN ISO/IEC 17025 : 2018

**4. КРАТОК ОПИС НА ОПСЕГОТ
НА АКРЕДИТАЦИЈАТА**

*A short description of the
accreditation scope*

**Калибрација на електрични броила;
Калибрација на стандардни референтни
броила и калибрација на мерни
инструменти за електрични големини.**

***Calibration of Electric Meters; Calibration of
Standard Reference Meters and Calibration of
Measuring Instruments for Electrical Quantities.***

5. ДЕТАЛЕН ОПИС НА ОПСЕГОТ НА АКРЕДИТАЦИЈА
Detailed description of the accreditation scope

Подрачје (од ИАРСМ документот Р 15) / *Field (from the IARNM document R 15):*
5 - ELECTRICITY
5.6 – ENERGY

Локација каде се изведува калибрацијата / *Location where calibration is performed:*
Laboratory in Permanent location

Реден број <i>No.</i>	Предмет на калибрација <i>Subject of calibration</i>	Мерен опсег <i>Measuring range</i>	Калибрациска мерна можност <i>Calibration measurement capability (cmc)*</i>	Метода на калибрација <i>Method of calibration</i>	Забелешка <i>Remark</i>
1	2	3	4	5	6
1	Electrical Energy Meters Class 0.2S; 0.5S; 0.5; C	Voltage: 0 V ÷ 300 V Current: 0 A ÷ 120 A Frequency: 45 Hz ÷ 65 Hz Phase Angle: 0° ÷ 360°	0.028%; 0.066%	Self-Developed Procedure by HTT-High Tech Tests: PR-305-Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE&MIEQ) IPR-305-1-Instruction for Calibration of Measuring Instrument of Energy (MIE) (Indicators) User Manual PRS.600.3 + PPS.400.3 User Manual KP-P3001-C EA-4/02 M:2022, Evaluation of the Uncertainty of Measurements in Calibration JCGM 100:2008, Evaluation of measurement data – Guide to the expression of uncertainty in measurement	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
2	Electric Energy Reference Standards Class 0.05 to 0.5	Voltage: 0 V ÷ 300 V Current: 0 A ÷ 120 A Frequency: 45 Hz ÷ 65 Hz Phase Angle: 0° ÷ 360°	0.028%	Self-Developed Procedure by HTT-High Tech Tests: PR-305-Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE&MIEQ) IPR-305-1-Instruction for Calibration of Measuring Instrument of Energy (MIE) (Indicators) IPR-305-2-Instruction for	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor k=2, which for a normal distribution

				Calibration of Measuring Instrument of Energy with Power Source (MIE) (Generators) User Manual PRS.600.3 + PPS.400.3 EA-4/02 M:2022, Evaluation of the Uncertainty of Measurements in Calibration JCGM 100:2008, Evaluation of measurement data – Guide to the expression of uncertainty in measurement	corresponds to a coverage probability of approximately 95%.
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Реден број No.	Предмет на калибрација Subject of calibration	Мерен опсег Measuring range	Калибрациска мерна можност Calibration measurement capability (cmc)*	Метода на калибрација Method of calibration	Забелешка Remark
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Локација каде се изведува калибрацијата / Location where calibration is performed:
Laboratory in Permanent location

Подрачје (од ИАРМ документот Р 15) / Field (from the IARM document R 15):
5 - ELECTRICITY
5.1 - DC/LF Voltage

Реден број No.	Предмет на калибрација Subject of calibration	Мерен опсег Measuring range	Калибрациска мерна можност Calibration measurement capability (cmc)*	Метода на калибрација Method of calibration	Забелешка Remark
3	Digital and analog multimeters, voltmeters and measuring instruments of DC V which are primarily intended for measuring quantities of a different type	0 mV ÷ 329.9 mV	8.7 µV	Self-Developed Procedure by HTT-High Tech Tests: PR-305-Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ) IPR-305-3-Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators) User Manual: Fluke 5522A User Manual: Fluke 5320A EURAMET CG-15:2015 Guidelines on the Calibration of Digital Multimeters EA-4/02 M:2022 Evaluation of the Uncertainty of Measurements in Calibration	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
		0.33 V ÷ 3.29 V	52 µV		
		3.3 V ÷ 32.9 V	0.61 mV		
		33 V ÷ 329.9 V	8.2 mV		
		330 V ÷ 1020 V	28 mV		

				JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement	
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4	Digital and analog multimeters, voltmeters and measuring instruments of AC V which are primarily intended for measuring quantities of a different type	1.0 mV ÷ 329.9 mV (10 Hz ÷ 500kHz)	0.28 mV	Self-Developed Procedure by HTT-High Tech Tests: PR-305-Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ) IPR-305-3-Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators) User Manual: Fluke 5522A User Manual: Fluke 5320A EURAMET CG-15:2015 Guidelines on the Calibration of Digital Multimeters EA-4/02 M:2022 Evaluation of the Uncertainty of Measurements in Calibration JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
		0.33 V ÷ 3.29 V (10 Hz ÷ 500 kHz)	2.8 mV		
		3.3 V ÷ 32.9 V (10 Hz ÷ 500 kHz)	41 mV		
		33 V ÷ 329.9 V (10 Hz ÷ 500kHz)	0.99 V		
		330 V ÷ 1020 V (45 Hz ÷ 10kHz)	0.81 V		

5.2 - DC/LF Current

5	Digital and analog multimeters, ammeters and measuring instruments of DC A which are primarily intended for measuring quantities	0 µA ÷ 329.9 µA	78 nA	Self-Developed Procedure by HTT-High Tech Tests: PR-305-Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ) IPR-305-3-Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators) User Manual: Fluke 5522A	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage
		0.33 mA ÷ 3.29 mA	0.46 µA		
		3.3 mA ÷ 32.9 mA	4.6 µA		
		33 mA ÷ 329.9 mA	82 µA		

	of a different type	0.33 A ÷ 2.9 A	1.3 mA	User Manual: Fluke 5320A User Manual: Fluke 52120A User Manual: Fluke Coil 3kA	factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
		3 A ÷ 20.5 A	23 mA	EURAMET CG-15:2015 Guidelines on the Calibration of Digital Multimeters	
		20.5 A ÷ 100 A	19 mA	EA-4/02 M:2022 Evaluation of the Uncertainty of Measurements in Calibration	
		100 A ÷ 2500 A	1.6 A	JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement	
6	Digital and analog multimeters, ammeters and measuring instruments of AC A which are primarily intended for measuring quantities of a different type	29 µA ÷ 3.29 mA (10 Hz ÷ 30 kHz)	19 µA	Self-Developed Procedure by HTT-High Tech Tests:	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
		3.3 mA ÷ 32.9 mA (10 Hz ÷ 30 kHz)	96 µA	PR-305- Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ)	
		33 mA ÷ 329.9 mA (10 Hz ÷ 30 kHz)	1.1 mA	IPR-305-3- Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators)	
		0.33 A ÷ 2.9 A (10 Hz ÷ 10 kHz)	84 mA	User Manual: Fluke 5522A User Manual: Fluke 5320A User Manual: Fluke 52120A	
		3 A ÷ 20.5 A (45 Hz ÷ 5 kHz)	0.63 A	User Manual: Fluke Coil 3kA	
		20.5 A ÷ 120 A (10 Hz ÷ 10 kHz)	0.21 A	EURAMET CG-15:2015 Guidelines on the Calibration of Digital Multimeters	
		120 A ÷ 3000 A (10 Hz ÷ 10 kHz)	1.6 A	EA-4/02 M: 2022 Evaluation of the Uncertainty of Measurements in Calibration JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement	

5.8 – Resistance					
7	Digital and analog multimeters, ohm meters and measuring instruments of Ω which are primarily intended for measuring quantities of a different type	0.1 Ω ÷ 4.9 Ω	46 m Ω	Self-Developed Procedure by HTT-High Tech Tests: PR-305- Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ) IPR-305-3- Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators) User Manual: Fluke 5522A User Manual: Fluke 5320A EURAMET CG-15:2015 Guidelines on the Calibration of Digital Multimeters EA-4/02 M: 2022 Evaluation of the Uncertainty of Measurements in Calibration JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
		5 Ω ÷ 29.9 Ω	94 m Ω		
		30 Ω ÷ 199.9 Ω	0.45 Ω		
		200 Ω ÷ 499.9 Ω	1.6 Ω		
		500 Ω ÷ 1.9 k Ω	4.4 Ω		
		2 k Ω ÷ 4.9 k Ω	13 Ω		
		5 k Ω ÷ 9.9 k Ω	19 Ω		
		10 k Ω ÷ 39.9 k Ω	88 Ω		
		40 k Ω ÷ 99.9 k Ω	0.23 k Ω		
		100 k Ω ÷ 199.9 k Ω	0.42 k Ω		
		200 k Ω ÷ 999.9 k Ω	2.3 k Ω		
		1 M Ω ÷ 9.9 M Ω	64 k Ω		
		10 M Ω ÷ 999.9 M Ω	5.7 M Ω		
	1 G Ω ÷ 10 G Ω	92 M Ω			
5.9 – Capacitance					
8	Digital and analog multimeters, and measuring instruments of capacitance which are primarily intended for measuring quantities of a different type	0.22 nF ÷ 32.9 nF	0.20 nF	Self-Developed Procedure by HTT-High Tech Tests: PR-305- Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ) IPR-305-3- Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators) User Manual: Fluke 5522A User Manual: Fluke 5320A EURAMET CG-15:2015 Guidelines on the	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor $k=2$, which for a normal distribution
		33 nF ÷ 329.9 nF	1.2 nF		
		0.33 μ F ÷ 3.29 μ F	12 nF		
		3.3 μ F ÷ 32.9 μ F	0.21 μ F		
		33 μ F ÷ 329.9 μ F	1.9 μ F		
		0.33 mF ÷ 3.29 mF	19 μ F		

		3.3 mF ÷ 32.9 mF	0.29 mF	Calibration of Digital Multimeters	corresponds to a coverage probability of approximately 95%.
		33 mF ÷ 110 mF	1.4 mF	EA-4/02 M: 2022 Evaluation of the Uncertainty of Measurements in Calibration JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement	

Подрачје (од ИАРМ документот Р 15) / Field (from the IARM document R 15):

4 – TIME AND FREQUENCY

4.2 – Phase Angle

9	Digital and analog multimeters, and measuring instruments of Phase Angle which are primarily intended for measuring quantities of a different type	Phase (°) Watts/VARs (0° ÷ 90°)	0.61°	<p>Self-Developed Procedure by HTT-High Tech Tests:</p> <p>PR-305- Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ)</p> <p>IPR-305-3- Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators)</p> <p>User Manual: Fluke 5522A User Manual: Fluke 5320A User Manual: Fluke 52120A User Manual: Fluke Coil 3kA</p> <p>EURAMET CG-15:2015 Guidelines on the Calibration of Digital Multimeters</p> <p>EA-4/02 M:2022 Evaluation of the Uncertainty of Measurements in Calibration</p> <p>JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement</p>	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
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4.3 – Frequency

10	Digital and analog multimeters, and measuring instruments of Frequency which are primarily intended for measuring quantities of a different type	0.01 Hz ÷ 119.9 Hz	15 mHz	Self-Developed Procedure by HTT-High Tech Tests: PR-305- Calibration of Measuring Instruments for Energy and Electrical Quantities (MIE & MIEQ) IPR-305-3- Instruction for Calibration of Instruments used for Measuring Electrical Quantities (Indicators) User Manual: Fluke 5522A User Manual: Fluke 5320A EURAMET CG-15:2015 Guidelines on the Calibration of Digital Multimeters EA-4/02 M:2022 Evaluation of the Uncertainty of Measurements in Calibration JCGM 100:2008 Evaluation of measurement data – Guide to the expression of uncertainty in measurement	The reported expanded uncertainty is stated as the combined standard uncertainty of measurements multiplied by a coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
		120 Hz ÷ 1199.9 Hz	58 mHz		
		1.2 kHz ÷ 11.9 kHz	1.8 Hz		
		12 kHz ÷ 119.9 kHz	51 Hz		
		120 kHz ÷ 1199.9 kHz	82 Hz		
		1.2 MHz ÷ 2 MHz	0.58 kHz		

м-р Слободен Чокревски
MSc Sloboden Chokrevski

Директор
Director

