***Contents***

Introduction 1

Transfer Standards 2

Transport 3

Time schedule 3

Measurements 3

Uncertainty 4

Report of results 4

Annex 1 5

Annex 2 6

Annex 3 7

Annex 4 8

# Introduction

The present intercomparison was proposed by the Institute of Metrology of Bosnia and Herzegovina (IMBiH), with the motive of supporting its CMCs in the quantity of resistance. The proposal was accepted by the laboratory of Low Frequency of the Hellenic Institute of Metrology (EIM), which will provide the travelling standards and assume the role of the pilot lab.

The scope of the intercomparison is the calibration of three resistance standards of the following values:

1 Ohm

100 Ohm

10 kOhm

**Pilot laboratory for the intercomparison:**

Low Frequency Laboratory

Hellenic Institute of Metrology

Ind. Area of Thessaloniki, Block 45

Sindos 57022, Thessaloniki

Greece

**EIM Contact person:**

Dr Myrto Holiastou

Tel.: 2310 569 971, 2310-569999

Fax: 2310 569 996

e-mail: holiastou@eim.gr

# Transfer Standards

Resistor A

Device: Resistor

Nominal value: 1 Ohm

Manufacturer: Guildline

Type: 9334

Serial Number: 63534

Resistor B

Device: Resistor

Nominal value: 100 Ohm

Manufacturer: Guildline

Type: 9334

Serial Number: 61944

Resistor C

Device: Resistor

Nominal value: 10 kOhm

Manufacturer: Guildline

Type: 9334

Serial Number: 63613

# Transport

The instrument must be transported in an appropriate package. Upon receipt, please, unseal and checke for possible damage. Then, please complete and send the form “Receipt Form” (Annex 1) to the pilot laboratory.

After completing the measurements IMBiH informs the pilot laboratory for the transport using the form “Send form” (Annex 2). For the transport the initial packaging material can be used provided that it is in good condition for this cause.

# Time schedule

The measurements will take place in the period May-June according to the following schedule:

|  |  |  |
| --- | --- | --- |
| Institute | **Action** | **Time period** |
| EIM | Perform initial EIM measurements  | May 2015 |
| IMBiH | Perform IMBiH measurements  | 17 June -3 July 2015 |
| EIM | Perform final EIM measurements  | July 2015 |

# Measurements

The reported resistance values must be referenced to 23.00 oC for all the travelling standards. The proposed currents of the measurements are:

* 1 Ohm Resistor: 20 mA
* 100 Ohm Resistor: 3 mA
* 10 kOhm Resistor: 0.3 mA

For the best calculation of the repeatability of measurements, the repetition of the measurement in at least three different days is proposed.

# Uncertainty

The calculation and the report of the uncertainty must be done according to the method described in the international standard ISO "Guide to the Expression of Uncertainty in Measurement”, 1995 and the standard EA-4/02. The expanded uncertainty is to be reported in the form of Annex 3.

# Report of results

The participating laboratory must send to the pilot lab 4 weeks after the completion of the measurements the following:

1. Report of the results (in the form of a calibration certificate)
2. Measurement results form (Annex 4)
3. Uncertainty budget tables (Annex 3)

**It is preferable that the documents are sent electronically.**

**Receipt Form**

Annex 1

*To: Low Frequency Laboratory, ΕΙΜ*

 *Attention: Myrto Holiastou*

 *Fax: 2310 569 996*

**Laboratory Name**: ...................................................................................

The package was received in (date):

After a brief control,

The package was found in: Good condition With obvious damage

**Comments:**

**Name of IMBiH Person Responsible:** .....................................................................

**Signature:** .......................................................................

Please, return this form immediately after the receipt of the package

**Send Form**

Annex 2

*To: Low Frequency Laboratory, ΕΙΜ*

 *Attention: Myrto Holiastou*

 *Fax: 2310 569 996*

**Laboratory Name**: ...................................................................................

The package was sent (date):

Name of courier company

Code of courier transport:

**Comments:**

**Name of IMBiH Person Responsible:** .................................................................

**Signature:** .......................................................................

Please, return this form immediately after the transport of the package

Annex 3

 ***UNCERTAINTY BUDGET TABLE***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Quantity*X*i | Estimate*x*i | Relative standard uncertainty*u*(*x*i) | Probability distribution / method of evaluation (A, B) | Sensitivity coefficient*c*i | Relative uncertainty contribution *u*(*R*i) | Degree of freedomn*νi* |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| *R*x |  |  |  |  |  |  |
|  |  | Combined standard uncertainty: |  |
|  |  | Degrees of freedom: |  |
|  |  | Expanded uncertainty (coverage factor 95% ): |  |

***RESULTS TABLE***

Annex 4

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Standard Serial no. | Date of measurement | Temperature  | Uncertainty of temperature | Current of measurement | Measurement result | Type A uncertainty of measurement |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |