



## **2021 AFRIMETS TC-EM committee meeting**

**held in videoconference mode**

on 24<sup>th</sup> June 2021

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## Introduction:

This report summarises deliberations and decisions taken during the 2021 AFRIMETS TC-EM committee meeting held in videoconference mode on 24<sup>th</sup> June 2021, due to the pandemic circumstances of Covid 19.

## Opening and welcome:

The chairperson, Alexander Matlejoane from NMISA, South Africa officially opened the meeting and welcomed delegates (see Attendance list on Appendix 1)

A proposed agenda was discussed and approved by delegates (see Appendix 2)

## TC-EM comparison plan:

The following comparison plan was discussed and approved by TC-EM:

Year	Identifier	Description	Participants	Pilot	Status
2015	AFRIMETS.EM-S1	DC resistance at 1 $\Omega$ , 10 $\Omega$ , 100 $\Omega$ , 1 k $\Omega$ and 10 k $\Omega$	NMISA, LPEE-LNM, DEF-NAT, KEBS, NIS, UNBS, NMIE	NMISA (had also provided artefact)	Revised draft B report was approved by TCEM and Pilot requested to submit revised version to CCEM WGLF chairperson on Monday 28 June 2021
2017	AFRIMETS.EM.RF-S1	RF attenuation	NMISA, NIS, DEF-NAT	NMISA	Completed. Results published
2019	AFRIMETS.EM-S2	ACV : 100 mV, 100 V, 1000 V @40 Hz 1 kHz. ACI : 10 mA, 1 A, 10 A @40 Hz and 1 kHz. DCI : 10 mA, 1 A, 10 A. DCV : 100 mV, 10 V, 1000 V DC Resistance : 100 k $\Omega$ , 1 M $\Omega$ , 100 M $\Omega$ Artefact : 6 ½ DMM	NMISA, LPEE-LNM, DEF-NAT, KEBS, NIS, UNBS, NMIE, SIRDC-NMI, ZMA	NIS (DEF-NAT provided artefact)	In progress (1 <sup>st</sup> loop completed)  One NMI is yet to carry out measurements on the 2 <sup>nd</sup> loop
2022	AFRIMETS.EM-S3	AC Power and energy 50V to 300V 5 mA to 120A 10W to 36000W, VAR PF 0 to 1 i/c 45 Hz to 65 Hz Artefact : Power and Energy meter	NMISA, LPEE-LNM, KEBS, NIS, TBS	NIS (will provide artefact)	Planned
2022	AFRIMETS.EM-S4	DC & AC High Voltage  DC : 5 kV, 10 kV, 20 kV  AC @50Hz : 5 kV, 10 kV, 20 kV  Artefact : to be identified	NIS, LPEE-LNM, DEF-NAT	NIS (LPEE-LNM will provide artefact)	Planned

## TC-EM comparison plan (continued) :

Year	Identifier	Description	Participants	Pilot	Status
2023	AFRIMETS.EM-S5	<p>AC-DC transfer in Voltage: 2 V @ 10 Hz, 1 kHz, 20 kHz, 100 kHz, 1 MHz</p> <p>200 V @ 10 Hz, 1 kHz, 10 kHz, 20 kHz, 50 kHz, 100 kHz</p> <p>Optional : 1000 V @ 10 Hz , 1 kHz, 10 kHz, 20 kHz, 50 kHz, 100 kHz</p> <p>Artefact : to be identified</p>	NMISA, DEF- NAT, NIS , NMIE, KEBS	NMISA (will provide artefact)	Planned
2023	AFRIMETS.EM-S6	<p>Radio Frequency power At frequencies 10 MHz, 100 MHz, 1GHz and 18 GHz</p> <p>Power sensors- at 100 microwatt, 1 mW, and 10 mW</p> <p>Artefact : power sensor</p>	NMISA, NIS, DEF-NAT	(NMISA could provide artefact and NIS/DEFANT could write protocol and analyse data )	Planned
2023	AFRIMETS.EM-S7	<p>S-parameters Reflection coefficient Sii (-1, 1) At frequencies: 50 MHz, 1GHz, and 18 GHz</p> <p>Reflection coefficient Sij (magnitude) 0 dB, 40 dB and 80 dB At frequencies: 50 MHz, 1GHz, and 18 GHz</p> <p>Sij (phase) (-180° to 180°) At frequencies: 50 MHz, 1GHz, and 18 GHz</p> <p>Artefact : Attenuators</p>	NMISA, NIS, DEF-NAT	(?? will provide artefact)	Planned

### Update on AFRIMETS.EM-S1 comparison:

Draft B Report already by TC-EM, and Pilot will send to CCEM WGLF Chairperson on 28<sup>th</sup> June 2021.

## **Update on AFRIMETS.EM-S2 comparison:**

Measurement schedule was delayed by shut down of countries due to Covid-19 pandemic. Measurements re-scheduled for completion in July 2021.

SIRDC, Zimbabwe reported that comparison standard is stuck at Zimbabwe customs and arrangements to get the standard from customs are in progress.

It was resolved that the Pilot can start to analyse data for loop 1 of comparison.

## **TC-EM Intra & Inter-RMO CMC reviews:**

### **Challenges**

Two CMCs were not approved during intra-RMO review.

Delayed intra-RMO review by some reviewers.

Delayed JCRB review of EURAMET CMCs by some reviewers;

Persistence to defy unwritten logical CMC review rules by some NMIs.

### **Achievements**

All AFRIMETS CMCs submitted for JCRB review are published in KCDB.

JCRB review of EURAMET CMCs completed before set deadline.

## **Presentations:**

Mr Michael KHOZA from NMISA gave a presentation on AFRIMETS.EM-S1 Comparison.

Dr Mohammed Helmy Abd El-Raouf from NIS gave a presentation on AFRIMETS.EM-S2 Comparison.

## Feedback from CCEM and related WG-RMO meeting:

The term of WGRMO chairperson Lic Lucas Di Lillo (INTI) was unanimously extended for the next two years.

Bugs on KCDB 2.0 platform have been resolved and system is fully operational.

A proposal to add a new service sub-category for digital multimeters was discussed at the EURAMET SC-P&E meeting in Ljubljana in 2019. The meeting agreed to avoid making new sub-categories but instead fit digital multimeters into existing categories.

The “Electricity and Magnetism Supplementary Guide for the submission of CMCs” will be updated to include examples of matrices.

NMIs from other RMOs are allowed to participate in AFRIMETS TCEM comparisons and AFRIMETS NMIs are also allowed to participate in other RMO comparisons. The proposed communication options are:

- *The CCEM WGRMO chair will consult RMO TC chairs about the possibility to share the reports of the meetings with other RMOs to know in an early stage about the plans for comparisons.*
- *When the WGRMO chair receives an email in which the KCDB office was asked to register a comparison, he/she will request the CCEM executive secretary to asks the other RMOs if there are any NMIs interested in participating in the comparison.*

Member NMIs are encouraged to participate in other RMO comparisons and not wait for AFRIMETS TCEM organised comparisons.

RMOs are required to develop strategic plans for comparisons, for instance TCEM has for now moved from single parameter comparisons to multi parameter comparisons to speed up publication of CMCs for services that member NMIs provide to their customers. The current DMM comparison will cover five parameters.

A new series of guideline documents on different aspects of the CIPM MRA are available on the BIPM website. They present the same information as the previous guides, but in a better and more structured way.

The JCRB website will be closed, and all activities are dealt with on the KCDB 2.0 platform. Information on JCRB website can be accessed when required.

Criteria of acceptance of CMCs in Electricity and Magnetism (WGRMO/21-03\_b), lists the technical evidence to take into consideration in addition to comparisons for review of CMCs. The objective is to remove the ambiguity during reviews of NMIs claims. The document also specifies which cases require a comparison.

A “Guide to convert numerical equations into quantity equations for KCDB applications” was presented. Based on a request from the Mass and Length community, there is a change in the way to express uncertainty equations (from equations based on numerical values to “quantity-based equations”). The CCs’ presidents approved this transition. In the case of E&M there are about 50 equations that will be uploaded in the new format.

The BIPM developed a new application called API (application programming interface). This interface allows to query the database directly from within other applications.

NMIs CMC claims must be consistent with the Executive Reports of NMIs. According to the CIPM MRA-G-13, chapter 9, “The responsibility for ensuring that CMC claims made by the institute are consistent with the results obtained in comparisons, are as follows:

- the institute making the CMC claim has the primary responsibility to modify, temporarily withdraw or delete the impacted CMC(s) from the KCDB;
- the RMOs, through their TC/WGs, should monitor the impact of key and supplementary comparison results on CMC claims for their institutes;”

CMC writers must in case of modified CMCs, indicate in the comments section a description of what has been modified. This requirement is captured in the “Getting started” document and it will be made clearer in the document. TC chairs must not approve but send back non-compliant CMCs to writers for review.

When using frequency and voltage ranges it is possible to include symbols like ‘<’ or ‘>’ in the matrix table because the context of it is treated as text. However, it is not possible in the CMCs itself and this should be included as a comment.

#### **2019-2022 TC-EM executive committee members:**

**Chairperson:** Alexander Matlejoane, NMISA, South Africa was re-elected for the next three years from 2022 to 2024.

**Vice chairperson 1:** Mohammed Helmy Abd El-Raouf, NIS, Egypt

**Vice chairperson 2:** Abdelkrim MALLAT, DEF-NAT, Tunisia

**Secretary:** Abdellah ZITI, LPEE-LNM, Morocco

**Vice secretary:** Hala Mohamed Abd El Megeed, NIS, Egypt

## Appendix 1: Attendance list for 2021 TC-EM meeting

NMI	Contact person	Contact details
National Metrology Institute of South Africa (NMISA), South Africa	Mr. Alexander Matlejoane Mr. Michael Khoza Mr Marcus Hlakola Mr Brian Maboko Dr. Tshepo Dinoko Dr.Linoh Magagula Mr. Flippie PRINSLOO Mr. Eugene GOLOVINS	<a href="mailto:amatlejoane@nmisa.org">amatlejoane@nmisa.org</a> <a href="mailto:mkhoza@nmisa.org">mkhoza@nmisa.org</a> <a href="mailto:mhlakola@nmisa.org">mhlakola@nmisa.org</a> <a href="mailto:BMaboko@nmisa.org">BMaboko@nmisa.org</a> <a href="mailto:tdinoko@nmisa.org">tdinoko@nmisa.org</a> <a href="mailto:lmagagula@nmisa.org">lmagagula@nmisa.org</a> <a href="mailto:fprinsloo@nmisa.org">fprinsloo@nmisa.org</a> <a href="mailto:egolovins@nmisa.org">egolovins@nmisa.org</a>
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## Appendix 2 : AFRIMETS 2021 TC-EM meeting agenda

5 minutes	Welcome	Chairperson
5 minutes	Confirmation of agenda	All
5 minutes	Chairperson report	Chairperson
5 minutes	Minutes of previous meeting	Secretary
10 minutes	Matters arising from minutes	All
20 minutes	Update on AFRIMETS.EM-S1	Pilot
20 minutes	Update on AFRIMETS.EM-S2	Pilot
10 minutes	Updating of comparison plan	All
15 minutes	Election of TCEM committee	All
5 minutes	Updating of mailing list	All
15 minutes	Any other business	All
5 minutes	Date of next meeting and closure	Chairperson