



1. General Aspects

TC-EM has approved its Charter, which defines the scope and activity of the TC and its subcommittees and working groups.

2. Projects

Detailed information about the EURAMET projects in the EM field is available from the EURAMET web-site and currently updated. An overview of the number of projects is given in the table below.

| | EURAMET Comparison | Traceability | Research | EMRP/EMPIR |
|-----------------|-------------------------------|---------------------|-----------------|---|
| On-going | 7 | 12 | 2 | 2014: 4 2015: 6 2016: 8 2017: 10 |

The Guide no. 12, "Guidelines on the Evaluation of Vector Network Analysers (VNA)" has been published on the EURAMET website.

3. Comparisons

During 2017, 3 supplementary EURAMET comparisons have been completed in the EM field. Besides this, EURAMET is or has been active in a number of CCEM comparisons.

4. CMCs

04.1 EURAMET EM CMCs

04.1.1 EURAMET.EM.14.2016

The CMC set EURAMET.EM.14.2016, submitted for inter-RMO review on 2016.11.06, has been published on 2017.06.30.

04.1.2 EURAMET.EM.15.2018

The intra-RMO review of the CMC set EURAMET.EM.15.2018 was carried out between September and December 2017.

17 NMIs submitted in total 276 entries. Of these, 74 are new entries, together with 48 matrices. 123 are improved existing entries, together with 83 matrices. For 79 rows and 68 matrices, minor changes were proposed: the scope was reduced, the uncertainty was increased or editorial modifications were applied. 28 entries are announced for removal from the KCDB. All the entries were reviewed by the members of the working group on the analysis of CMCs.

CH has proposed entries in Cat. 6 and a new classification ("Voltage Meter with IEC 61850-9-2 output"). The emergence of these instruments and their relevance has been acknowledged

informally by CCEM; an extension of the classification scheme has been proposed and is under agreement.

CCEM has approved a revision of the CMC Categories 8 and 9 proposed by EURAMET. The full set of CMC entries, both those proposed in EURAMET.EM.15.2018 and those already published in the KCDB, have been reformatted to be consistent with the new CMC classification.

EURAMET.EM.15.2018 has been published on the JCRB website on 2018.04.20 for the inter-RMO reviewing.

04.2 Inter-regional review of CMCs

In 2017, EURAMET TCEM was involved in two inter-RMO reviews. In agreement with the other RMOs, it has been decided to share the inter-RMO review of these sets between the other RMOs. The EURAMET review concerned the CMC sets

SIM.EM.10.2017. Posted on 2017.02.13. EURAMET review 2017.03.24. Approved 2017.05.31.

COOMET.EM.13.2017. Posted on 2017.11.21. EURAMET review on 2017.12.30. Approved 2018.03.04.

5. Activities of the Subcommittees

The activities of the four subcommittees (DC and Quantum Metrology, Low Frequency, Radiofrequency and Microwave, Power and Energy) are largely dominated by R&D activities related to EMRP and EMPIR.

In 2017, the following SC meetings occurred:

SC-DC&QM Contact Person Meeting, VTT, Finland, 1-2 June 2017

SC-LF Contact Person Meeting, UME, Istanbul, Turkey, 29-30 May 2017;

SC RF&MW Contact Person Meeting, CMI, Prague, Czech Republic, 4-5 April 2017;

SC Power and Energy Meeting, June 5-6 2017, NPL, UK.

For 2018, the following informal SC meetings are programmed:

SC-DC&QM Meeting, 2018.07.10, at the CPEM Conference, Paris;

SC-LF meeting, 2018.07.10, at the CPEM Conference, Paris.6. Participation in EMRP/ EMPIR

2018 Call

A workshop was held on 15 and 16 January 2017 at CMI, Prague. Local organizers were Jiri Streit, Jan Kučera, Peter Kiška. About 36 people subscribed to the meeting. The meeting was structured with two plenary sessions at the beginning and the end of the meeting, and subgroups for the different subject.

A summary of the PRT topic discussed is provided at the end of this report.

7. Capacity Building: Activities of the last year and future needs

No activity. Future needs will be discussed at the 2018 meeting.

8. Meetings

TC-EM Contact Person Meeting. The 11th EURAMET Electricity and Magnetism Technical Committee Contact Persons Meeting was held on 3 and 4 October 2017 at Caparica, Portugal, hosted by Luis Ribeiro.

34 people representing 6 EURAMET members, one person from BIPM, one from NIST and two from SASO attended it.

WGSP meeting: 3 october 2017, at the Instituto Portuges de Qualidade (IPQ), Rua António Gião, Caparica, Portugal, hosted by Luis Ribeiro.

9. Issues

None.

10. Strategic Planning

Strategic Planning has been addressed by email with a draft proposal for organizing the forthcoming EURAMET comparisons and will be discussed at the next TC-EM meeting.

11. Outlook for 2018 / 2019

WGSP meeting at the CPEM Conference, 2018.07.11, Paris, France. The meeting will be devoted to the interaction of the European Metrology Networks "Smart Electricity Grids" and "Quantum Technologies", under approval at the next GA, and the SC structure of TC-EM.

2018 TC-EM Contact Person Meeting and **WGSP meeting** are provisionally scheduled for 27 and 28 September 2018, Cavtat, Croatia.

TC-EM EMPIR 2019 meeting will take place in January 2019, place and date to be defined.

Luca Callegaro
TC-EM Chair

EURAMET TC-EM Workshop on the EMPIR 2018 Call – List of PRTs

| TP | From | Email | Subject | Title |
|-----|---------------------|-----------------------------|----------------|--|
| SIB | METAS Jeanneret | Blaise.Jeanneret@metas.ch | Quantum std | GIQS – Graphene Impedance Quantum Standard |
| SIB | PTB Behr | Ralf.Behr@ptb.de | Quantum std | QuADC^2 - Josephson AC |
| SIB | NPL Kataoka | masaya.kataoka@npl.co.uk | Quantum std | Quantum realisation of the SI ampere |
| SIB | RISE Tarasso | valter.tarasso@ri.se | P&E | Power IN Time - Traceability for electrical power in time domain |
| EMN | VSL Mubarak | fmubarak@vsl.nl | P&E | Smart Grids |
| HLT | GUM Podgorni | a.podgorni@gum.gov.pl | Magnetics | Improvement of drug permeability across blood-brain barrier by magnetic field. |
| SIB | PTB Hahn | christian.hahn@ptb.de | Magnetics | Advanced quantum based magnetic field metrology |
| SIB | PTB Sibylle Sievers | sibylle.sievers@ptb.de | Magnetics / RF | Metrology for high frequency dynamics of magnetic materials and sensors |
| SIB | PTB Schumacher | Hans.W.Schumacher@ptb.de | Magnetics | QuNanoMag - Towards quantum traceability of nano scale magnetic field measurements |
| SIB | LNE Piquemal | francois.piquemal@lne.fr | Materials | NanoElec - Nanoscale traceable electrical quantity measurements |
| SIB | PTB Kleine-Ostmann | Thomas.Kleine-Ostmann@ptb.d | RF | Metrology for the next generation of modulated radio frequency signals |
| SIB | PTB Kuhlmann | Karsten.kuhlmann@ptb.de | RF | Passive intermodulation measurement at metrology and non-metrology connectors |
| HLT | VSL Mubarak | fmubarak@vsl.nl | RF | Measure4Health - externalbodydetection |
| SIB | METAS Zeier | markus.zeier@metas.ch | RF | Extending traceability in the THz range (mm-waves and beyond) |

