



Electricity and Magnetism Metrology Working Group

2010 SIM EM MWG Meeting, INTI, Argentina
(Monday, September 06, 09:00 h – 1600 h, Aula 1, INTI)
Instituto Nacional de Tecnología Industrial, INTI
INTI - Física y Metrología,
Unidad Técnica Electricidad
C.C.: 157, B1650WAB San Martin, Pcia. de Buenos Aires, Argentina

Agenda

09:00 h – 09:15 h	Introduction Welcome/Introduction of the participants	SIM representatives
09:15 h – 10:30 h	Agenda Approval of the Agenda Matters arising from the last CCEM meeting SIM Technical Review Process for EM CMC Use of MS Excel 'hide' function in CMC submissions Funding for SIM activities	SIM representatives Chairperson
10:30 h – 11:15 h	SIM.EM-K5 Electric Power Comparison Protocol approved Comments on status	Pilot: CENAM
11:15 h – 12:00 h	SIM.EM-S7 Electric Energy Comparison Protocol approved Comments on status	Pilot: CENAM
12:00 h – 13:00 h	Lunch	
13:00 h – 13:45 h	SIM.EM-K12 AC-DC Current Transfer Comparison Protocol approved Comments on status	Pilot: INTI
13:45 h – 14:00 h	SIM.EM-K4, SIM.EM-S4, SIM.EM-S3 Capacitance Comparisons Draft B Report status	Pilot: NIST
14:00 h – 14:15 h	SIM.EM-S5 Digital Multimeter Comparison Draft A Report status and DMMs custody by NMIs interested	Pilot: NIST
14:15 h – 14:30 h	JVS bilateral comparison between NIST and Inmetro (SIM.EM.BIPM-K10.b.1) Final comments	NIST and Inmetro
14:30 h – 14:45 h	SIM.EM-K3 Inductance Comparison Review of measurement progress and traveling standard distribution Measurement schedule	Pilot: Inmetro
14:45 h – 15:15 h	New and Proposed Comparisons SIM Supplementary Comparison on Current Transformers (Pilot: UTE) SIM Pilot Study on Current Shunts / Low-valued Resistors (Pilot: CENAM) SIM Comparison on RF Attenuation (Pilot: to be defined) SIM.EM-K4.b, SIM.EM-S4.b, SIM.EM-S3.b Capacitance (NIST and ICE) SIM Comparison on Calibration factor of type-N thermistor mounts (Pilot: ICE).	SIM representatives
15:15 h – 15:45 h	SIM and inter-regional CMC review CMC SIM.EM.03.2009 – final comments CMC COOMET.EM.05.2010 – final comments CMC CENAM CMC INDECOPI CMC Inmetro	SIM reviewers
15:45 h – 16:00 h	Next SIM EM MWG Meeting Next meeting to be held in Natal, Brazil, Sept. 2011 II Training and Development on Electrical Metrology in Natal, Sept. 2011 CPEM 2012 in Washington , June 2012 Electrical Measurements Seminar at NRC, 2013	Chairperson



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Participants

Country	NMI	Name	E-mail
Argentina	INTI	Lucas Di Lillo	ldili@inti.gob.ar
Brazil	Inmetro	Gregory Kyriazis	gakyriazis@inmetro.gov.br
Canada	NRC	Peter Filipski	Peter.Filipski@nrc.ca
Chile	LCPN-ME	Rodrigo Ramos P.	roramos@udec.cl
Colombia	SIC	Alexander Martínez L.	amartinez@correo.sic.gov.co
Costa Rica	ICE	Harold Sanchez	hsanchez@ice.go.cr
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Trinidad - Tobago	TTBS	Eshwar Ramrattan	eshwar.ramrattan@gmail.com
Uruguay	UTE	Daniel Slomovitz	DSlomovitz@ute.com.uy
USA	NIST	Rand Elmquist	elmquist@nist.gov



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1. SIM EM MWG Annual Meeting - Introduction

Welcome and introduction of the participants

The meeting started at 8:30 am with a welcome by the chairman followed by self introductions of the attendees from the various countries represented.

2. Agenda

Approval of the Agenda

The agenda was changed in minor points and approved by all participants.

Francis Hamilton (TTBS) kindly accepted to be the rapporteur to this meeting.

Matters arising from the last CCEM meeting

At the last Consultative Committee on Electricity and Magnetism (CCEM) meeting held in Paris in 2009, it was decided that the RMOs should discuss their procedures for reviewing Electricity and Magnetism CMCs towards a future possible harmonization. Based on such request the chairperson elaborated a draft proposal (see next section) that has been distributed to SIM EM MWG representatives for review. The Chairperson invited the representatives to comment on the draft proposal. He indicated that CENAM had already submitted comments.

SIM Technical Review Process for EM CMC

The Draft SIM Document *SIM TECHNICAL REVIEW PROCESS FOR ELECTRICITY AND MAGNETISM CALIBRATION AND MEASUREMENT CAPABILITY* was submitted to SIM EM MWG for approval. Its content will be explained in detail during the *SIM Workshop on Formulation and Review of EM CMCs* when the attendees will have opportunity to make suggestions for improvement. The document will be distributed later again to SIM members for further review after the implementation of the suggestions accepted. The chairperson invited the NMI representatives to comment on the draft. Harold Sanchez (ICE) and Lucas Di Lillo (INTI) volunteered to translate the document to Spanish once the final version in English is approved to be published in SIM web page.

Use of MS Excel 'hide' function in CMCs

Those responsible for updating the KCDB requested that, prior to submission to KCDB, CMCs be formatted using the MS "hide" function so that only those rows where changes have been made can be shown. This will reduce the workload of those responsible for updating the KCDB.

Funding for SIM Activities

The Chairperson reported that he had received a report on the funding of SIM Activities, which indicated that the present activities were within budget. He informed that OAS funding has been mainly directed to training or training-related activities. Hence, he added that future SIM EM MWG meetings will have a training event attached, with photos to be taken and added to a report to SIM/OAS. Pilot studies are considered a training activity.

A proposal was made by Lucas Di Lillo (INTI) that in order for the process of CMC approvals to be more efficiently managed, one document CMC file for review be used with access to all NMI's, and that all the comments made be displayed so that all can see the comments made and avoid duplication which often happens currently.



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This may work not only for SIM review of other RMO submissions but also for RMO's review of SIM submissions. One file on one server was suggested, along with a deadline date, so that stray (or late) comments can be minimized. It was suggested that a recommendation can be made to BIPM to implement such a system.

It was noted by Peter Filipski (NRC) that the CMC publication would also have to pass through SIM before returning to BIPM. Peter further suggested that the problem was more time of review rather than the type of documents exchanged. What is required is a set time for review and collating of comments, maybe a deadline. Then a final review and adjustment of the CMC submission would take place. The review process may be too long.

CMC's are sent out to 4 (four) Regional Metrology Organizations (RMO) automatically. The chairperson suggested using a set of files, and that they be maintained to conduct a review with each RMO and its comments with a final document for capturing all the alterations in the light of the comments received. Six (6) documents are required for managing the CMC approval process by this means: the old CMC file, four CMC files each one reviewed by each RMO, and the new CMC file incorporating all reviewers suggestions. Patience with diplomatic communication and skill could facilitate easier approvals of CMC's.

Anyway, the chairperson will forward to CCEM the suggestion to simplify the procedure.

Much of what was discussed is contained in the SIM draft document discussed above to be reviewed.



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3. SIM.EM-K5 Electric Power Comparison

Pilot - CENAM

Report by David Avilés (on behalf of René Carranza)

Considering the high stability of the RD-22-311, it will be used to ensure the link between the SIM.EM-K5 and the CCEM-K5. Thus, this standard will be sent to either those NMIs who did take part in the CCEM-K5 or to those NMIs whose declared CMCs, reported at the KCDB, show measurement uncertainties below $\pm 50 \mu\text{W}/\text{VA}$ for the calibration services of power meters.

Measurements to be done in sequence by NIST, CENAM, INTI, Inmetro, UTE, INTI, CENAM, NRC, and CENAM.

The laboratories which do not satisfy the requirements for receiving the RD-22-311 standard will receive the RD-23-432 standard.

In this case, measurements to be done in sequence by LCPN-ME, SNM-INDECOPI, SIC, CENAM, ICE, CENAMEP AIP, and CENAM.

Current status: The RD 22 is in México after NIST measurements. The RD 23 is in Peru.

The testing points were covered. Results reporting were also covered. Comparisons are motivated by the desire to link NMIs to previous key comparisons.

Traveling sequences for the standards were also mentioned. Measurement instructions for each standard given along with pictures for clarification. Transportation protocol covered. KCRV of the mean of all lab results is to be used and degrees of equivalence discussed. The outliers treatment was also mentioned.

4. SIM.EM-S7 Electric Energy Comparison

Pilot - CENAM

Report by David Avilés (on behalf of René Carranza)

Considering the high stability of the RD-22-311, it will be used to ensure the link between the SIM.EM-S7 and the SIM.EM-S2. Thus, this standard will be sent to either those NMIs who did take part in the SIM.EM.S2 or to those NMIs whose declared CMCs, reported at the KCDB, show measurement uncertainties below $\pm 50 \mu\text{Wh}/\text{VAh}$ for the calibration services of energy meters.

Measurements to be done in sequence by NIST, CENAM, INTI, Inmetro, UTE, INTI, CENAM, NRC, and CENAM.

The laboratories which do not satisfy the requirements for receiving the RD-22-311 standard will receive the RD-23-432 standard.

In this case, measurements to be done in sequence by LCPN-ME, SNM-INDECOPI, SIC, CENAM, ICE, CENAMEP AIP, and CENAM.

Current status: The RD 22 is in México after NIST measurements. The RD 23 is in Peru.



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This inter-comparison is to run in parallel with the power comparison commented above. Uncertainties to be reported in $\mu\text{Wh}/\text{VAh}$. The testing points were mentioned. The method of measurement is by the comparison of electric pulses. Depending on how the national standard is connected to the traveling standard, the difference in the reading is to be reported appropriately.

The representative from Ecuador requested to participate in the energy comparison. It was decided that efforts will be made to accommodate this request.

Action agreed	Responsible	Date
Chairperson will check on the necessary requirements to allow participation of CMEE in SIM.EM-S7	Chairperson	ASAP
CENAM will check on the possibility to accommodate the request from Ecuador	David Avilés	ASAP



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5. NMI News

A change was made in the agenda for NMI representatives to present NMI news.

NIST

A presentation was then given by Rand Elmquist concerning the realignment of NIST. He indicated that the new NIST structure would incorporate the following entities: Materials Measurement lab, Physical Measurement lab, Engineering Lab, Nanoscale Science & Technology Centre and Centre for Neutron Research, so as to minimize the competition for limited funding.

A couple examples of the research that is ongoing at NIST were also mentioned, the details of which could be readily downloaded from the NIST website.

ICE

Harold Sanchez of ICE-Costa Rica gave a synopsis of the current state of development of ICE with respect to its role as a Designated Lab in Costa Rica. He gave insights into the calibrations and development of measurement systems within Costa Rica and regionally through CAMET. ICE participated in inter-comparisons and requested training in the area of Power and Energy. He mentioned that because ICE is not a national lab accessing the finances required is sometimes a problem.

Discussions surrounded using a US manufacturer e.g. Fluke or Agilent as a Designated Lab, to make recognition for smaller NMI's easier. All Designated Labs are published in Appendix A of the CIPM MRA.

NRC

Peter Filipski then made a presentation on the NRC. He gave some insight into the latest changes at NRC. The main focus has been the purchase and installation of the Watt balance from NPL. NRC has called this effort the electronic kilogram. The Electrical Group numbers 12 persons and they work in areas of the electronic kilogram and the attendant requirements for measuring gravity, the Josephson Junction measurements, AC-DC Difference, Calculable Capacitor, Microwave Power Standard. NRC is aggressively pursuing making all standards quantum based and not artifact based.

Special comments

The SIM EM MWG representative from SNM-INDECOPI is now Henry Diaz. Henry Postigo (INDECOPI) is devoting more of his time now to his role as vice-head of SNM-INDECOPI. He asked the chair to send his regards to all colleagues with whom he has worked several years so as to feel like in a family. He thanks all those and each one of you that always provided support and knowledge in an uninterested way as we do in a family. These words are not final but he feels that he possibly will not have another opportunity to express them.

Before lunch special thanks and tribute were officially given to Lucas Di Lillo and INTI for the work done in hosting the meeting and the workshop at INTI.



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6. SIM.EM-K12 AC-DC current transfer comparison

Pilot - INTI

Report by Lucas Di Lillo

Measurements to be done in sequence by INTI, UTE, NRC, NIST, CENAM, SIC, INMETRO, and INTI.

Current status: The standard is currently in Uruguay but in a few days will be sent to Canada.

This comparison is to be done at two values, 10 mA and 5 A, using a shunt and thermal converters all manufactured by INTI. A data logger will be used to measure temperature and humidity during testing and transportation of the standards.

Participants were instructed to download the data from the logger upon receipt or completion of measurements, in order take into account the limited memory of the logger. The running of the program for the logger was discussed. A CD with a tutorial and software will be issued for participants to know what should be done. The downloaded file is to be sent to INTI after the measurements have been made, and the logger reprogrammed before being sent on to the next lab. The standard is currently in Uruguay and will be sent next to NRC in Canada, then to NIST and CENAM. Changes were made in the transportation details due to a problem in CENAM.

The importance of properly connecting the thermocouple to earth, depending on the measurement system of the NMI, was emphasized. The thermal converter is to be used, but with a shunt for higher current measurements.

ICE inquired about joining the comparison, but since the request is being made after the publishing of the protocol, the request will be responded to after investigation. The result of this investigation will also be relevant for the Ecuadorian request to participate in the Electric Energy Comparison.

Action agreed	Responsible	Date
Chairperson will check on the necessary requirements to allow participation of ICE in SIM.EM-K12	Chairperson	ASAP
INTI will check on the possibility to accommodate the request from Costa Rica	Lucas Di Lillo	ASAP



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7. SIM.EM-K4, SIM.EM-S4, SIM.EM-S3 Capacitance Comparisons

Pilot - NIST

Report by Rand Elmquist (on behalf of Andrew Koffman)

Current status:

Measurements finished by NIST, CENAM, ICE, NRC, INTI, Inmetro, UTE.

Traveling standards in NIST.

Measurement data received by pilot laboratory (NIST).

Draft B in elaboration.

Corrected data was supplied after the Draft A was distributed. The comparison data has been analyzed using corrected data for about four of the labs. At our last meeting at CPEM 2010 the SIM EM MWG discussed the reasons for this after A. Koffman described the status. Comparison results have been linked to CCEM.K4. N-F. Zhang is writing up the description of the analysis procedure that has been designed for the S4 comparison data. After the meeting, the Chair inquired of the BIPM if it was allowed to use corrected results in the analysis, and they replied that only the original data as submitted could be used once the results of the other participants was revealed. Koffman then agreed to modify the data set and use only the original data. He estimated the Draft B report would be finalized by the end of this year. An appendix could show the reasons for the discrepancies reported by the four labs. Post-comparison results and modifications could perhaps be reported in appendices but should not be part of the main document. Of course, those laboratories who have corrected data and wish to participate in a bilateral comparison with NIST could do so by contacting NIST directly. The bilateral comparison reports would then be issued later by NIST.

The initial data produced was not all that good and some data was resubmitted, which is not in keeping with standard protocol. Andrew is working with statistician to use the data in a rational manner to gain maximum benefit from the work already done. The results from the other labs left the link to the key comparison in question, due to higher uncertainty obtained.

Draft A had been published and after the publishing four labs recognized problems in their system. INTI suggested that a paragraph be included in an appendix to the report to reflect the changes beyond their control which has a bearing on the results. Consideration is to be given to dropping the NRC results from the calculation of the KCRV. The SIM EM MWG agreed that only the NIST results would then be used in the KCRV calculation.

Action agreed	Responsible	Date
Draft B should be delivered to the participants for approval	Andrew Koffman	December 2010
NIST to receive comments on draft B and issue Final Report	Andrew Koffman	January 2011
Final Report approved	Comparison participants	February 2011
Submission of Final Report to chairperson	Andrew Koffman	March 2011
Final Report published in KCDB	Chairperson	April 2011
NIST to report on the further bilateral comparisons	Andrew Koffman	After the Final Report is published.



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8. SIM.EM-S5 Digital Multimeter Comparison

Pilot - NIST

Report by Rand Elmquist (on behalf of Mark Parker)

Current status:

Measurements finished by NORAMET (only NIST participated as pilot), CAMET (ICE, CENAMEP AIP), CARIMET (TTBS), ANDIMET (SNM-INDECOPI, CMEE, SIC) and SURAMET (INTI, UTE, LCPN-ME, Inmetro)

4 (four) traveling standards distributed to sub-regions

No Draft A yet.

At our last meeting during CPEM 2010, NIST reported that Mark Parker had made the decision to retire in August, 2010. Since the SIM.EM-S5 comparison data has not yet been fully compiled, T. Nelson and R. Elmquist (NIST) asked if another lab could volunteer to compile the data and prepare the average results tables for the analysis. Elmquist would then work with N.-F. Zhang (NIST) to analyze the data. Harold Sanchez (ICE) said he would try to compile the data. Parker would provide the data to Sánchez in as complete a form as possible before July 15.

Mark Parker from NIST indeed retired but passed on his data. Harold Sanchez (ICE) agreed to coordinate the report and has now all of the files necessary to compile the data tables containing the following: Participant lab ID, Average date for lab measurements, Corrected result for each parameter measured, Type A and Type B uncertainty for each parameter, Total expanded uncertainty for each parameter, and Correlation to other labs results (if significant in the uncertainty).

Statisticians will need to be brought in to evaluate the uncertainties. The analysis is not of type A and type B. It will need these however for the statisticians to analyze the results to find the KCRV and the degrees of equivalence, and their uncertainties.

NIST error budget may not also have been in place. It seems there is only one budget in the NIST files. There were uncertainty values for each parameter in Mark's tables, but it seems there was not a full NIST uncertainty budget in any of the files. This may be needed for the report, but it is not needed for the analysis. Rand will see if Tom Nelson (NIST) has a more complete uncertainty budget, if it is missing. But Harold can proceed with his work for now.

It seems that Mark has supplied only four NIST data tables for four DMMs. Four (4) tables for the four (4) meters used will need to be created.

The 6 (six) DMMs purchased with OAS resources for SIM.EM-S5 (only four were used in the comparison) are going to be distributed by NIST to the three pivot laboratories from SURAMET, ANDIMET and CAMET, namely, INTI, INDECOPI and ICE. Each NMI will receive 2 (two) DMMs and will be responsible for coordinating sub-regional comparisons in the future.

Action agreed	Responsible	Date
Distribution of DMMs to pivot labs for future sub-regional comparisons coordinated by such laboratories	Rand Elmquist	October 2010
Data to be compiled and the average results tables for the analysis to be prepared	Harold Sánchez	November 2010
Draft A with identification of NMIs should be delivered to the participants for approval	Rand Elmquist	March 2011



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9. JVS bilateral comparison between NIST and Inmetro (SIM.EM.BIPM-K10.b.1)

Final Report published in the KCDB.
Measurements finished by NIST and Inmetro.

10. SIM.EM-K3 Inductance Comparison

Pilot - Inmetro
Report by Gregory Kyriazis (on behalf of Luiz Macoto Ogino)

Current status:
Measurements finished by INTI, Inmetro, ICE, CENAM, NIST, NRC and UTE.
All labs reported their values.
No Draft A yet.

The traveling standard returned in July to Inmetro. Measurements have since then been performed on the standard. It is estimated that the Draft A report will be available beginning 2011.

Action agreed	Responsible	Date
Measurements to be performed on the standard	Luiz Macoto Ogino	September 2010
Draft A with identification of NMIs should be delivered to the participants for approval	Luiz Macoto Ogino	March 2011



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11. New and Proposed Comparisons

SIM.EM-S8 Comparison of current ratios using instrument transformers

Pilot: UTE

Participants: still to be defined.

Status: Protocol elaborated

UTE prepared a draft protocol and distributed it. It has been already circulated for approval.

Invitations to participate were sent out, but responses were not firm. Countries which expressed interest include Brazil, Colombia, Canada and Argentina.

NIST cannot participate since it no longer does High Current measurements (outsourced to NRC). The Protocol to be distributed to intended participants. UTE will provide a list of proposed participants.

Action agreed	Responsible	Date
Draft Protocol to be updated and circulated for final approval	Daniel Slomovitz	November 2010

SIM.EM.RF-K19.CL Comparison on RF Attenuation

Test points: 10 dB, 20 dB and 30 dB (30MHz, 1 GHz and 10 GHz)

Pilot lab: ICE

Participants: ICE, CENAM, INTI, NIST and possibly NRC

Status: Proposed

SIM.EM.RF-K8 Comparison on Calibration factor of type-N thermistor mounts

Test points: to be defined

Pilot lab: ICE

Participants: ICE, CENAM, INTI, NIST and possibly NRC

Status: Proposed

A manufacturer of RF standards agreed to provide 2 (two) standards for a comparison. Labs expressing some interest in the comparison included ICE, CENAM, INTI, NIST and possibly NRC. Confirmation of NIST's willingness to serve as pilot lab was being sought. Debate surrounded whether NIST needed to participate as pilot in the comparison as opposed to just supplying a calibration of the standards used. It was concluded that having NIST as a pilot may not be necessary. In light of this, ICE was willing to be the pilot. It was proposed that a coordinating group be formulated to manage the comparison including CENAM and INTI. The Proposal is to be drafted and submitted with NIST intended to start and end the round of measurements.

Action agreed	Responsible	Date
A Proposal is to be drafted and submitted again for approval	Harold Sánchez, Lucas Di Lillo and Israel Garcia	November 2010



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Pilot Study Current shunts and low-valued resistors

Test points: 1 m Ω , 10 m Ω and 100 m Ω and 100 mW power.

Pilot lab: CENAM

Participants: not defined yet.

Status: Proposed by CENAM

At the SIM EM MWG meeting at CPEM 2010, a support group was proposed and the need for an oil bath and appropriate scaling for this work was pointed out. It was suggested that two resistors at 1 m Ω be considered. It was again recommended that a draft protocol be produced and submitted for review prior to approval. This would then be circulated for approval.

CENAM is still interested, but had no time to put together a proposal.

SIM.EM-K4.b, SIM.EM-S4.b, SIM.EM-S3.b Capacitance

Participants: NIST and ICE

Status: To be started after SIM.EM-K4, SIM.EM-S4, SIM.EM-S3 draft B is published

A Bilateral Comparison between NIST and ICE is scheduled. New capacitance standards to be purchased by ICE will be sent to NIST for calibration. Then they will be calibrated by ICE and a comparison made of the two sets of results.



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12. SIM and inter-regional CMC reviews

SIM NMI CMCs

CMC SIM.EM.03.2009 was published in the KCDB

Participation of SIM reviewers in inter-regional reviews

CMC COOMET.EM.05.2010 approved by SIM

Proposals for new CMCs in the region

CMC CENAM - review finished

CMC INDECOPI – review pending

CMC Inmetro – review finished

The above CMC updates once finished will be included in SIM.EM.04.2010 and submitted for inter-regional review. The chairperson informed that SIM.EM.04.2010 is awaiting response from INDECOPI. There were some issues with the acceptance of the CMC as proposed and this is being followed up.

The SIM EM MWG agreed upon a window from April to October each year within which the chairperson would be receiving CMCs for intraregional review and submitting CMCs for interregional review.

There is one SIM EM CMC review cycle per annum and the chairperson would prefer if, along with the CENAM submission, the INDECOPI could be made altogether. CENAM indicated a willingness to delay its submission to accommodate the inclusion of the INDECOPI CMC in the SIM submission. INTI suggested a deadline, which was generally accepted. It was proposed that from **1st of March** and **1st October** each year be the deadline dates for receiving SIM EM CMCs for intraregional or interregional reviews. The next SIM submission for publication in the KCDB would be the SIM.EM.04.2010 submission. Therefore, INDECOPI would need to have its CMC approved before October 01 in order to be part of SIM.EM.4.2010.

Action agreed	Responsible	Date
INDECOPI to update its CMC and send it again for intraregional review	Henry Diaz	ASAP
CMC review of INDECOPI CMC	Daniel Slomovitz	October 1, 2010
SIM.EM.4.2010 to be submitted for publication in the KCDB	Chairperson	October 30, 2010



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13. Next SIM EM MWG Meeting

Several proposals for future meeting dates were received, including: Natal, Brazil, proposed for September 2011, CPEM 2012 in Washington DC, USA and a meeting in Ottawa, Canada, to be held during NRC's proposed Electrical Measurement Workshop in September 2013, for 4 to 5 days. This proposal by NRC involves hands-on training in Josephson voltage, Electronic kilogram, High Voltage, Power, Capacitance, Bridges, and Quantum Hall. This would have to be coordinated with INTI since X SEMETRO is also scheduled to be held at INTI in September 2013.

The 2011 SIM EM MWG meeting will be held on September 25, 2011, in Natal, Brazil. The *II Training and Development on Electrical Metrology* will be held on September 26, 2011, in the same venue. Suggestions for speakers are welcomed. The SIM EM MWG members are encouraged to submit technical papers by March 11, 2011. The papers will be presented at Metrologia 2011 to be held in the same venue from 27 to 30 September 2011. Folders of Metrologia 2011 were distributed during the meeting.

Some SIM members expressed the desire to speak Spanish during the future meetings. The comments in Spanish would be restricted to specific moments where better expression or clarification is needed by those members. Such comments would be simultaneously translated to English by another SIM member. The English-tongue country representatives agreed on that.

The SIM EM MWG meeting in INTI ended at 4:00 p.m.

Action agreed	Responsible	Date
Application for funding	Chairperson	OK
Approval response	SIM	April 2011
Submission of technical papers to Metrologia 2011	SIM representatives	March 11, 2011
2011 SIM EM MWG Meeting in Brazil	SIM representatives	September 2011
Presentation of technical papers at Metrologia 2011	SIM representatives	September 2011

Thanks were again given to Lucas Di Lillo and INTI for all the work done in hosting the meeting at INTI.

20100928
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