



中国计量科学研究院
National Institute of Metrology



APMP

ASIA PACIFIC METROLOGY PROGRAMME

APMP TCT Activity Report

Dr. Xiaojuan FENG

National Institute of Metrology, China

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Paris, France



1. APMP TCT workshop and meeting in 2024



- November 23, 25-26, 2025
- Hybrid Meeting, New Delhi, India
- Chaired by Dr. Hisashi Abe

- TCT workshop :
 - CMC training + 8 lab reports
 - CMC submission, reviewing, suggestions
 - lasts two years → better understanding

- TCT meeting :
 - WG reports, CMC, Comparisons...





1. APMP TCT workshop and meeting in 2025



- November 22, 24-25, 2025
- Incheon, Korea
- Chaired by Dr. Xiaojuan Feng
- TCT workshop :
 - 3 recent activities from CCT+ 5 Lab reports
- TCT meeting :
 - WG reports, CMC, Comparisons...





1. APMP TCT workshop and meeting in 2025



□ 14 Economies

- CMS/NML
- KRISS
- NIM
- NIMT
- NISIT, PG
- NMC, A*Star
- NMIA
- NMIJ, AIST
- NMIM
- SCL
- SNSU-BSN
- VMI
- VNIIM
- UzNIM

□ Outputs

to coordinate the comparisons especially older than 5 years



Outcomes of APMP 2025 TCT Meeting
24-25 November 2025
Incheon, Korea

TCT Resolutions

TCT-RE-2501: The participants of APMP.T-S8 and TCT_01_TCI2018 that do not submit the results to the pilot by the end of Jan. 2026 will be removed from the comparison.

TCT Actions

TCT-AC-2501: KRISS submits the measured results to the pilot of APMP.T-S9 by the end of Mar. 2026. The pilot updates the status of APMP.T-S9 on KCDB website by the end of Dec. 2025.

TCT-AC-2502: The pilot of APMP.T-S11 and T-S12 clarifies the schedule for data analysis by the end of Jan. 2026, especially for APMP.T-S11, the data analysis is recommended to be finished before APMP 2026 TCT meeting.

TCT-AC-2503: The WG leader of humidity confirms the status of CCT-K6.1 by the end of Dec. 2025.

TCT-AC-2504: All of the pilots provide updates of the comparison status according to the request from TCC.



2. APMP TCT Structure



□ **Chair:** Dr. Xiaojuan FENG (NIM), from Dec 2024

Vice Chair: Dr. Hisashi ABE (NMIJ), former TCT chair

□ **Working groups(5)**

- **SPRT, FP and TPW** (5 members led by Inseok Yang, KRISS)

- **Radiation Thermometry** (5 members led by Xiaofeng Lu, NIM)

- **Humidity** (6 members led by Hisashi Abe, NMIJ)

- **Industrial Thermometers** (6 members led by Ghufron Zaid, SNSU-BSN)

→ **new leader after APMP 2025, Charuayrat Yaokulbodee, NIMT**

- **Thermophysical Properties** (4 members led by Megumi Akoshima, NMIJ)



3. APMP TCT Key Comparisons



| Identifier | Comparison | Status |
|------------------|----------------|---|
| APMP.T-K4.2* | Al realization | Draft B being reviewed → Published in Feb 2026 |
| APMP.T-K6.2013* | DP Meter | Measurement in progress → Draft A is under revising |
| APMP.T-K9* | SPRT Ar-Zn | Waiting for data submission → Draft A is waiting for response |
| APMP.T-K7.2021 | WTP cell | Measurement in progress → Report in progress, draft A |
| APMP.T-K7.2021.1 | WTP cell | Protocol complete (2026-2027) |

* Categorized as “uncompleted comparison older than 5 years” in Oct 2025



3. APMP TCT Supplementary Comparisons



| Identifier | Comparison | Status |
|--------------------------|-----------------------|--|
| APMP.T-S8 ^{*,#} | LiG Thermometer | Measurement complete → Report in progress, draft A |
| APMP.T-S9 ^{*,#} | Thermal diffusivity | Measurement in progress → Measurement completed, start draft A soon |
| APMP.T-S10 [*] | Thermal conductivity | Measurement in progress → Measurement completed, draft A will be start from Dec 2025 |
| APMP.T-S11 [*] | Radiation thermometer | Data analysis in progress ^{**} |
| APMP.T-S12 [*] | Radiation thermometer | Data analysis in progress ^{**} |
| APMP.T-S13 [*] | DP Meter | Measurement in progress → Report in progress, draft B |
| APMP.T-S14 [*] | RH Meter | Measurement in progress → Report in progress, draft A |
| APMP.T-S16 [*] | Thermocouple | Published in Dec 2024 |
| APMP.T-S17 [*] | Air thermometer | Measurement in progress → Report in progress, draft A |

*Categorized as “uncompleted comparison older than 5 years” in Oct 2025

Categorized as “status needed to be updated on KCDB”

**APMP.T-S11 and S12: Draft A will be OK before Nov 2026 APMP TCT meeting

| Code | A-NMI | I-NMI | Artifact/Range | Third party |
|----------------|------------|----------|---------------------|--------------------------|
| APMP.T-H3 | MUSSD | NIM | SPRT from TPW to Zn | TCT Chair [*] |
| APMP.T-H4.2024 | NMC,A*Star | KRISS | DP Meter | TCT Chair ^{**} |
| APMP.T-H5.2025 | NMIM-SIRIM | SNSU-BSN | Type R thermocouple | TCT Chair ^{***} |
| APMP.T-H5.2025 | NMIM-SIRIM | SNSU-BSN | Type N thermocouple | TCT Chair ^{***} |

^{*}Ex-TCT Chair, Dr. Inseok Yang (KRISS)

^{**}Ex/Vice-TCT Chair, Dr. Hisashi Abe (NMIJ)

^{***}TCT Chair, Dr. Xiaojuan Feng (NIM)

Status:

- APMP.T-H3, Calibration report from I-NMI received, measurement on-going in A-NMI
- APMP.T-H4.2024, final report approved
- APMP.T-H5.2025 and APMP.T-H6.2025, application form approved in Nov 2025



3. TCI Projects



- TCT_01_TCI2017 Relative humidity

Measurement complete

- TCT_01_TCI2018 LIG comparison

Measurement complete

- TCT_01_TCI2019 Ag freezing point

The duty of the project overseer was transferred from KRISS to NIM

Measurement complete and data analysis in progress

- TCT_01_TCI2024 CO₂ triple point cell

Measurement on-going

- TCT_01_TCI2025 Black globe thermometers

Measurement on-going



4. Peer Reviews



* Approve by EC due to non-NMI Staff

Approve by EC due to incumbent TCT Chair

† Approve by EC due to incumbent TCT Chair's NMI

Updated
2025.11.19

| Laboratory | Sub-field | 2025 | 2024 | 2023 | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 |
|------------|---------------|-----------------|-------------------|----------------|--------------|------------------|------|-------------|---------------------|----------------------|----------------|------------------|-------------|
| CMS | contact-T | Jonathan Pearce | | | | | | | | | | Zundong Yuan | |
| | non-contact-T | Sang-Wook Lee | | | | | | | | | | Hisashi Abe | |
| KRISS | contact-T | | | | | Shu-Fei Tsai | | | | Jintao Zhang | | | |
| | non-contact-T | | | | | Wang Li | | | | Duan Yuning | | | |
| MSL | contact-T | | | | | | | | | Hisashi Abe | | | |
| | non-contact-T | | Mohamed Sadli | | | | | Andrew Todd | | | | Eric van der Ham | |
| NIM | contact-T | | | Wang Li | | Byung Il Choi | | | | Hisashi Abe | | | |
| | non-contact-T | | | | | Wang Li | | | Steffen Rudtsch | | Klaus Anhalt | | |
| NIMT | contact-T | | | | | Inseok Yang# | | | | Shu Fei Tsai | | | |
| | non-contact-T | | | | | Naohiko Sasajima | | | | Yoshiro Yamada | | | |
| NMC | contact-T | | Jianping Sun | | | Byung Il Choi | | | | Hisashi Abe | Inseok Yang | | |
| | non-contact-T | | Xiaofeng Lu | | | | | | | | Yoshiro Yamada | | |
| NMIA | contact-T | | | | | | | | Lars Bunger | | | Shu-Fei Tsai | |
| | non-contact-T | | Andrea Peruzzi | | | | | | Jeremy Lovell-Smith | | | Hisashi Abe | |
| NMIJ | contact-T | | Inseok Yang† | | | | | | | Shu Fei Tsai | | | |
| | non-contact-T | | | Vito Fericola† | | | | | | Jerrymy Lovell-Smith | | | |
| NMIM | contact-T | | | | | Jianping Sun | | | | | Yong-Gyoo Kim | | |
| | non-contact-T | | | | | Xiaofeng Lu | | | | | Wang Li# | | |
| SCL | contact-T | | Fan Yan | | Jintao ZHANG | Inseok Yang# | | | | | Kee-Sool Gam | | |
| | non-contact-T | | Stefaan Janssens | Shu-Fei Tsai | | Wang Li | | | Graham Machin | | Stephanie Bell | | |
| SNSU-BSN | contact-T | | | Inseok Yang | | | | | | | | Kazuaki Yamazawa | |
| | non-contact-T | | | Wang Li | | | | | | | | Yoshiro Yamada | |
| NML-ITDI | contact-T | | Damian Twerenbold | | | | | | | | | | Hisashi Abe |
| | non-contact-T | | | | | | | | | | | | |
| | Humidity | | | | | | | | | | | | |



5. APMP CMC reviews and submissions



APMP TCT 2025 CMC reviews

completed 50

- Recommendation: clear comments and support information

2025 call for CMC submissions in Sept 2025

Published 36 CMCs (7 economies) in 2025

- 5 from KRISS in July (Temperature)
- 7 from NIM in June (Temperature)
- 4 from NIMT in June (Temperature)
- 2 from NMC,A*Star in June (Temperature)
- 8 from NMIJ in Feb and June (Temperature)
- 9 from NMIM in June and July (Temperature)
- 1 from SNSU-BSN in June (Humidity)

| NMI/DI | SPRT, FP, TPW | Industrial T | Radiation T | Humidity | Total |
|--------------|---------------|--------------|-------------|----------|----------|
| SNSU-BSN | 1 | 1 | | | 2 |
| SCL | | | 2 | | 2 |
| NMC,A*Star | | | | 1 | 1 |
| Total | 1 | 1 | 2 | 1 | 5 |

□ In the first half of 2025 (152, completed)

- 84 from EURAMET (SPRT, Industrial T, RT, Humidity)
- 17 from GULFMET (SPRT, Industrial T)
- 51 from SIM (SPRT, Industrial T, RT, Humidity)

□ In the second half of 2025 (12, completed)

- 12 from AFRIMETS (Industrial T)

□ In the second half of 2025 (8)

- 6 from COOMET (Humidity, completed)
- 1 from EURAMET (Industrial T, completed)
- 1 from SIM (Humidity, completed)

Thank the reviewers and WG leaders!

Good tradition of APMP TCT for >10 years: Three deadlines





5. Future plan



- Hybrid meeting about realization of CO₂ (part of TCI project) in 2026 or 2027 APMP TCT workshop
- Considering the possibility of TG-digitalization / AI for thermal metrology
- Calling for APMP TCT chair-elect



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Thank you very much for your attention!

fengxj@nim.ac.cn