



REPORT ON APMP TCQM ACTIVITIES IN 2025 AND FUTURE DIRECTIONS

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1. Introduction

The Asia Pacific Metrology Programme Technical Committee for Amount of Substance (APMP TCQM) continued in 2025 to play an important regional role in strengthening chemical and biological metrology, supporting implementation of the CIPM Mutual Recognition Arrangement, and creating greater coherence between technical metrology work and broader stakeholder needs across the Asia-Pacific region. This report covers the substantive progress made by the APMP TCQM during the year in the areas of calibration and measurement capabilities, comparison activities, peer review oversight, capability building, stakeholder engagement, and strategic positioning in emerging areas such as bio-metrology, public health, clean water, food safety, and climate-related measurements. These efforts also reflected a more deliberate attempt to position TCQM not only as a technical committee fulfilling regional obligations, but also as a regional node for excellence in chemistry and biology and a gateway for collaboration with regulators, accreditation bodies, industry, and international partners.

2. Roles and Responsibilities of TCQM

The responsibilities of APMP TCQM remain anchored in three core functions. First, the Committee supports adherence of chemical and biological measurements to the International System of Units (SI), and where direct SI traceability is not yet feasible, to internationally agreed references. Second, it contributes to the establishment and maintenance of a globally recognised system of national measurement standards, methods, and facilities in chemistry and biology, especially through implementation of the CIPM MRA in the region. Third, it serves as a forum for exchange of technical information, sharing of work programmes, and development of new opportunities for collaboration among members and with external stakeholders. In 2025, these responsibilities were increasingly interpreted in a broader strategic sense, with stronger emphasis on enabling regulatory confidence, public health, and environmental protection.

3. Participation and Internal Stakeholder Engagement

Participation in APMP TCQM activities remained broad, with representation from a substantial number of full and associate member economies. The TCQM community includes institutes from across Asia-Pacific as well as selected associate members from outside the region. Participation data reviewed during the year indicated that over the past 3-year period, meeting attendance rates were approximately 55% for full members and 40% for associate

members. While there is room to further strengthen continuity of engagement, this level of participation reflects a stable and active technical community. The 25th APMP TCQM Meeting held in November 2025 at Songdo Convensia in Incheon, Republic of Korea, saw strong participation from NMIs, designated institutes, and invited contributors such as APMP Focus Group Chairs.



4. Calibration and Measurement Capabilities (CMCs)

One of the most significant areas of progress in 2025 was the Committee's work on Calibration and Measurement Capabilities. In CMC Cycle XXVI, APMP institutes submitted a total of 250 CMCs for intra-regional review, of which 234 were successfully advanced to JCRB review, corresponding to a success rate of approximately 93.6%. The work of 19 technical experts serving as CMC reviewers across five technical domains had been critical to sustaining the system. APMP contributed a substantial proportion of global submissions, accounting for

about 32.5% of reviewed CMCs across RMOs. A notable milestone was the publication of the first QM CMCs from the National Metrology Institute of Malaysia.

5. Peer Review Activities

The peer review system continued to function as a key mechanism for maintaining confidence in CMC claims. In 2025, four institutes, namely the National Measurement Institute, Australia, the Center for Measurement Standards/Industrial Technology Research Institute, Chinese Taipei, the National Metrology Centre/Agency for Science and Technology, Singapore, and the National Metrology Institute of Malaysia, underwent peer review, with an additional five scheduled for 2026. All institutes adhered to the requirement of maintaining a five-year validity cycle for peer reviews under the CIPM MRA.

6. Comparisons and Pilot Studies

6.1 Overview of Activities

APMP TCQM has organised 15 key comparisons, 28 supplementary comparisons, and 40 pilot studies to date. By 2025, most had been completed, with a smaller number ongoing. These comparisons remain central to demonstrating equivalence of measurement capabilities and supporting CMC claims. To support developing metrology institutes in evaluating and strengthening their measurement capabilities, TCQM Case Studies are organised as practical learning exercises; however, these studies are not intended to serve as evidence for CMC claims.

6.2 Progress and Technical Developments

Key comparisons and studies discussed in 2025 comprised topics in gas composition, environmental monitoring, food safety, and health products. Progress was made in on-going comparisons on automobile emission gas (APMP.QM-K3.2019) and histamine in fish (APMP.QM-S21), as well as new comparisons on pesticide residues (APMP.QM-S23/P43 & APMP.QM-S24/P44), and adulterants in supplements (APMP.QM-S22/P42). Technical discussions during the year highlighted issues such as methodological consistency, logistical constraints, and alignment with CCQM activities.

6.3 New and Emerging Areas

New proposals included comparisons on anions in water, elements in cell-based meat, heavy metals in soy protein, and PM2.5 measurements. These reflect a shift towards emerging applications in environmental monitoring, food innovation, and public health.

7. Capability Building and Knowledge Transfer

TCQM continued to strengthen capability building through a structured approach involving needs assessment, capacity mapping, targeted training, and follow-on comparisons. Major workshops in 2025 covered clinical markers, water quality, climate-related measurements, food safety, and bio-metrology. These activities engaged participants, including regulators,

industry representatives, and laboratory professionals, demonstrating TCQM's expanding role beyond traditional metrology communities.

8. Bio-metrology and Public Health Initiatives

A significant development in 2025 was the expansion into bio-metrology. The establishment of the Bioanalysis Sub-Committee and the organisation of the first TCQM bio-metrology workshop organised by Dr Eugene Lee and Dr Young-kyung Bae from Korea Research Institute of Standards and Science (KRISS) prior to the TCQM meetings marked an important addition of TCQM's focus. Key areas of interest included clinical diagnostics, infectious diseases, food authenticity, and microbiology, supported by methodologies such as PCR and IDMS. See Appendix A for the programme of the TCQM workshop on 22 November 2025.

The APMP Public Health Initiative on clinical marker linked to non-communicable diseases such as cardiovascular diseases, renal failure and diabetes further demonstrated TCQM's relevance to healthcare systems. It engaged 44 clinical laboratories and 10 IVD manufacturers across six economies (China, India, Japan, Malaysia, Republic of Korea and Thailand), and five metrology institutes (Health Sciences Authority, Singapore; Korea Research Institute of Standards and Science; National Institute of Metrology, China; National Metrology Institute of Japan; and National Institute of Standards and Technology, USA) in value assignment activities for nine clinically important biomarkers. This initiative highlights the role of metrology in improving diagnostic accuracy and supporting healthcare quality assurance.

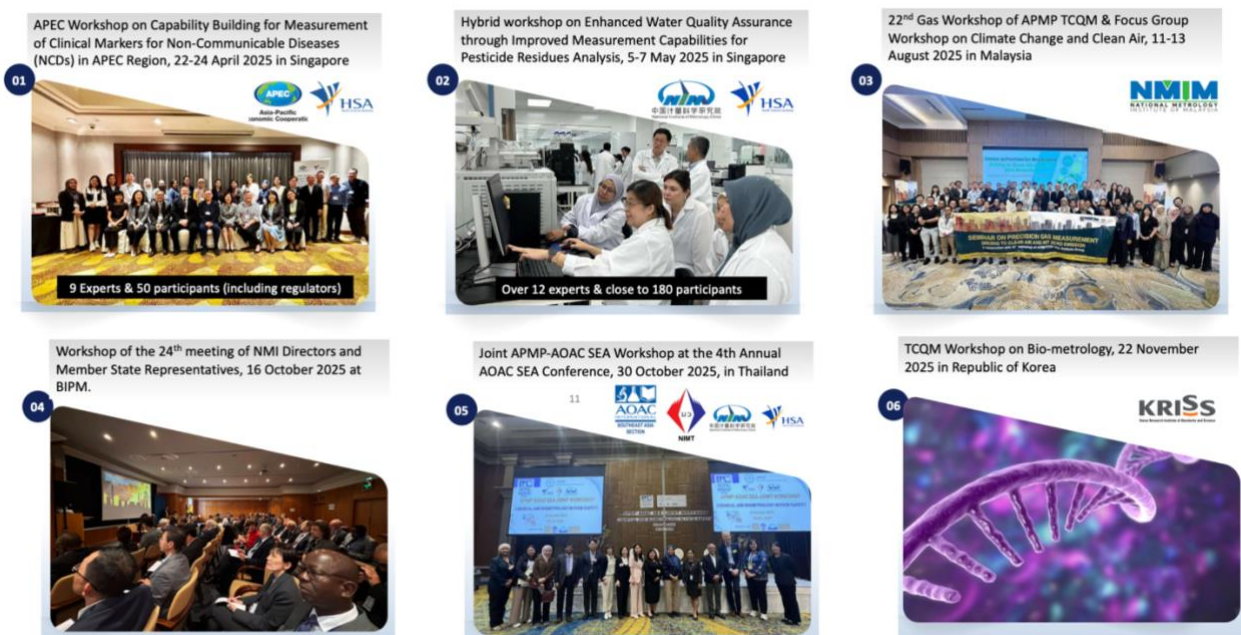
9. Focus Groups and Cross-Sector Engagement

TCQM actively supported APMP Focus Groups in clean water, climate change and clean air, food safety, and energy efficiency. These groups identified priority needs in training, comparisons, and CRMs, and addressed emerging challenges such as microplastics, PFAS, and energy-related measurements. High levels of stakeholder engagement and positive feedback demonstrated the effectiveness of these initiatives.

10. Stakeholder Engagement and International Collaboration

Engagement with external stakeholders was significantly expanded in 2025. TCQM collaborated with organisations such as Asia Pacific Economic Cooperation (APEC), Asia Pacific Accreditation Cooperation (APAC), AOAC Southeast Asia, industry partners, etc. These collaborations enhanced visibility, strengthened technical relevance, and created opportunities for joint capability building. The invitation to present TCQM's work at regional and international forums further reflects growing recognition of APMP's approach to stakeholder engagement.

Notably, the APAC approved two proposals for proficiency testing (PT) programmes submitted in 2025. These include a PT (T116) organised by NIM and HSA in parallel with APMP supplementary comparisons APMP.QM-S23 & APMP.QM-S24, where the supplementary comparison reference values will be used to evaluate the results from APAC's nominated testing laboratories; and standalone PT (T117) organised by NIM on event-specific quantitative analysis for genetically modified soybean line GTS 40-3-2.



11. Organisational Developments and Governance

The development of a formal “Modus Operandi for APMP TCQM” provided a structured framework for governance, covering responsibilities, organisational structure, key activities, and collaboration mechanisms. The establishment of four sub-committees has strengthened coordination and planning across technical domains, enabling more strategic and efficient delivery of TCQM activities.

12. Strategic Alignment with CCQM

TCQM activities in 2025 were closely aligned with CCQM priorities, including improving global comparability, supporting broad-scope CMC development, and addressing emerging areas with advanced measurement technologies. This alignment ensures that APMP remains an active and relevant contributor to the global metrology system.

13. Challenges and Future Directions

Despite strong progress, several challenges remain. These include increasing workload associated with CMC re-reviews, limited participation in emerging areas such as novel food, logistical constraints in comparisons, and the need for more efficient CMC frameworks.

Looking ahead, TCQM will focus on expanding bio-metrology, strengthening engagement in healthcare and regulatory science, advancing work in novel food and environmental monitoring, and improving efficiency in comparison and CMC processes. Greater emphasis will also be placed on stakeholder-driven metrology services for impactful outcomes, and raising regional developing metrology institutes through trainings supported by grants for APMP Technical Committee Initiatives.

Appendix A Programme for TCQM Workshop on 22 November 2025

Session 1: Overview of Biometrology in APMP economies

Starts at	Duration	Topic / Title	Presenters
9:30	10 mins	Welcome and introduction of participants	All attendees
9:40	10 mins	Introduction and opening address	Dr Tang Lin Teo / HSA, Singapore
9:50	20 mins	From Biometrology to Society: NMIJ's Research Activities and Contributions (recording)	Dr Megumi Kato / NMIJ, Japan
10:10	20 mins	Research activities in biometrology in NIM	Dr Lianhua Dong / NIM, China
10:30	20 mins	Metrological Approaches to Meat Quantification in APMP Economies – DNA-Based Measurement for Food Authenticity (recording, <i>tentative</i>)	Dr Phattaraporn Morris / NIMT, Thailand
COFFEE & TEA BREAK (20 min)			
11:10	20 mins	Recent activities in biomedical metrology at KRISS	Dr Young Bae / KRISS, Republic of Korea
11:30	20 mins	HbA1c Hexapeptide CRMs: Development Insights and Applications (recording)	Ms Sharon Yong / HSA, Singapore
11:50	20 mins	Overview of Biometrology activities at NMIA (recording)	Dr Kate Griffins/ NMIA, Australia
12:10	20 mins	Advancing Bio-Analytical Excellence: Molecular Biology Applications in Speciation, GMO Detection, and Allergen Analysis at the Hong Kong Government Laboratory	Dr. SO Lok Yan / GLHK
LUNCH at Grant Ballroom C			
14:00	20 min	Case Study: APMP-APAC Joint Proficiency Testing Programme: Event-specific quantitative analysis for genetically modified (GM) Maize Line MON87427 (on site or recording, TBC)	Di WANG / NIM, China
14:20	20 min	Discussion on future direction in TCQM	All attendees
COFFEE & TEA BREAK (20 min)			

Session 2: In vitro Diagnostics in the Asian Pacific region

Starts at	Duration	Topic / Title	Presenters
15:00	30 mins	Digital real-time PCR applications as In Vitro Diagnosis	Dr Seong Min SUH Optolane, Korea
15:30	30 mins	Laboratory Tests for Diagnosis of Infectious Diseases in Korea	Dr Kiho HONG Yonsei University College of Medicine
16:00	30 mins	(TBC) Molecular genetics/genetic disorder diagnosis in laboratory medicine	Dr Jisoo LEE Seoul National University College of Medicine