

Developing Procedure on Performance Testing of Personal Monitoring Services (PMS) in the Philippines

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PURPOSE: Develop a procedure on blind testing of dosimeter for method validation of the OSL Personnel Monitoring Service (OPMS) and TLD Personnel Monitoring Service (TPMS)

SCOPE: In-house blind sampling of OSLD and TLD to validate the performance of both dosimetry systems

Introduction

IAEA Safety Standards
for protecting people and the environment

Occupational
Radiation Protection

Jointly sponsored by
IAEA

General Safety Guide
No. GSG-7

IAEA
International Atomic Energy Agency

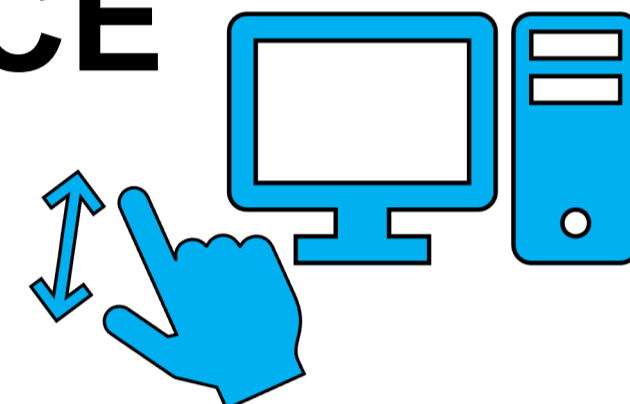


ISO/IEC 17025:2017

General requirements for the competence of testing and calibration laboratories



PERFORMANCE TESTING



RADIATION PROTECTION SERVICES SECTION

PERSONAL MONITORING SERVICES (PMS)



OSLD + TLD

PNRI

Participates in the intercomparison activities by the IAEA/WHO Network of Secondary Standard Dosimetry Laboratory (SSDL) and ASEAN region to:

1. To comply with the ISO/IEC 17025 Standard
2. To ensure the accuracy of dose monitoring reports



CHALLENGES

1. International and regional activities are mostly for OSLD and seldom for TLD
2. No local provider of performance testing services
3. Both the SSDL and PMS are under PNRI management which may be subject to impartiality issues
4. Sending dosimeters to laboratories abroad that provide testing is expensive.

Methodology

SSDL Team received the irradiation request form and dosimeters.

SSDL Team irradiated the dosimeters. Irradiation parameters are unknown to both staff of both dosimeter system.

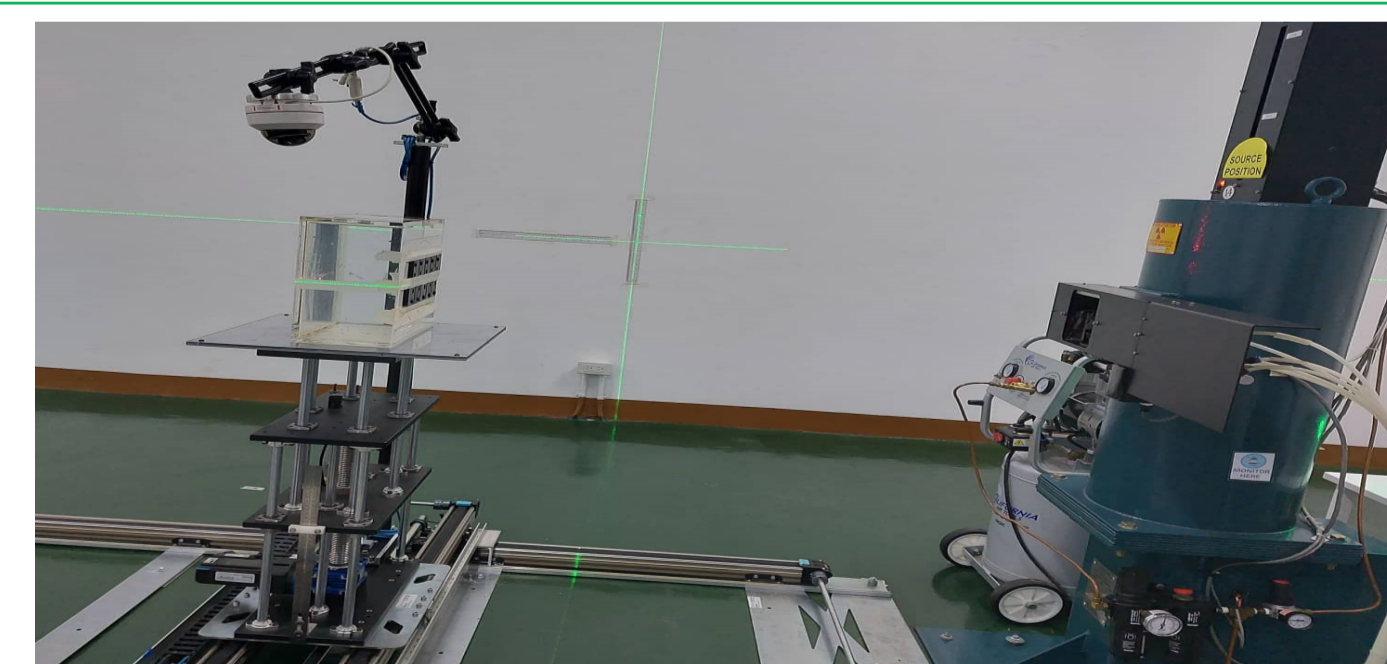
PMS Team processed the dosimeters after 24 hr after irradiation following the normal routine. Then, results were submitted to SSDL Team.

SSDL Team analyzed the result from dosimeter system following the IAEA No. GSG-7.

Is $H_p(10)$ response of the dosimeter $\geq \pm 10\%$ of unity?

NO
Laboratory Manager certified the results.

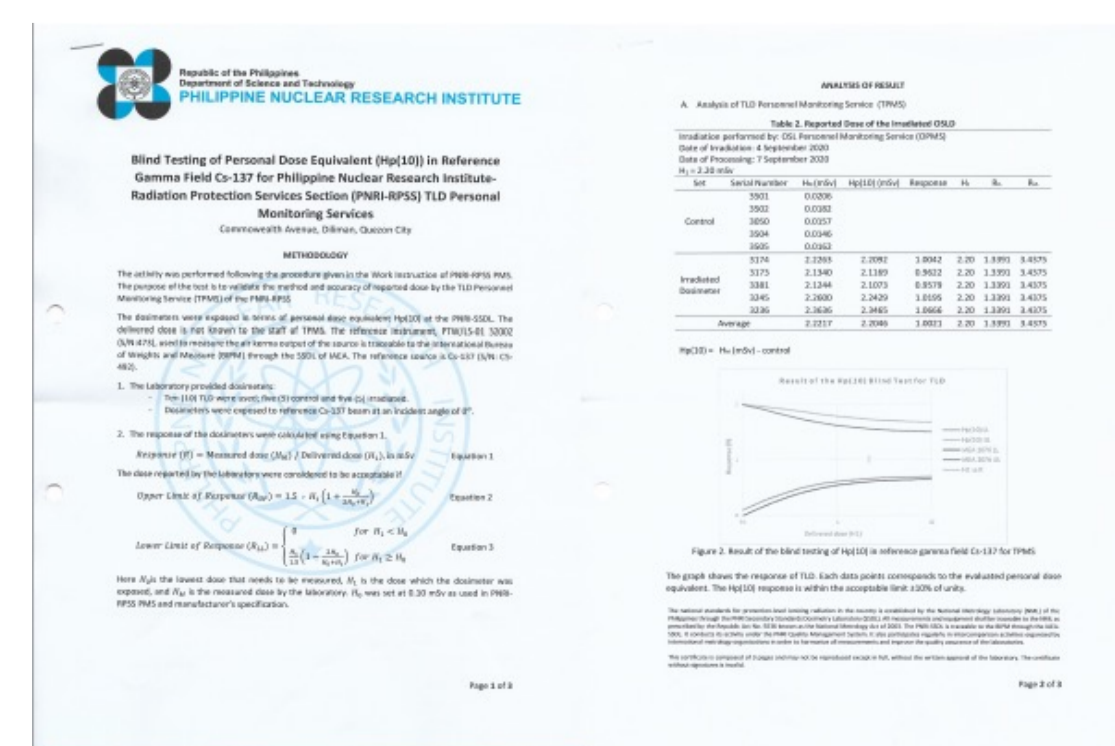
BLIND TESTING PROCESS



IRRADIATION OF DOSIMETERS



PROCESSING OF DOSIMETERS



CERTIFICATION

Results and Discussion

Table 1. 2020 Blind Test Result

Dosimetry System	Dose Range 1 Response	Dose Range 2 Response
OSLD	1.02	0.93
TLD	1.00	1.06

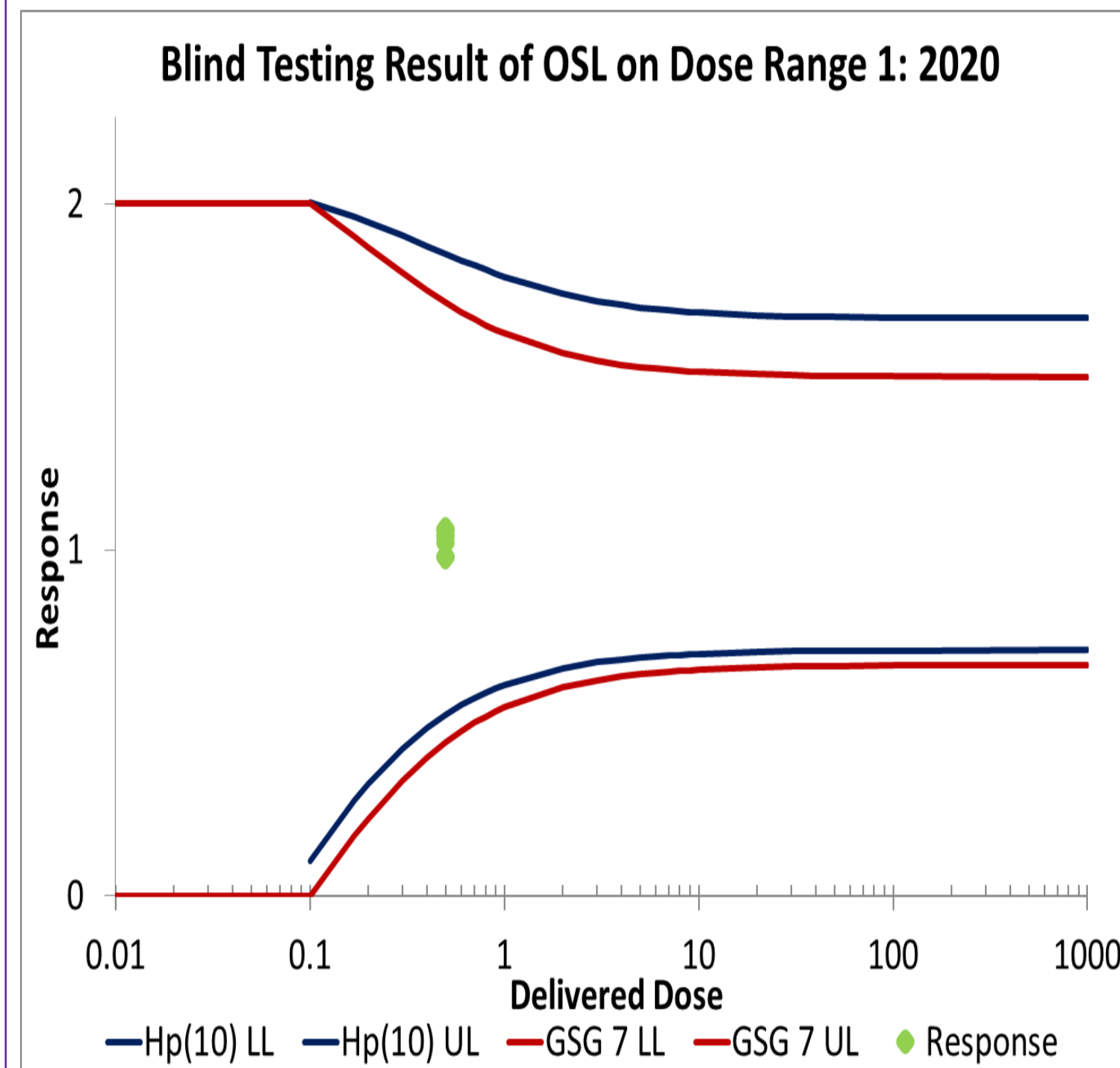


Figure 1. Hp (10) response +2% of OSLD

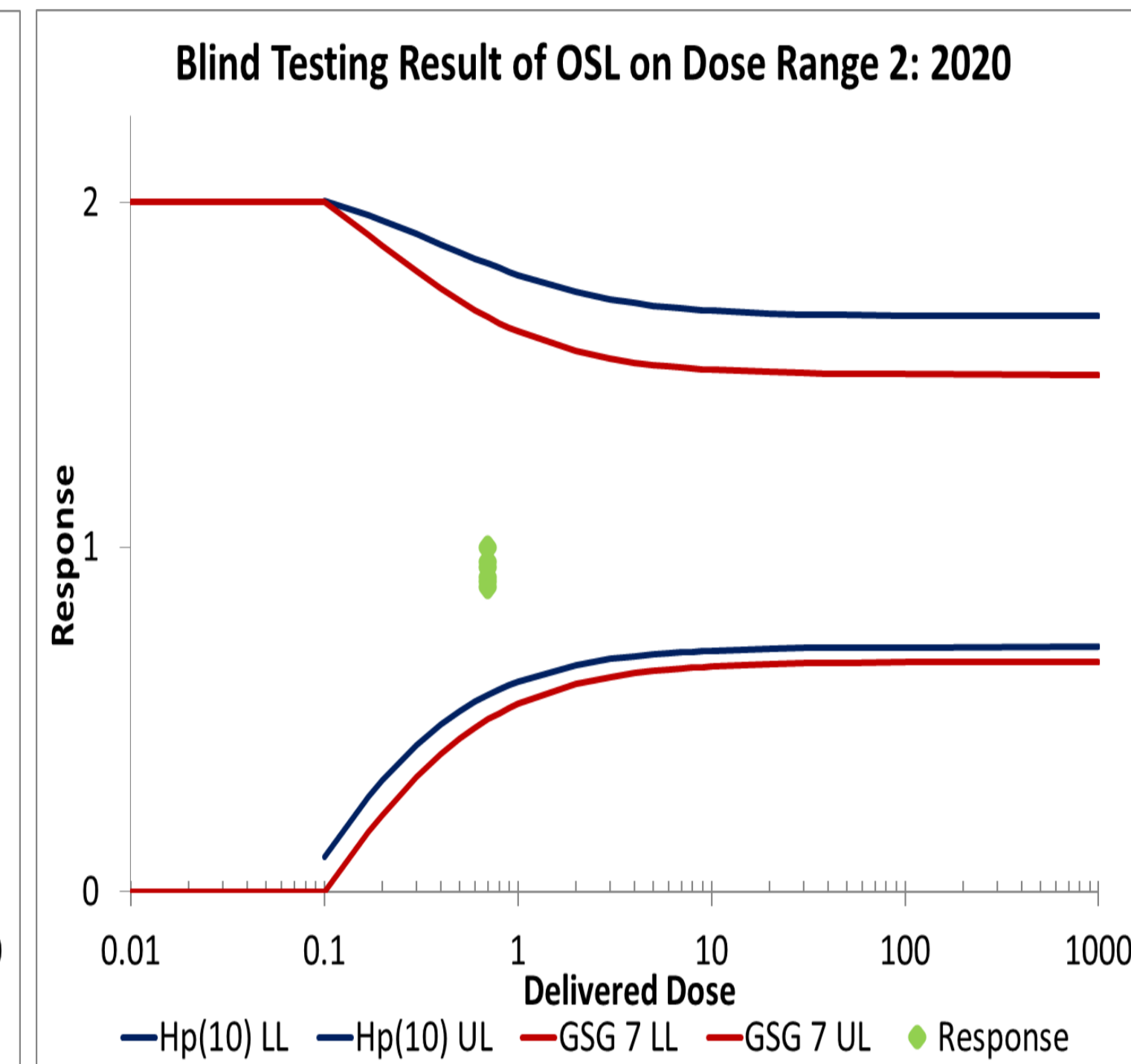


Figure 2. Hp (10) response -7% of OSLD

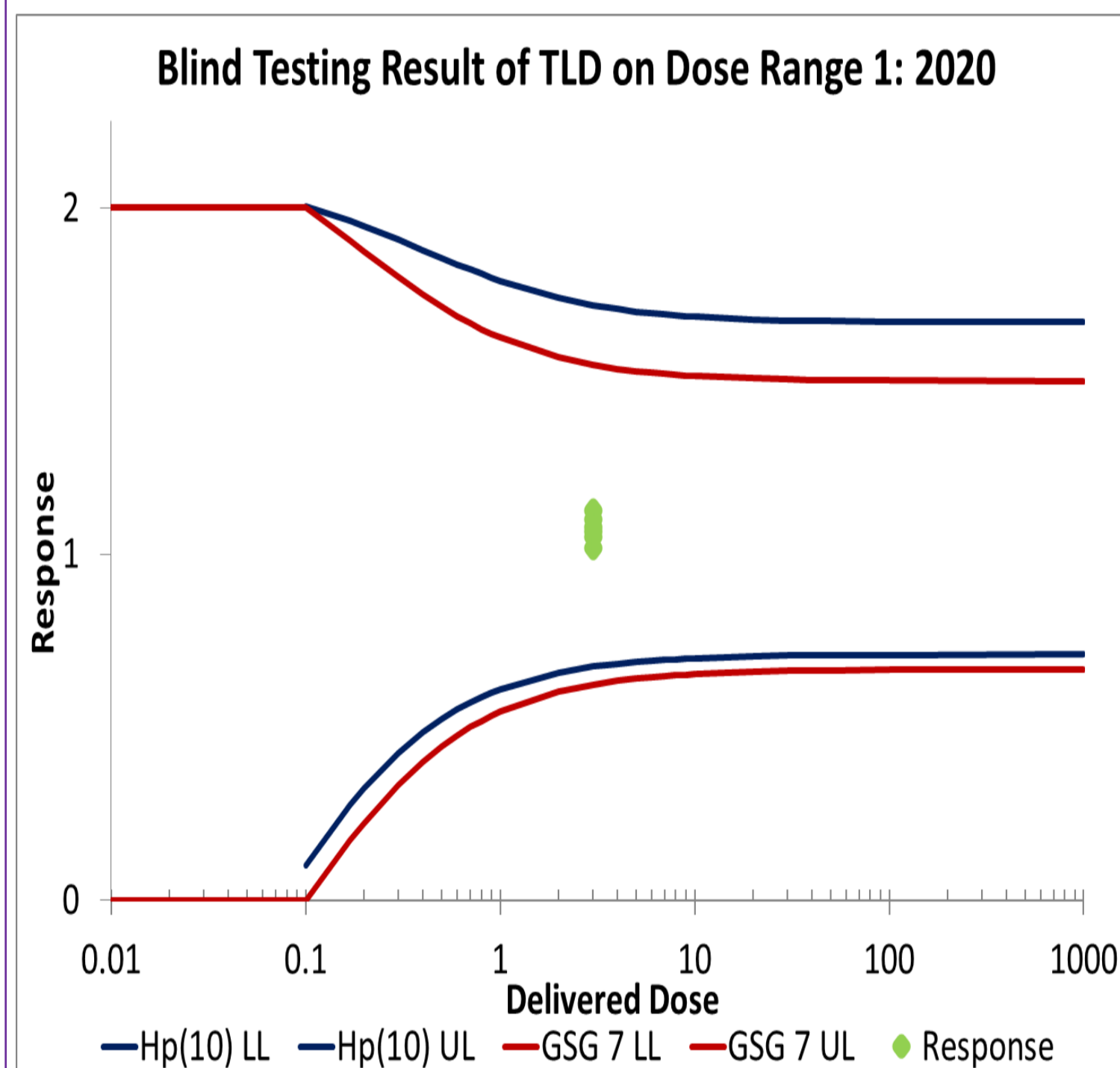


Figure 3. Hp (10) response 1.0 of TLD

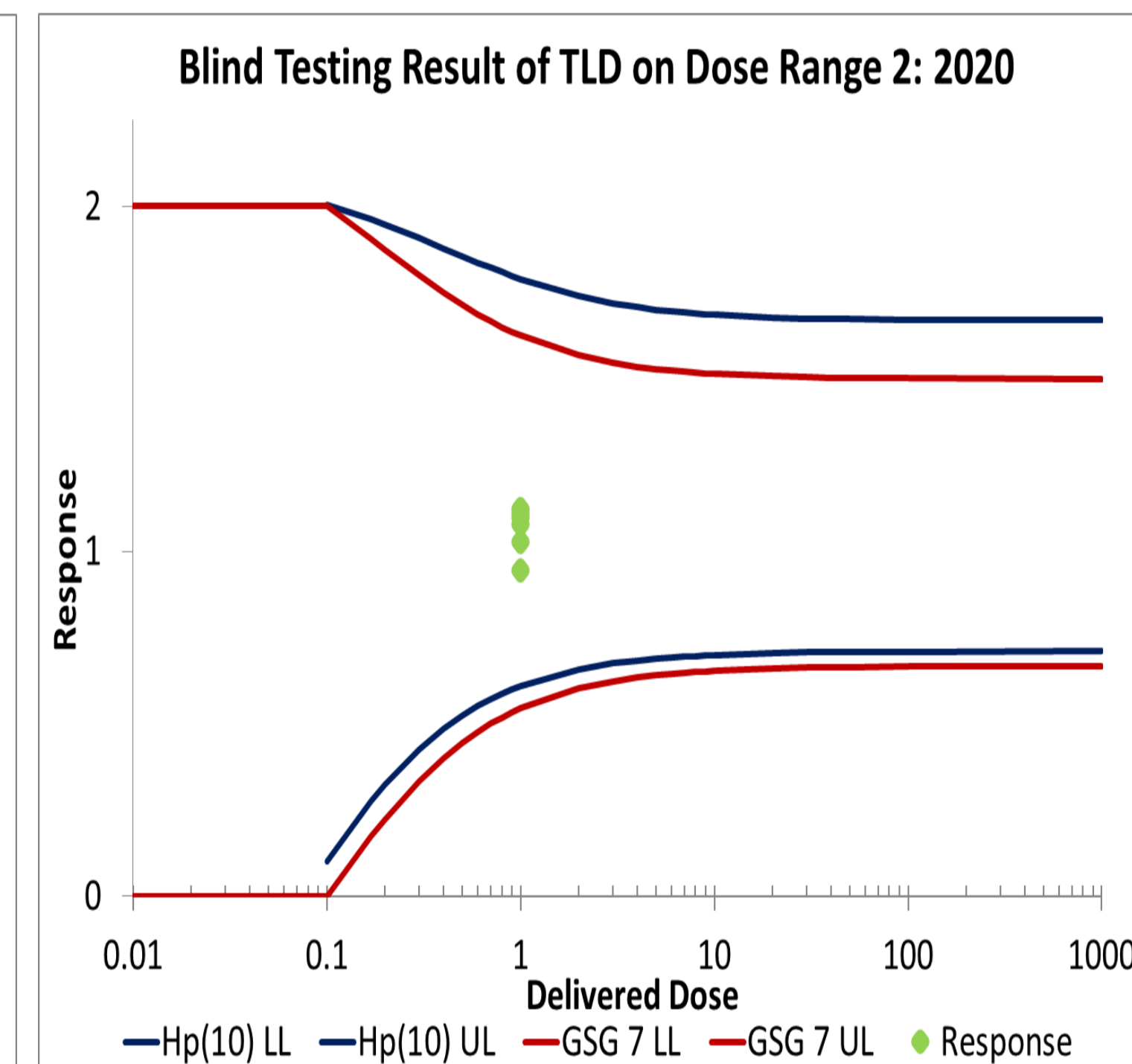


Figure 4. Hp (10) response +6% of TLD

In the 2021 blind test activity, the OSLD and TLD* results were still acceptable based on the set acceptable limit of $\pm 10\%$ of unity and the trumpet curve

*TLD results were outside the acceptable range, hence, the process were repeated once for verification.

Conclusion

- Both dosimetry systems were within the acceptable range, hence, performance testing of OPMS & TPMS showed promising result.
- PNRI-SSDL demonstrated its capacity to organize intercomparison exercises that caters both OSLD and TLD.
- Impartiality was addressed by designation of an independent SSDL Team.
- RPSS could locally provide and low-cost service on performance testing for PMS providers in the Philippine
- For further improvement: uncertainty calculation, other radiation quality, etc.

References

1. INTERNATIONAL ATOMIC ENERGY AGENCY, Occupational Radiation Protection, Safety Guide No. GSG-7, IAEA, Vienna, 1999
2. INTERNATIONAL ATOMIC ENERGY AGENCY, Intercomparison of Measurement of Personal Dose Equivalent $H_p(10)$ in Photon Field in West Asia Region, IAEA-TECDOC-CD-1567, IAEA, Vienna, 2007
3. M. Arib, A. Herrati, F. Dari, J. Ma, Z. Lounis-Mokrani (2014). Intercomparison 2013 on measurements of the personal dose equivalent $H_p(10)$ in photon fields in the African region. Radiation Protection Dosimetry, Volume 163, Issue 3, February 2015, Pages 276–283.

Acknowledgement

We would like to thank Christy Mae T. Betos, Ma. Jesseca Embestro, Ma. Eloisa V. Villacora, Jhon Ray L. Amapardo, Dante Q. Bajet, Robert C. Dacoco, and Marlo Etong for their assistance during the activities.

