

Intercomparison IC2021 area of passive area dosimetry systems



Organization

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Challenge: measuring low extra-doses with values below background dose

- 3 scenarios:
 - 3 months outdoor exposition
 - 6 months outdoor exposition
 - 3 months indoor exposition
- 12 dosimeters (6 for background, 6 for irradiation)
- extra-doses of 150 μSv and 300 μSv

Online Platform – Dosimetry System



Passive area dosemeter intercomparison IC2021area

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♦ Welcome! ♦

Welcome to the EURADOS Passive area dosemeter intercomparison IC2021area!

On this homepage, participants of the **Passive area dosemeter intercomparison IC2021area** can log in and check the current status of the intercomparison, receive information about the irradiation process, enter their dose values and much more.

For the documentation please have a look at the file 'IC2021area Online Platform Documentation.pdf' which is available via the 'Documents' link!

As the deadline for registration is over (Monday, 2021-05-31, 23:59 (CEST)), registration is no longer possible.

By the way: you can change the language of this homepage in the bottom left corner.



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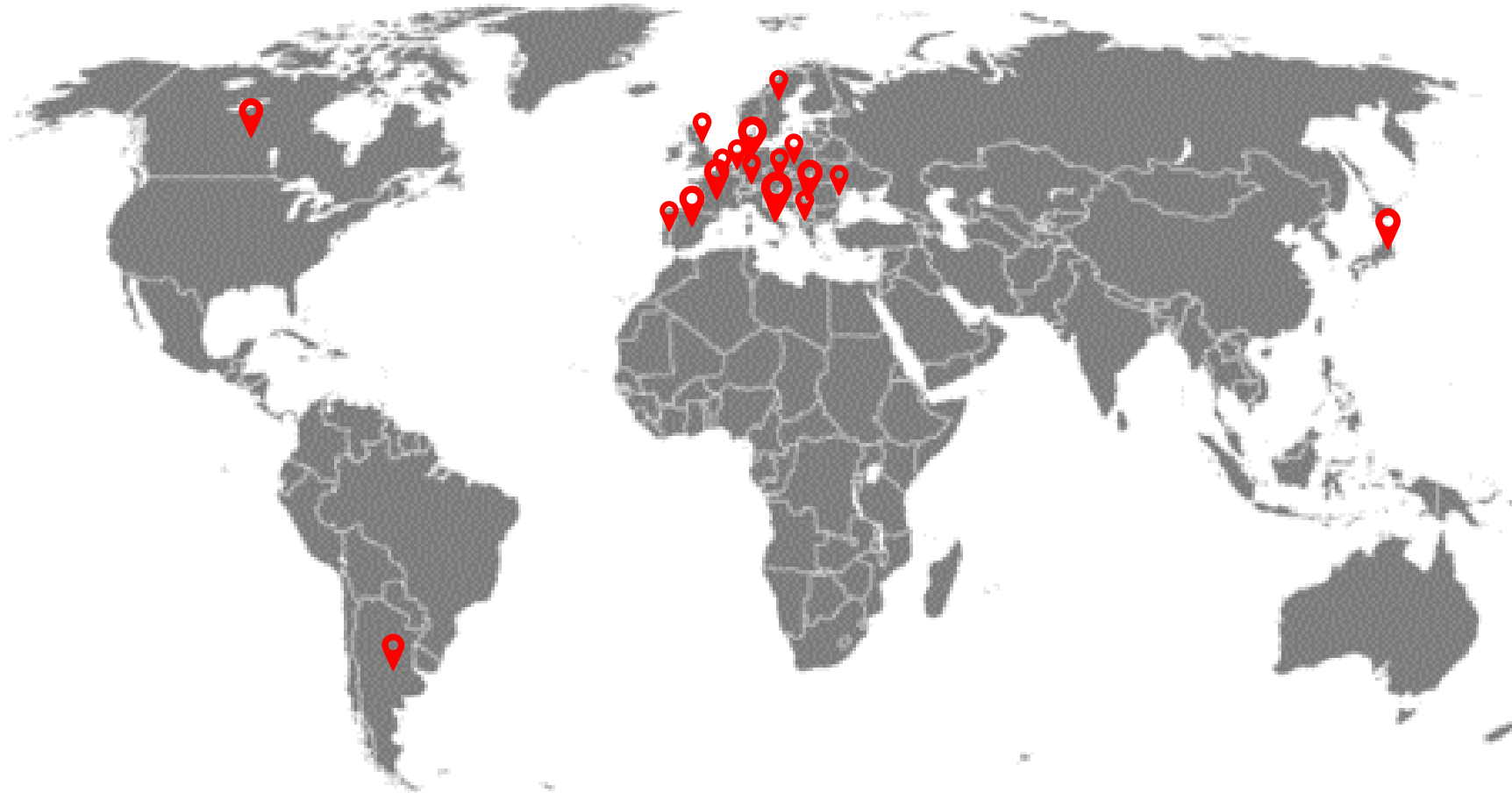
These documents are provided as a source of information regarding the EURADOS Passive area dosemeter intercomparison IC2021area.

[IC2021area Announcement.pdf](#) (363 KB)
[IC2021area Online Platform Documentation.pdf](#) (261 KB)
[IC2021area Terms and Conditions of participation.pdf](#) (94 KB)

These are additional documents for participants of the EURADOS Passive area dosemeter intercomparison IC2021area.

[IC2021area Instructions for preparing the dosimeters.pdf](#) (91 KB)
[IC2021area Instructions for readout.pdf](#) (120 KB)
[IC2021area Labels 'Do not x-ray' v1.pdf](#) (62 KB)
[IC2021area Labels 'Do not x-ray' v2.pdf](#) (50 KB)
[IC2021area Labels 'Do not x-ray' v3.pdf](#) (34 KB)
[IC2021area Labels Address.pdf](#) (65 KB)
[IC2021area Transport Protocol.pdf](#) (93 KB)

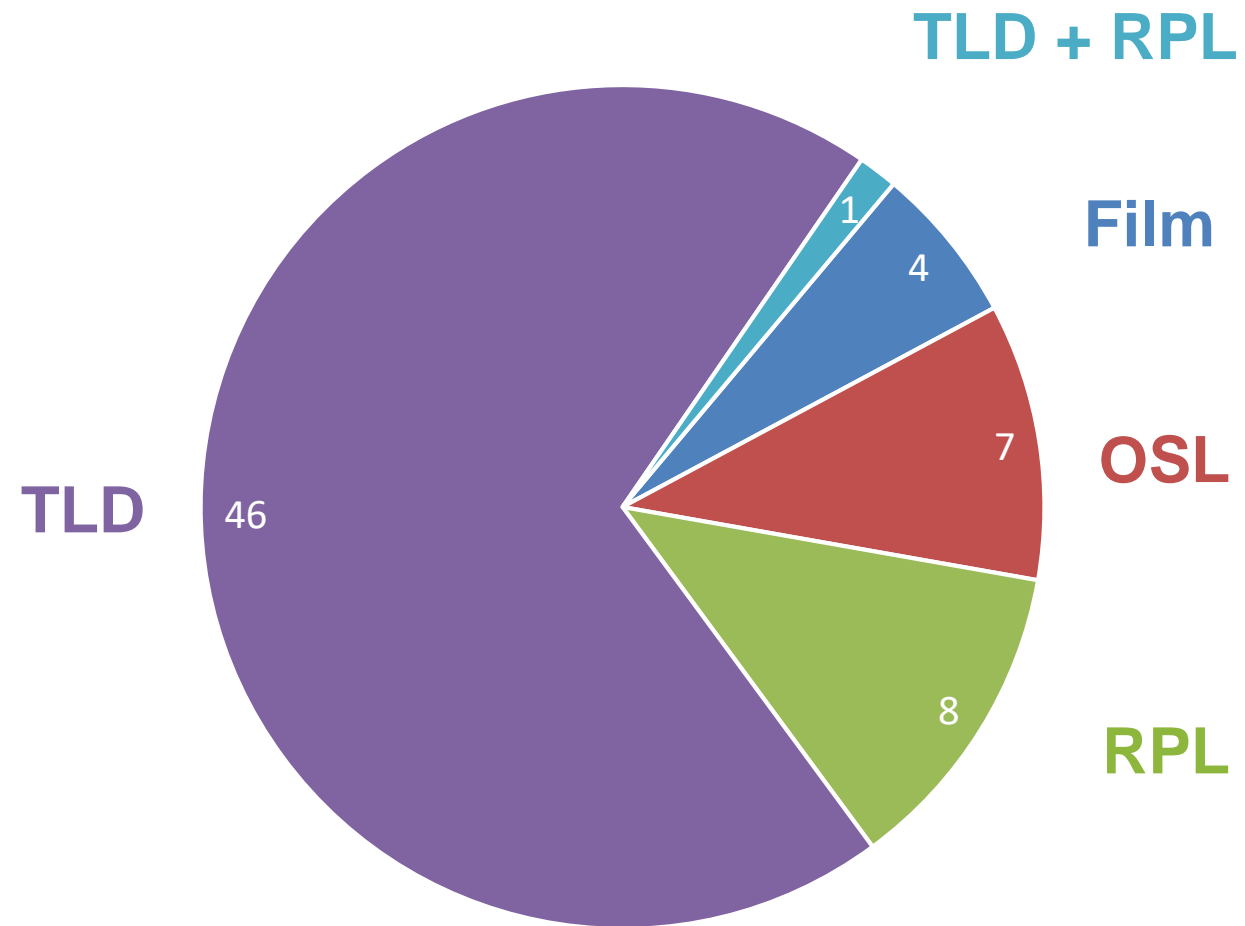
Participants



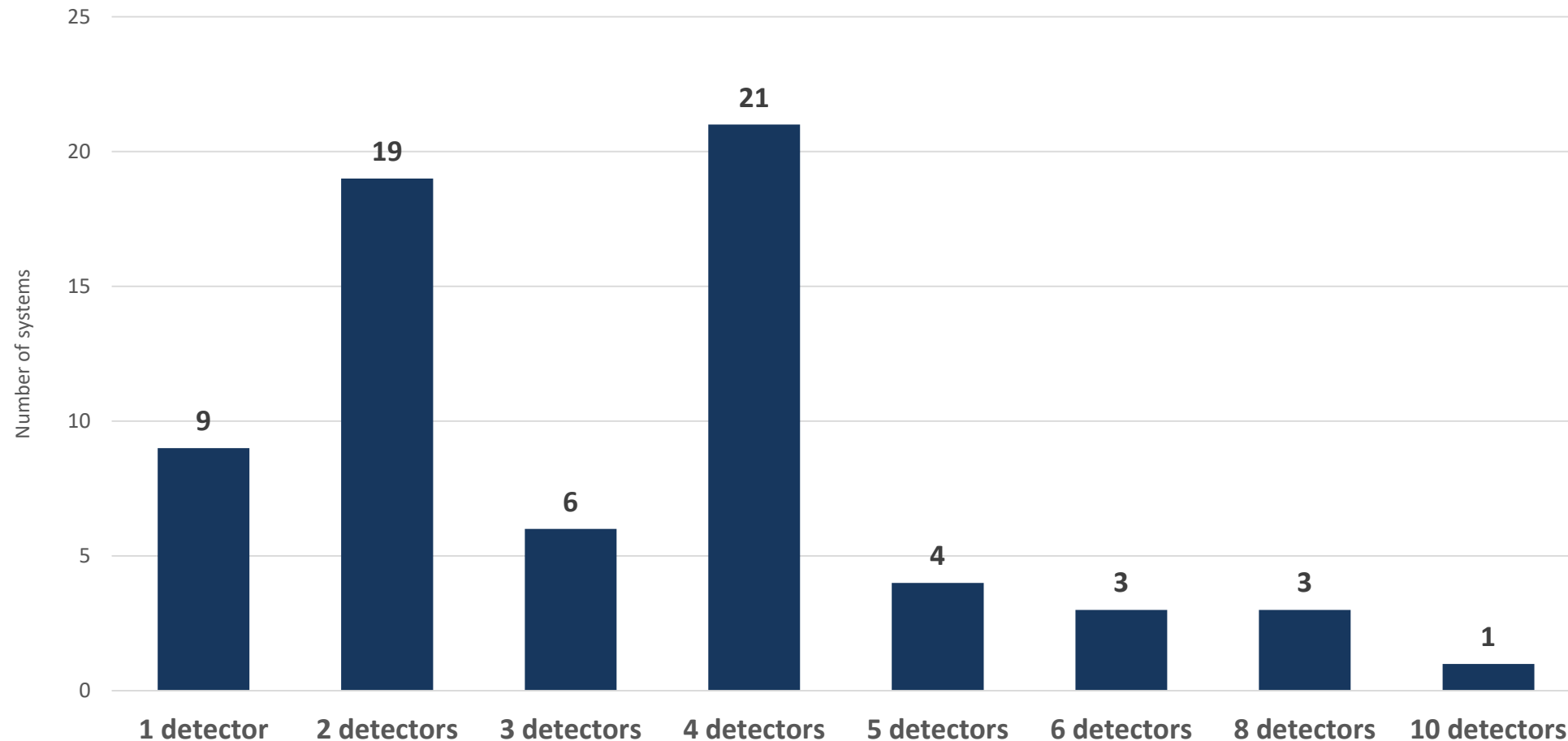
Country	Number of systems
Italy	14
Germany	9
Slovenia	5
Spain	5
Belgium	4
Japan	4
Austria	3
France	3
Switzerland	3
United Kingdom	3
Croatia	2
Czech Republic	2
Sweden	2
Argentina	1
Bulgaria	1
Canada	1
Lithuania	1
Portugal	1
Romania	1
Serbia	1

66 passive $H^*(10)$ area dosimetry systems ; 47 institutes ; 20 countries

System specifications – detector type

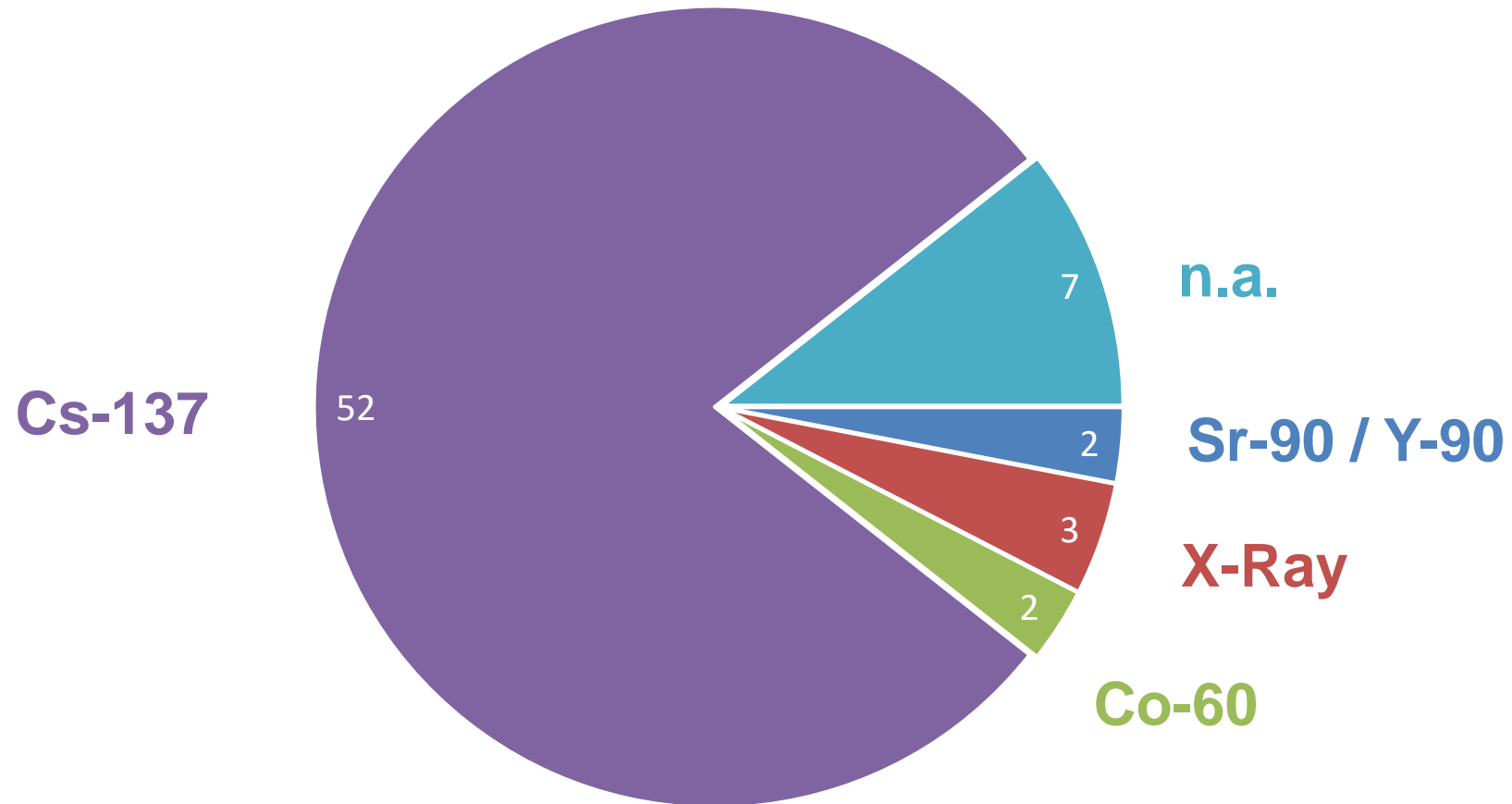


System specifications – number of detectors



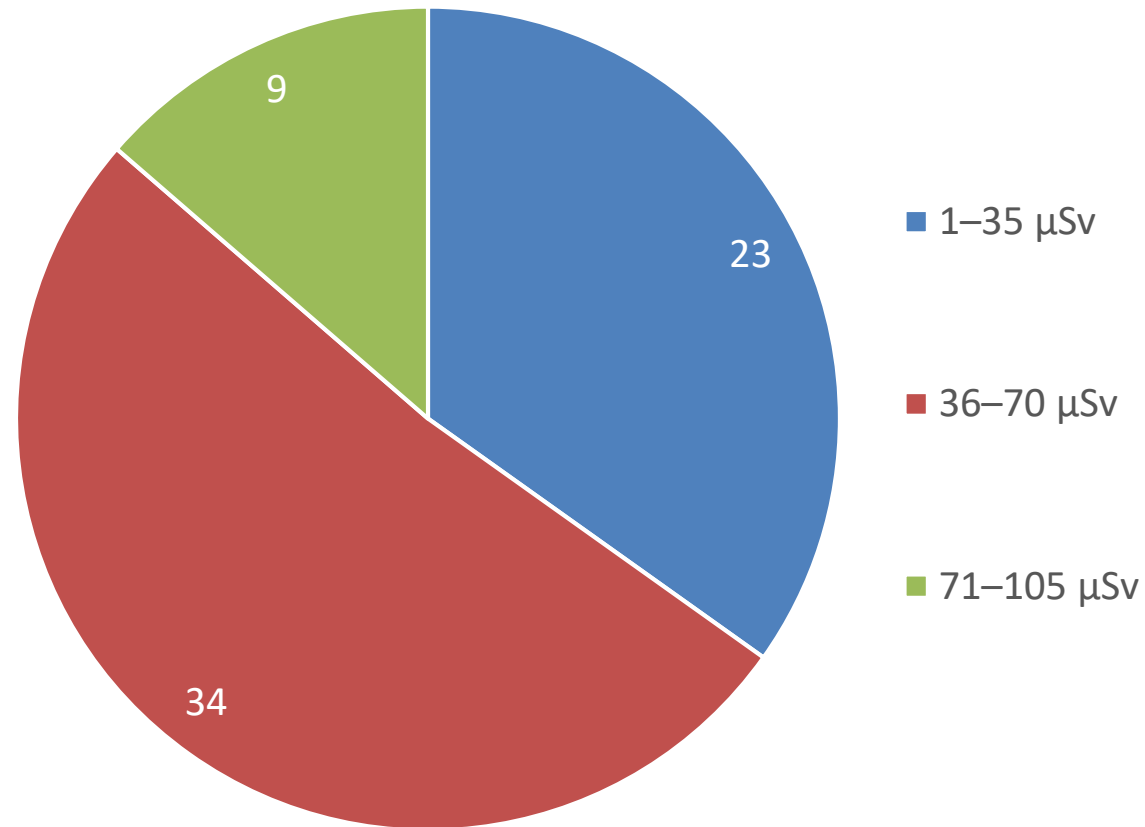
Reference energy used by participants

Number of systems - reference energy dependent

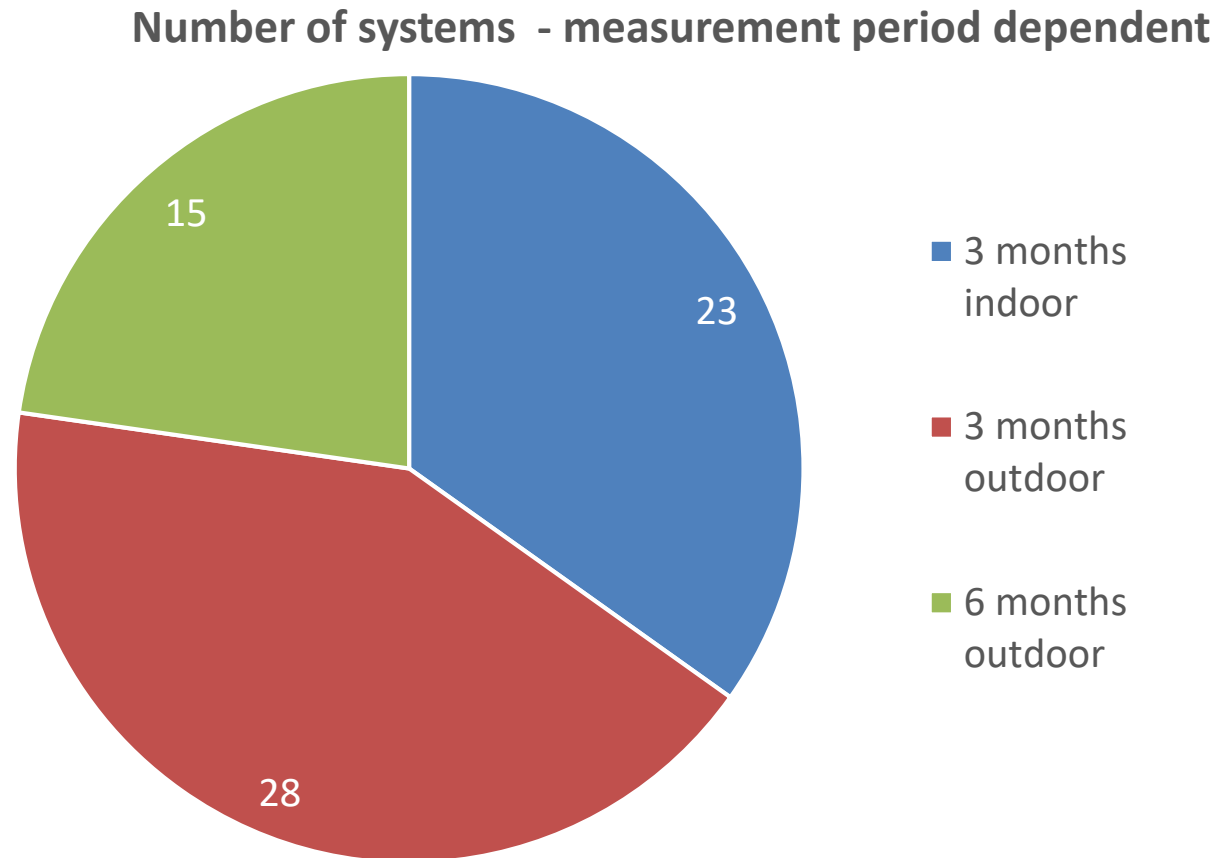


System specifications – lower measurement limit

Number of systems - lower measurement limit dependent



Measurement periods and conditions



Measurement sites – outdoor exposition



516 dosemeters

74 m²

1 m above ground

Measurement sites – outdoor exposition



Measurement sites – indoor exposition



276 dosimeters

2 m above ground

Measurement sites – indoor exposition

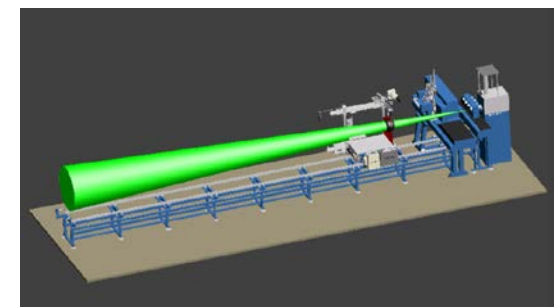
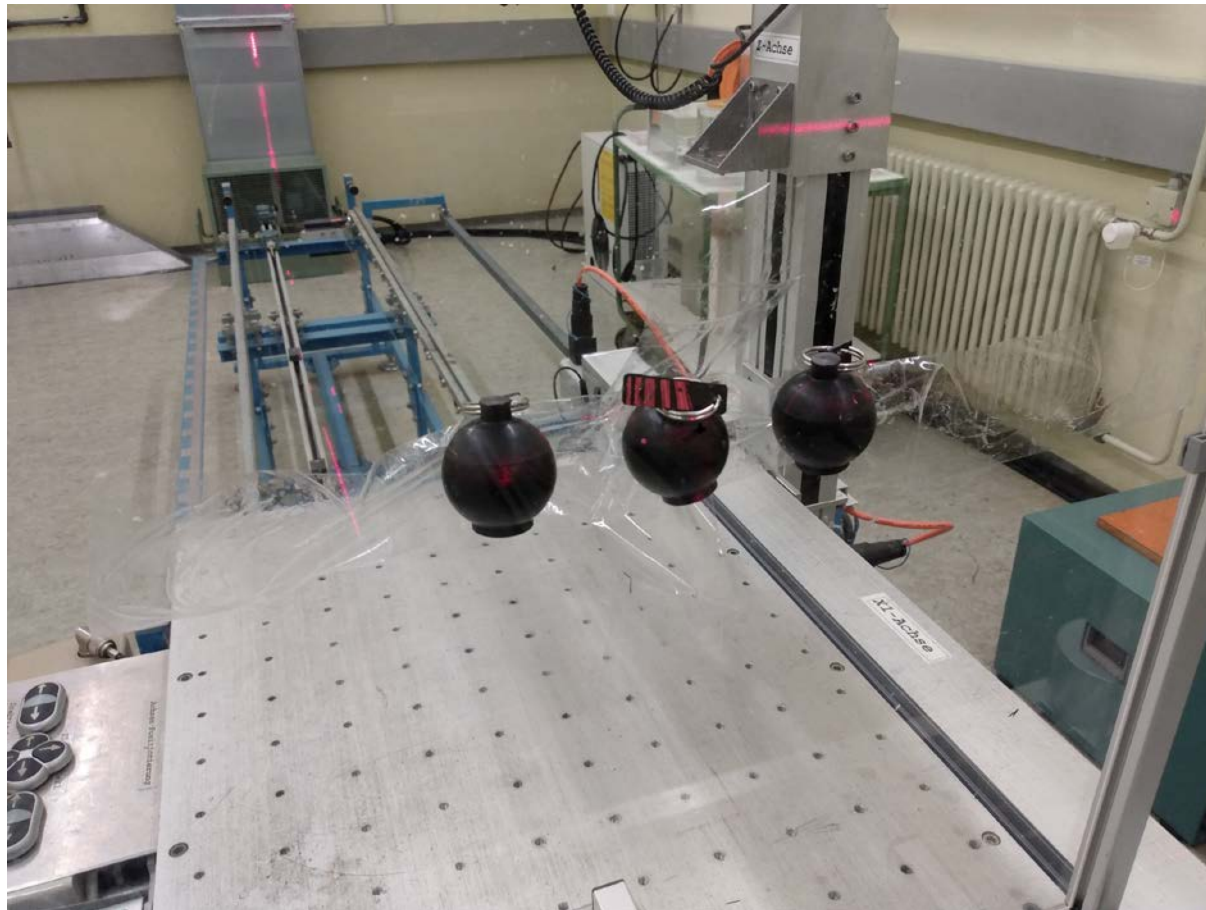


Extra irradiations

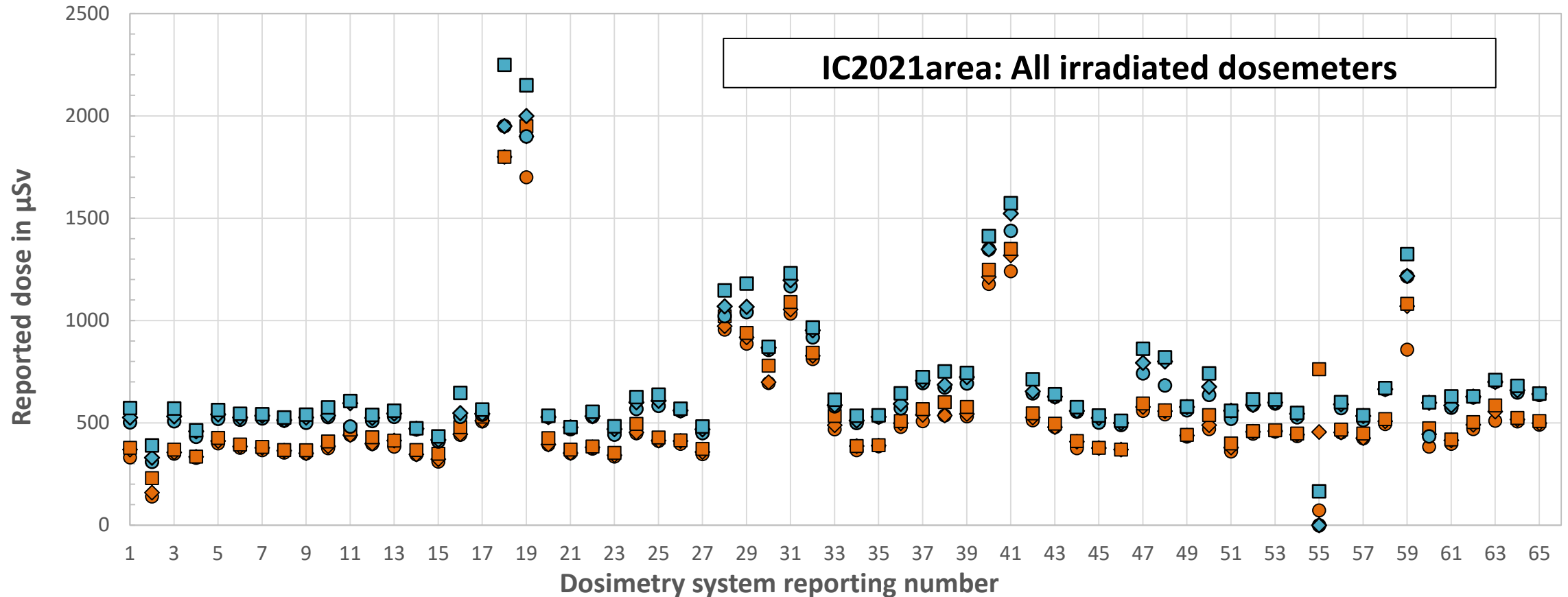
- irradiations roughly in the middle of exposition period
- two reference dose values: 150 μSv and 300 μSv
- simultaneous irradiation of three dosimeters per dose

Extra irradiations

The irradiations were performed at the ISO 17025 accredited calibration laboratory of KIT

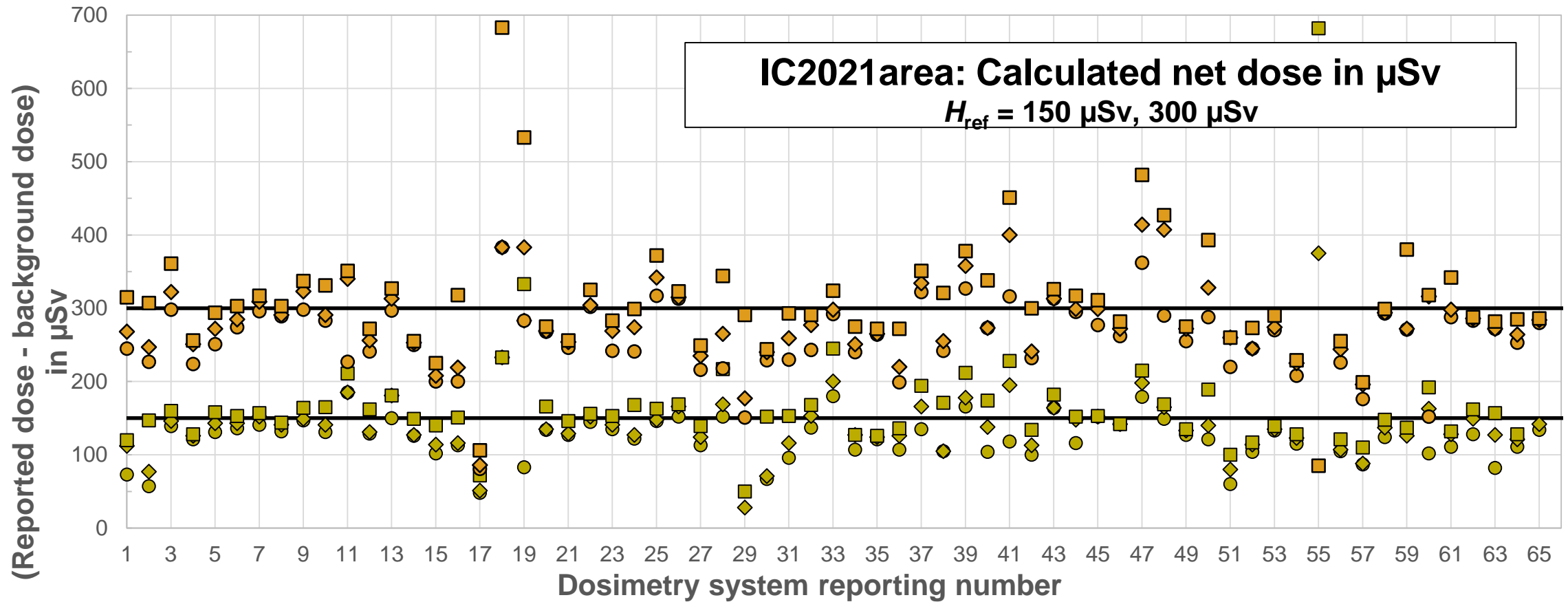


Results – dose values and response results



Reported dose values of the irradiated dosimeters with reference dose H_{ref} equal to $150 \mu\text{Sv}$ (orange symbols) and H_{ref} equal to $300 \mu\text{Sv}$ (cyan symbols).

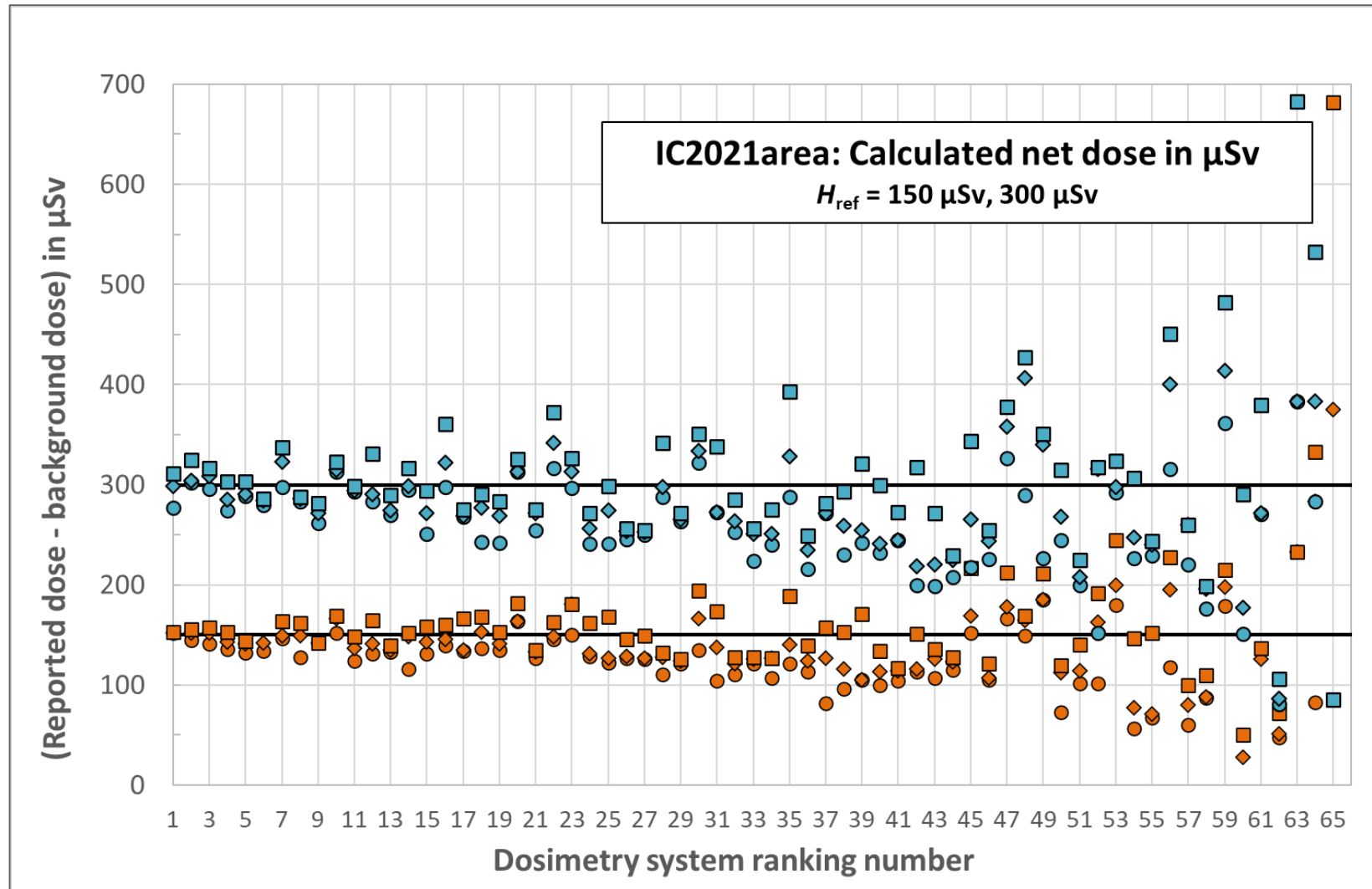
Results – dose values and response results



Calculated net dose values of the 6 irradiated dosimeters of a system after subtraction of the average background dose.

Intercomparison results

Net dose of 6 irradiated dosimeters



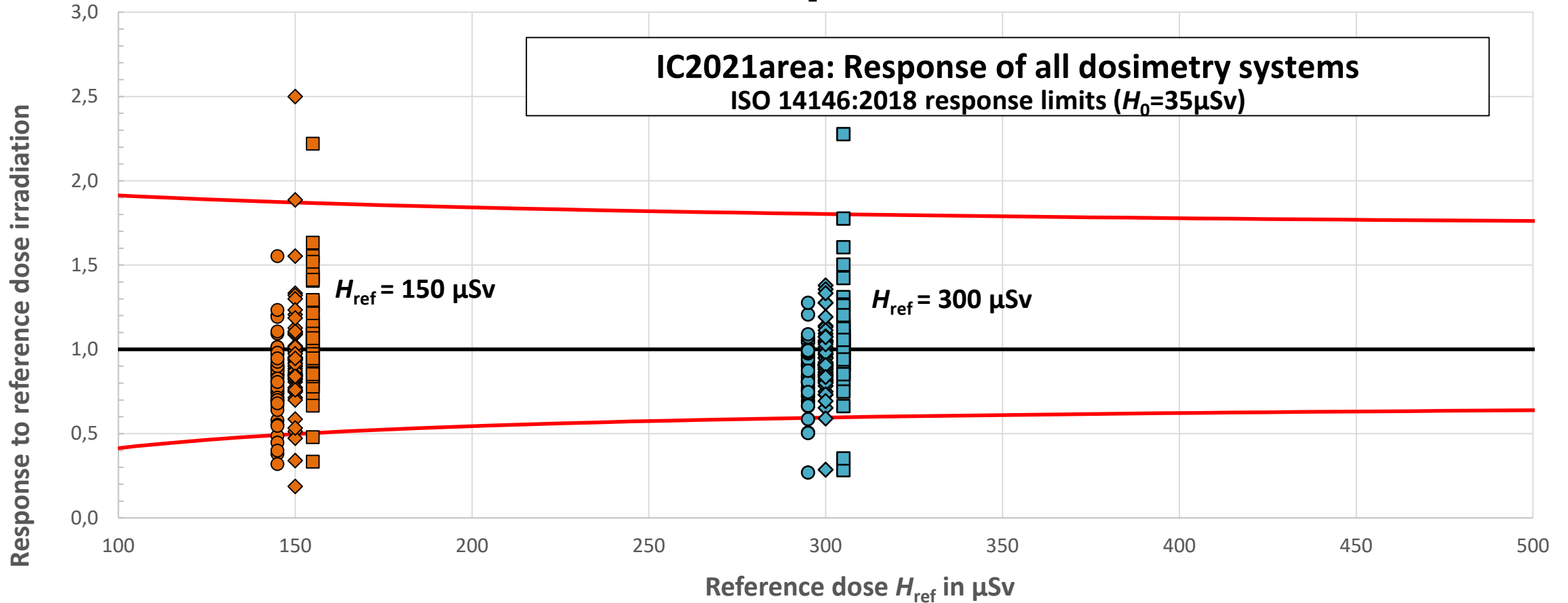
Comments on evaluation

OG decided on H_{ref} dependent criteria for this low-dose intercomparison according ISO 14146:2018 (Radiological protection - Criteria and performance limits for the periodic evaluation of dosimetry services) using an appropriate trumpet-curve parameter

OG had no information about intended use of dosimeters (environmental/workplace) $\rightarrow H_0 = 35 \mu\text{Sv}$

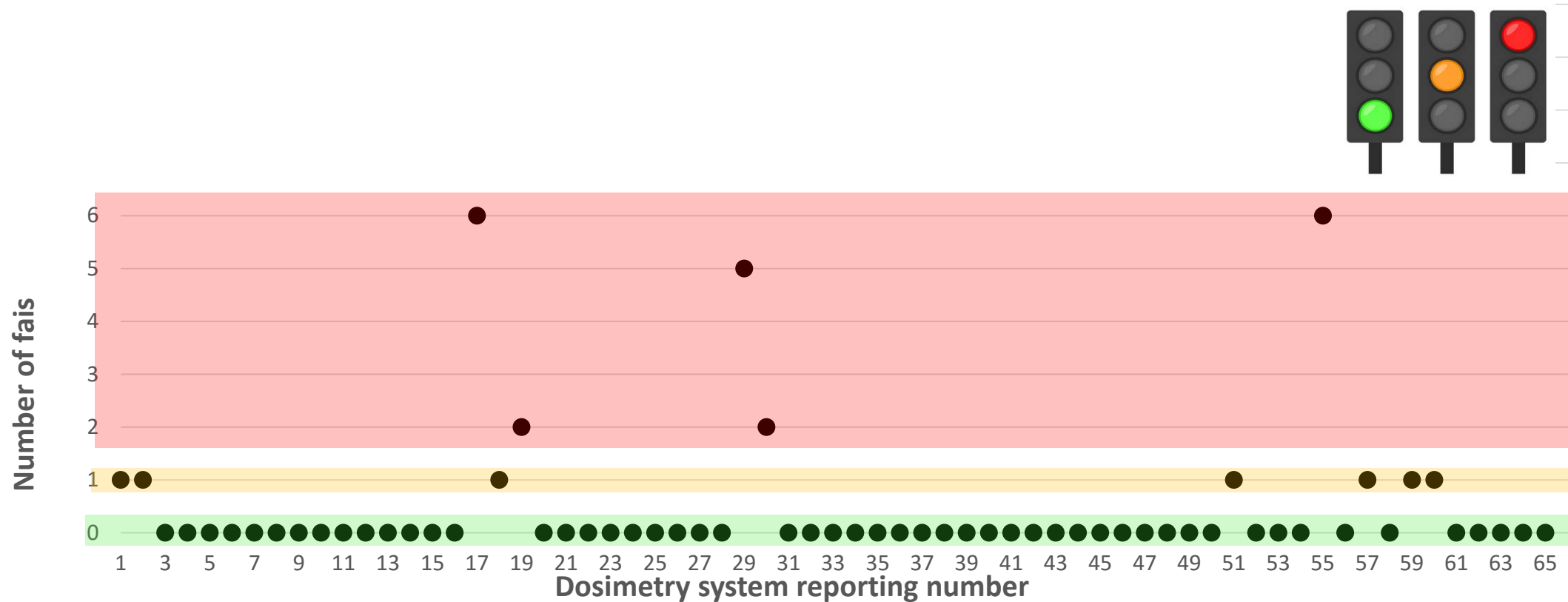
Response limits for $H_{\text{ref}}=150 \mu\text{Sv}$	$0,5 \leq R \leq 1,87$
Response limits for $H_{\text{ref}}=300 \mu\text{Sv}$	$0,6 \leq R \leq 1,80$

Results – dose values and response results



All dosimeter response values plotted at their reference dose values H_{ref} equal to $150 \mu\text{Sv}$ (orange symbols) and H_{ref} equal to $300 \mu\text{Sv}$ (cyan symbols). ISO 14146 lower and upper response limits so-called trumpet curves (red lines) are applied with trumpet curve parameter H_0 equal to $35 \mu\text{Sv}$.

Results – dose values and response results



According to the applied ISO 14146 response criteria, 93 % of the response values were within these limits. In total, 53 dosimetry systems passed the criteria with all irradiated dosimeters (green area, 0 fails), 7 dosimetry systems had a single fail (orange area) and 5 dosimetry systems had more than one fail (red area).



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