Ionizing Radiation, Finland, STUK (Radiation and Nuclear Safety Authority)

Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration			
Quantity	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?	Reference standard	Source of traceability	NMI Internal Service Identifier	Comments
DOSIMETRY																
Air kerma	Radiotherapy dosemeters	Calibration free in air	1.00E+00	3.00E+00	Gy	Co-60	IAEA TRS277. Air kerma rate 3 mGy/s to 7 mGy/s	1.0	%	2	~95%	Yes	Secondary standard ionization chamber	BIPM	EUR-RAD-STUK-1001	Approved on 24 January 2012
Air kerma	Radiotherapy dosemeters	Calibration free in air	1.00E+00	3.00E+00	Gy	X-ray, 10 kV to 50 kV	BIPM, 10 kV to 50 kV, HVL 0.036 mm Al to 2.257 mm Al, Report BIPM 01/04. Air kerma rate 0.6 mGy/s	2.0	%	2	~95%	Yes	Secondary standard ionization chamber	BIPM	EUR-RAD-STUK-1002	Approved on 24 January 2012
Air kerma	Radiodiagnostic dosemeters	Calibration free in air	1.00E+00	3.00E+00	Gy	X-ray, 50 kV to 420 kV	BIPM, 50 kV to 180 kV, HVL 1.021 mm Al to 0.990 mm Cu, Report BIPM 01/04. Air kerma rate 0.6 mGy/s	2.5	%	2	~95%	Yes	Secondary standard ionization chambers	BIPM	EUR-RAD-STUK-1003	Approved on 24 January 2012
Air kerma	Radiodiagnostic dosemeters	Calibration free in air	1.00E+00	3.00E+00	Gy	X-ray, 10 kV to 50 kV	IEC RQR, 40 kV to 50 kV, HVL 1.0 mm Al to 1.5 mm Al, IEC standard 1267, 1994. Air kerma rate 0.6 mGy/s	2.8	%	2	~95%	Yes	Secondary standard ionization chamber	BIPM	EUR-RAD-STUK-1004	Approved on 24 January 2012
Air kerma	Radiodiagnostic dosemeters	Calibration free in air	1.00E+00	3.00E+00	Gy	X-ray, 50 kV to 420 kV	IEC RQR, 60 kV to 150 kV, HVL 2.0 mm Al to 5.7 mm Al, IEC standard 1267, 1994. Air kerma rate 0.6 mGy/s	2.8	%	2	~95%	Yes	Secondary standard ionization chamber	BIPM	EUR-RAD-STUK-1005	Approved on 24 January 2012
Air kerma	Biological sample, electronic component or other passive object	Irradiation free in air	8.00E-07	1.80E+03	Gy	Co-60	ISO standard 4037-1, 1996. Air kerma rate 30 µGy/h to 25 Gy/h	3.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1006	Approved on 24 January 2012

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Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration			
Quantity	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?	Reference standard	Source of traceability	NMI Internal Service Identifier	Comments
Air kerma	Biological sample, electronic component or other passive object	Irradiation free in air	8.00E-07	5.70E+01	Gy	Cs-137	ISO standard 4037-1, 1996. Air kerma rate 30 µGy/h to 0.8 Gy/h	3.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1007	Approved on 24 January 2012
Air kerma	Biological sample, electronic component or other passive object	Irradiation free in air	6.00E-05	1.00E+01	Gy	X-ray, 10 to 50 kV	ISO narrow spectrum series 10 kV to 40 kV, HVL 0.047 mm Al to 0.084 mm Cu, ISO standard 4037-1, 1996. Air kerma rate 20 mGy/h to 90 mGy/h	4.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1008	Approved on 24 January 2012
Air kerma	Biological sample, electronic component or other passive object	Irradiation free in air	6.00E-05	1.00E+01	Gy	X-ray, 50 kV to 420 kV	ISO narrow spectrum series 60 kV to 300 kV, HVL 0.24 mm Cu to 6.12 mm Cu, ISO standard 4037-1, 1996. Air kerma rate 10 mGy/h to 50 mGy/h	3.1	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1009	Approved on 24 January 2012
Absorbed dose to water	Radiotherapy dosimeters	Calibration in a water phantom	1.00E+00	3.00E+00	Gy	Co-60	IAEA TRS 398, dose rate 3 mGy/s to 7 mGy/s	1.2	%	2	~95%	Yes	Secondary standard ionization chamber	BIPM	EUR-RAD-STUK-1010	Approved on 24 January 2012
Ambient dose equivalent rate	Radioprotection dosemeters	Calibration free in air	3.00E-05	3.00E+00	$Sv\ h^{-1}$	Co-60	ISO standard 4037-1, 1996	5.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1012	Approved on 24 January 2012
Ambient dose equivalent rate	Radioprotection dosemeters	Calibration free in air	3.00E-05	8.00E-01	$Sv\ h^{-1}$	Cs-137	ISO standard 4037-1, 1996	5.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1013	Approved on 24 January 2012

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Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration			
Quantity	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?	Reference standard	Source of traceability	NMI Internal Service Identifier	Comments
Ambient dose equivalent rate	Radioprotection dosemeters	Calibration free in air	1.70E-03	2.30E-03	Sv h^{-1}	X-ray, 10 kV to 50 kV	ISO narrow spectrum series 10 kV to 40 kV, HVL 0.047 mm Al to 0.084 mm Cu, ISO standard 4037-1, 1996	7.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1014	Approved on 24 January 2012
Ambient dose equivalent rate	Radioprotection dosemeters	Calibration free in air	1.70E-03	2.30E-03	Sv h^{-1}	X-ray, 50 kV to 420 kV	ISO narrow spectrum series 60 kV to 300 kV, HVL 0.24 mm Cu to 6.12 mm Cu, ISO standard 4037-1, 1996	5.2	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1015	Approved on 24 January 2012
Ambient dose equivalent rate	Radioprotection dosemeters	Calibration free in air	5.00E-03	1.40E-01	Sv h^{-1}	Beta radiation	ISO-6980, 1996, Sr-90/Y-90	6.0	%	2	~95%	Yes	Calibrated source	PTB	EUR-RAD-STUK-1016	Approved on 24 January 2012
Directional dose equivalent rate	Radioprotection dosemeters	Calibration free in air	3.00E-05	3.00E+00	Sv h^{-1}	Co-60	ISO standard 4037-1, 1996	5.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1017	Approved on 24 January 2012
Directional dose equivalent rate	Radioprotection dosemeters	Calibration free in air	3.00E-05	8.00E-01	Sv h^{-1}	Cs-137	ISO standard 4037-1, 1996	5.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1018	Approved on 24 January 2012
Directional dose equivalent rate	Radioprotection dosemeters	Calibration free in air	1.70E-03	2.30E-03	Sv h^{-1}	X-ray, 10 kV to 50 kV	ISO narrow spectrum series 10 kV to 40 kV, HVL 0.047 mm Al to 0.084 mm Cu, ISO standard 4037-1, 1996	7.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1019	Approved on 24 January 2012

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Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration			
Quantity	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?	Reference standard	Source of traceability	NMI Internal Service Identifier	Comments
Directional dose equivalent rate	Radioprotection dosemeters	Calibration free in air	1.70E-03	2.30E-03	Sv h^{-1}	X-ray, 50 kV to 420 kV	ISO narrow spectrum series 60 kV to 300 kV, HVL 0.24 mm Cu to 6.12 mm Cu, ISO standard 4037-1, 1996	5.2	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1020	Approved on 24 January 2012
Personal dose equivalent at 0.07 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	6.00E-05	1.60E-02	Sv	X-ray, 10 kV to 50 kV	ISO narrow spectrum series 10 kV to 40 kV, HVL 0.047 mm Al to 0.084 mm Cu, ISO standard 4037-1, 1996	7.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1021	Approved on 24 January 2012
Personal dose equivalent at 0.07 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	6.00E-05	1.60E-02	Sv	X-ray, 50 kV to 420 kV	ISO narrow spectrum series 60 kV to 300 kV, HVL 0.24 mm Cu to 6.12 mm Cu, ISO standard 4037-1, 1996	5.2	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1022	Approved on 24 January 2012
Personal dose equivalent at 0.07 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	1.00E-04	1.00E+01	Sv	Beta radiation	ISO-6980, 1996, Sr-90/Y-90	6.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1023	Approved on 24 January 2012
Personal dose equivalent at 0.07 mm depth	Personal dosimeters	Irradiation or calibration on a PMMA rod phantom	6.00E-05	1.60E-02	Sv	X-ray, 10 kV to 50 kV	ISO narrow spectrum series 10 kV to 40 kV, HVL 0.047 mm Al to 0.084 mm Cu, ISO standard 4037-1, 1996	7.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1024	Approved on 24 January 2012

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Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration			
Quantity	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Value	Units	Coverage factor	Level of Confidence	Is the expanded uncertainty a relative one?	Reference standard	Source of traceability	NMI Internal Service Identifier	Comments
Personal dose equivalent at 0.07 mm depth	Personal dosimeters	Irradiation or calibration on a PMMA rod phantom	6.00E-05	1.60E-02	Sv	X-ray, 50 kV to 420 kV	ISO narrow spectrum series 60 kV to 300 kV, HVL 0.24 mm Cu to 6.12 mm Cu, ISO standard 4037-1, 1996	5.2	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1025	Approved on 24 January 2012
Personal dose equivalent at 0.07 mm depth	Personal dosimeters	Irradiation or calibration on a PMMA rod phantom	1.00E-04	1.00E+01	Sv	Beta radiation	ISO-6980, 1996, Sr-90/Y-90	6.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1026	Approved on 24 January 2012
Personal dose equivalent at 10 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	8.00E-07	2.40E+01	Sv	Co-60	ISO standard 4037-1, 1996	5.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1027	Approved on 24 January 2012
Personal dose equivalent at 10 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	8.00E-07	6.40E+00	Sv	Cs-137	ISO standard 4037-1, 1996	5.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1028	Approved on 24 January 2012
Personal dose equivalent at 10 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	6.00E-05	1.60E-02	Sv	X-ray, 10 kV to 50 kV	ISO narrow spectrum series 10 kV to 40 kV, HVL 0.047 mm Al to 0.084 mm Cu, ISO standard 4037-1, 1996	7.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1029	Approved on 24 January 2012
Personal dose equivalent at 10 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	6.00E-05	1.60E-02	Sv	X-ray, 50 kV to 420 kV	ISO narrow spectrum series 60 kV to 300 kV, HVL 0.24 mm Cu to 6.12 mm Cu, ISO standard 4037-1, 1996	5.2	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1030	Approved on 24 January 2012

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Calibration or Measurement Service			Measurand Level or Range			Measurement Conditions/Independent Variable		Expanded Uncertainty					Reference Standard used in calibration			
Quantity	**Instrument or Artifact**	**Instrument Type or Method**	**Minimum value**	**Maximum value**	**Units**	**Parameter**	**Specifications**	**Value**	**Units**	**Coverage factor**	**Level of Confidence**	**Is the expanded uncertainty a relative one?**	**Reference standard**	**Source of traceability**	**NMI Internal Service Identifier**	**Comments**
Personal dose equivalent at 10 mm depth	Personal dosimeters	Irradiation or calibration on a water slab phantom	1.00E-04	1.00E+01	Sv	Beta radiation	ISO-6980, 1996, Sr-90/Y-90	6.0	%	2	~95%	Yes	Secondary standard ionization chamber	PTB	EUR-RAD-STUK-1031	Approved on 24 January 2012