Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

x_i **adjusted value of the measurement reported by laboratory *i* (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)**

$U_{\text{Lab } i}$ **expanded uncertainty of x_i at a 95 % level of confidence**

Lab *i*	x_i / (μV/V)	$U_{\text{Lab } i}$ / (μV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	6.0	16.1	Feb 2000	Yes	Yes
BEV	0.7	18.1	Apr 2000	No	Yes
MIKES	0.1	10.1	May 2000	No	Yes
INETI	13.7	32.0	Jun 2000	No	Yes
AREPA	4.7	21.1	Jul 2000	Yes	Yes
NPL	-0.3	13.1	Aug 2000	Yes	Yes
SP	2.7	9.1	Sep 2000	Yes	Yes
IEN	-0.7	14.9	Oct 2000	Yes	Yes
CEM	-6.3	36.0	Nov 2000	Yes	Yes
PTB	-0.5	8.0	Jan 2001	Yes	Yes
NMi-VSL	3.0	20.0	May 2001	Yes	Yes
OMH	-0.6	43.0	Oct 2001	No	Yes
JV	-1.1	22.1	Mar 2002	No	Yes
UME	0.9	30.1	Apr 2002	No	Yes
INTI	-4.5	14.1	Jul 2000	Yes	No
NMIA	1.0	11.1	Nov 2000	Yes	No
NRC	0.5	10.1	Mar 2001	Yes	No
VNIIM	-0.6	20.3	May 2001	Yes	No
METAS	-1.5	6.2	Aug 2001	Yes	Yes
NIST	7.4	17.1	Jan 2002	Yes	No
NIM	-0.8	24.3	May 2002	Yes	No
CMI	7.5	50.0	Dec 2002	No	Yes

Key comparison SIM.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

$\delta_{\text{Lab } i\text{-SIM}}$: **result of measurement carried out by laboratory *i* participant in SIM.EM-K9**
$U_{\text{Lab } i\text{-SIM}}$: **expanded uncertainty (*k* = 2) of** $\delta_{\text{Lab } i\text{-SIM}}$
$u_{\text{Lab } i\text{-SIM}}$: **standard uncertainty (*k* = 1) of** $\delta_{\text{Lab } i\text{-SIM}}$

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$U_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
NIST	10	11.6	Jan to Feb 04
INTI	5.2	16	04 Mar to 16 Apr 04
INMETRO	5	18	28 Jun to 28 Jul 04
CENAM	5.7	15	07 to 24 Aug 04
NRC	6.7	10	Sep to Oct 04

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$u_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
UTE	4	11	18 May to 22 Jun 04

Key comparison APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 3 of the Final Report. They were taken between 2000 and 2004.

Key comparison SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

Measurement results of the participants in key comparison SIM.EM-K9.1 are given in Table IV of the Final Report. They were taken in 2012.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R = 0.2 µV/V, U_R = 3.1 µV/V

The degree of equivalence of laboratory i relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories i and j is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.

The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking SIM.EM-K9 to CCEM-K9

INTI, NRC and NIST provide the link between key comparisons CCEM-K9 and SIM.EM-K9.
The linkage process is described in section 11 of the SIM.EM-K9 Final Report.
The degree of equivalence of the laboratory i participant in SIM.EM-K9 with respect to the key comparison reference value is given by a pair of terms both expressed in µV/V:
D_i and U_i, its expanded uncertainty (k = 2).
The computation of the degrees of equivalence is explained in the SIM.EM-K9 Final Report.
The degree of equivalence between two laboratories i and j is not computed for the laboratories participant in key comparison SIM.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes it possible to extend the graph of equivalence to participants in APMP.EM-K9 only.
Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 17 of the Final Report. They are not reported here.

Linking SIM.EM-K9.1 to CCEM-K9

The linkage process is based on the results of the common participant, the LNE, and is detailed in Section 9 of the SIM.EM-K9.1 Final Report. This makes it possible to extend the graph of equivalence to INMETRO.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

Degrees of equivalence

Lab *i*

	D_i / (μV/V)	U_i / (μV/V)
LNE	5.8	15.8
AREPA	4.5	20.9
NPL	-0.5	12.7
SP	2.5	8.6
IEN	-0.9	14.6
CEM	-6.5	35.9
PTB	-0.7	7.4
NMi-VSL	2.8	19.8
INTI	-4.7	13.8
NMIA	0.8	10.7
NRC	0.3	9.6
VNIIM	-0.8	20.1
METAS	-1.7	5.4
NIST	7.2	16.8
NIM	-1.0	24.1

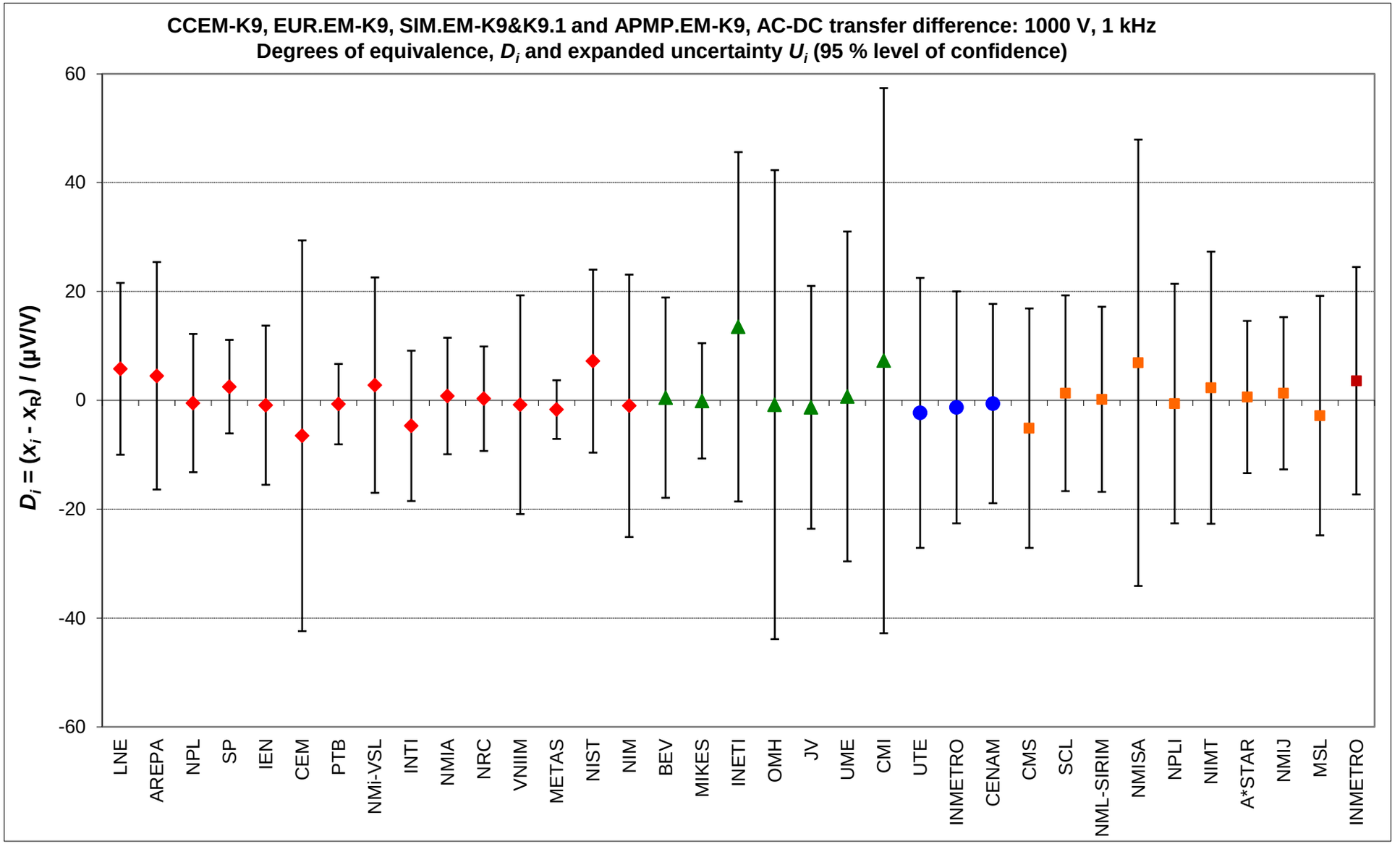
	D_i / (μV/V)	U_i / (μV/V)
BEV	0.5	18.4
MIKES	-0.1	10.6
INETI	13.5	32.1
OMH	-0.8	43.1
JV	-1.3	22.3
UME	0.7	30.3
CMI	7.3	50.1

	D_i / (μV/V)	U_i / (μV/V)
UTE	-2.3	24.8
INMETRO	-1.3	21.3
CENAM	-0.6	18.3

	D_i / (μV/V)	U_i / (μV/V)
CMS	-5.1	22
SCL	1.3	18
NML-SIRIM	0.2	17
NMISA	6.9	41
NPLI	-0.6	22
NIMT	2.3	25
A*STAR	0.6	14
NMIJ	1.3	14
MSL	-2.8	22

	D_i / (μV/V)	U_i / (μV/V)
INMETRO	3.6	20.9

Red: participants in CCEM-K9
Green: participants in EUROMET.EM-K9 only
Blue: participants in SIM.EM-K9 only
Orange: participants in APMP.EM-K9
Brown: participant in SIM.EM-K9.1 only



Red diamonds: participants in CCEM-K9 ; **Green triangles:** participants in EUROMET.EM-K9
Blue circles: participants in SIM.EM-K9 only ; **Orange squares**: participants in APMP.EM-K9 ; **Brown square**: participant in SIM.EM-K9.1 only

Key comparisons CCEM-K9 and EUROMET.EM-K9

Matrix of Equivalence

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

Pair-wise degrees of equivalence involving participants in SIM.EM-K9 and APMP.EM-K9 are not given here.

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	LNE		AREPA		NPL		SP		IEN		CEM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**5.8**	15.8			**1.3**	26.6	**6.3**	20.8	**3.3**	18.5	**6.7**	22.0	**12.3**	39.5
AREPA	**4.5**	20.9	**-1.3**	26.6			**5.0**	24.9	**2.0**	23.0	**5.4**	25.9	**11.0**	41.8
NPL	**-0.5**	12.7	**-6.3**	20.8	**-5.0**	24.9			**-3.0**	16.0	**0.4**	19.9	**6.0**	38.4
SP	**2.5**	8.6	**-3.3**	18.5	**-2.0**	23.0	**3.0**	16.0			**3.4**	17.5	**9.0**	37.2
IEN	**-0.9**	14.6	**-6.7**	22.0	**-5.4**	25.9	**-0.4**	19.9	**-3.4**	17.5			**5.6**	39.0
CEM	**-6.5**	35.9	**-12.3**	39.5	**-11.0**	41.8	**-6.0**	38.4	**-9.0**	37.2	**-5.6**	39.0		
PTB	**-0.7**	7.4	**-6.5**	18.0	**-5.2**	19.6	**-0.2**	15.4	**-3.2**	12.2	**0.2**	17.0	**5.8**	36.9
NMi-VSL	**2.8**	19.8	**-3.0**	25.7	**-1.7**	29.1	**3.3**	24.0	**0.3**	22.0	**3.7**	25.0	**9.3**	41.2
INTI	**-4.7**	13.8	**-10.5**	21.5	**-9.2**	25.4	**-4.2**	19.3	**-7.2**	16.8	**-3.8**	20.6	**1.8**	38.7
NMIA	**0.8**	10.7	**-5.0**	19.6	**-3.7**	23.9	**1.3**	17.2	**-1.7**	14.4	**1.7**	18.6	**7.3**	37.7
NRC	**0.3**	9.6	**-5.5**	19.1	**-4.2**	23.4	**0.8**	16.6	**-2.2**	13.6	**1.2**	18.1	**6.8**	37.4
VNIIM	**-0.8**	20.1	**-6.6**	26.0	**-5.3**	29.3	**-0.3**	24.2	**-3.3**	22.3	**0.1**	25.2	**5.7**	41.4
METAS	**-1.7**	5.4	**-7.5**	17.3	**-6.2**	22.0	**-1.2**	14.5	**-4.2**	11.1	**-0.8**	16.2	**4.8**	36.6
NIST	**7.2**	16.8	**1.4**	23.5	**2.7**	27.2	**7.7**	21.6	**4.7**	19.4	**8.1**	22.7	**13.7**	39.9
NIM	**-1.0**	24.1	**-6.8**	29.2	**-5.5**	32.2	**-0.5**	27.7	**-3.5**	26.0	**-0.1**	28.6	**5.5**	43.5
BEV	**0.5**	18.4	**-5.3**	24.3	**-4.0**	27.8	**1.0**	22.4	**-2.0**	20.3	**1.4**	23.5	**7.0**	40.3
MIKES	**-0.1**	10.6	**-5.9**	19.1	**-4.6**	23.4	**0.4**	16.6	**-2.6**	13.6	**0.8**	18.1	**6.4**	37.4
INETI	**13.5**	32.1	**7.7**	35.9	**9.0**	38.4	**14.0**	34.6	**11.0**	33.3	**14.4**	35.3	**20.0**	48.2
OMH	**-0.8**	43.1	**-6.6**	46.0	**-5.3**	47.9	**-0.3**	45.0	**-3.3**	44.0	**0.1**	45.6	**5.7**	56.1
JV	**-1.3**	22.3	**-7.1**	27.4	**-5.8**	30.6	**-0.8**	25.7	**-3.8**	24.0	**-0.4**	26.7	**5.2**	42.3
UME	**0.7**	30.3	**-5.1**	34.2	**-3.8**	36.8	**1.2**	32.9	**-1.8**	31.5	**1.6**	33.6	**7.2**	47.0
CMI	**7.3**	50.1	**1.5**	52.6	**2.8**	54.3	**7.8**	51.7	**4.8**	50.9	**8.2**	52.2	**13.8**	61.7

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	PTB		NMi-VSL		INTI		NMIA		NRC		VNIIM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**5.8**	15.8	**6.5**	18.0	**3.0**	25.7	**10.5**	21.5	**5.0**	19.6	**5.5**	19.1	**6.6**	26.0
AREPA	**4.5**	20.9	**5.2**	19.6	**1.7**	29.1	**9.2**	25.4	**3.7**	23.9	**4.2**	23.4	**5.3**	29.3
NPL	**-0.5**	12.7	**0.2**	15.4	**-3.3**	24.0	**4.2**	19.3	**-1.3**	17.2	**-0.8**	16.6	**0.3**	24.2
SP	**2.5**	8.6	**3.2**	12.2	**-0.3**	22.0	**7.2**	16.8	**1.7**	14.4	**2.2**	13.6	**3.3**	22.3
IEN	**-0.9**	14.6	**-0.2**	17.0	**-3.7**	25.0	**3.8**	20.6	**-1.7**	18.6	**-1.2**	18.1	**-0.1**	25.2
CEM	**-6.5**	35.9	**-5.8**	36.9	**-9.3**	41.2	**-1.8**	38.7	**-7.3**	37.7	**-6.8**	37.4	**-5.7**	41.4
PTB	**-0.7**	7.4			**-3.5**	21.6	**4.0**	16.3	**-1.5**	13.7	**-1.0**	12.9	**0.1**	21.9
NMi-VSL	**2.8**	19.8	**3.5**	21.6			**7.5**	24.5	**2.0**	22.9	**2.5**	22.5	**3.6**	28.5
INTI	**-4.7**	13.8	**-4.0**	16.3	**-7.5**	24.5			**-5.5**	18.0	**-5.0**	17.4	**-3.9**	24.8
NMIA	**0.8**	10.7	**1.5**	13.7	**-2.0**	22.9	**5.5**	18.0			**0.5**	15.1	**1.6**	23.2
NRC	**0.3**	9.6	**1.0**	12.9	**-2.5**	22.5	**5.0**	17.4	**-0.5**	15.1			**1.1**	22.7
VNIIM	**-0.8**	20.1	**-0.1**	21.9	**-3.6**	28.5	**3.9**	24.8	**-1.6**	23.2	**-1.1**	22.7		
METAS	**-1.7**	5.4	**-1.0**	10.2	**-4.5**	21.0	**3.0**	15.5	**-2.5**	12.8	**-2.0**	11.9	**-0.9**	21.3
NIST	**7.2**	16.8	**7.9**	18.9	**4.4**	26.4	**11.9**	22.2	**6.4**	20.4	**6.9**	19.9	**8.0**	26.6
NIM	**-1.0**	24.1	**-0.3**	25.6	**-3.8**	31.5	**3.7**	28.1	**-1.8**	26.8	**-1.3**	26.4	**-0.2**	31.7
BEV	**0.5**	18.4	**1.2**	19.8	**-2.3**	27.0	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-0.1**	10.6	**0.6**	12.9	**-2.9**	22.5	**-**	-	**-**	-	**-**	-	**-**	-
INETI	**13.5**	32.1	**14.2**	33.0	**10.7**	37.8	**-**	-	**-**	-	**-**	-	**-**	-
OMH	**-0.8**	43.1	**-0.1**	43.8	**-3.6**	47.5	**-**	-	**-**	-	**-**	-	**-**	-
JV	**-1.3**	22.3	**-0.6**	23.6	**-4.1**	29.9	**-**	-	**-**	-	**-**	-	**-**	-
UME	**0.7**	30.3	**1.4**	31.2	**-2.1**	36.2	**-**	-	**-**	-	**-**	-	**-**	-
CMI	**7.3**	50.1	**8.0**	50.7	**4.5**	53.9	**-**	-	**-**	-	**-**	-	**-**	-

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	METAS		NIST		NIM		BEV		MIKES		INETI	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**5.8**	15.8	**7.5**	17.3	**-1.4**	23.5	**6.8**	29.2	**5.3**	24.3	**5.9**	19.1	**-7.7**	35.9
AREPA	**4.5**	20.9	**6.2**	22.0	**-2.7**	27.2	**5.5**	32.2	**4.0**	27.8	**4.6**	23.4	**-9.0**	38.4
NPL	**-0.5**	12.7	**1.2**	14.5	**-7.7**	21.6	**0.5**	27.7	**-1.0**	22.4	**-0.4**	16.6	**-14.0**	34.6
SP	**2.5**	8.6	**4.2**	11.1	**-4.7**	19.4	**3.5**	26.0	**2.0**	20.3	**2.6**	13.6	**-11.0**	33.3
IEN	**-0.9**	14.6	**0.8**	16.2	**-8.1**	22.7	**0.1**	28.6	**-1.4**	23.5	**-0.8**	18.1	**-14.4**	35.3
CEM	**-6.5**	35.9	**-4.8**	36.6	**-13.7**	39.9	**-5.5**	43.5	**-7.0**	40.3	**-6.4**	37.4	**-20.0**	48.2
PTB	**-0.7**	7.4	**1.0**	10.2	**-7.9**	18.9	**0.3**	25.6	**-1.2**	19.8	**-0.6**	12.9	**-14.2**	33.0
NMi-VSL	**2.8**	19.8	**4.5**	21.0	**-4.4**	26.4	**3.8**	31.5	**2.3**	27.0	**2.9**	22.5	**-10.7**	37.8
INTI	**-4.7**	13.8	**-3.0**	15.5	**-11.9**	22.2	**-3.7**	28.1	-	-	-	-	-	-
NMIA	**0.8**	10.7	**2.5**	12.8	**-6.4**	20.4	**1.8**	26.8	-	-	-	-	-	-
NRC	**0.3**	9.6	**2.0**	11.9	**-6.9**	19.9	**1.3**	26.4	-	-	-	-	-	-
VNIIM	**-0.8**	20.1	**0.9**	21.3	**-8.0**	26.6	**0.2**	31.7	-	-	-	-	-	-
METAS	**-1.7**	5.4			**-8.9**	18.2	**-0.7**	25.1	**-2.2**	19.2	**-1.6**	11.9	**-15.2**	32.6
NIST	**7.2**	16.8	**8.9**	18.2			**8.2**	29.8	-	-	-	-	-	-
NIM	**-1.0**	24.1	**0.7**	25.1	**-8.2**	29.8			-	-	-	-	-	-
BEV	**0.5**	18.4	**2.2**	19.2	**-**	-	**-**	-			**0.6**	20.8	**-13.0**	36.8
MIKES	**-0.1**	10.6	**1.6**	11.9	**-**	-	**-**	-	**-0.6**	20.8			**-13.6**	33.6
INETI	**13.5**	32.1	**15.2**	32.6	**-**	-	**-**	-	**13.0**	36.8	**13.6**	33.6		
OMH	**-0.8**	43.1	**0.9**	43.5	**-**	-	**-**	-	**-1.3**	46.7	**-0.7**	44.2	**-14.3**	53.7
JV	**-1.3**	22.3	**0.4**	23.0	**-**	-	**-**	-	**-1.8**	28.6	**-1.2**	24.3	**-14.8**	38.9
UME	**0.7**	30.3	**2.4**	30.8	**-**	-	**-**	-	**0.2**	35.2	**0.8**	31.8	**-12.8**	44.0
CMI	**7.3**	50.1	**9.0**	50.4	**-**	-	**-**	-	**6.8**	53.2	**7.4**	51.1	**-6.2**	59.4

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 1 kHz

Lab *j* ⇨

Lab *i* ⇩	D_i / (μV/V)	U_i / (μV/V)	**OMH** D_{ij} / (μV/V)	**OMH** U_{ij} / (μV/V)	**JV** D_{ij} / (μV/V)	**JV** U_{ij} / (μV/V)	**UME** D_{ij} / (μV/V)	**UME** U_{ij} / (μV/V)	**CMI** D_{ij} / (μV/V)	**CMI** U_{ij} / (μV/V)
LNE	**5.8**	15.8	**6.6**	46.0	**7.1**	27.4	**5.1**	34.2	**-1.5**	52.6
AREPA	**4.5**	20.9	**5.3**	47.9	**5.8**	30.6	**3.8**	36.8	**-2.8**	54.3
NPL	**-0.5**	12.7	**0.3**	45.0	**0.8**	25.7	**-1.2**	32.9	**-7.8**	51.7
SP	**2.5**	8.6	**3.3**	44.0	**3.8**	24.0	**1.8**	31.5	**-4.8**	50.9
IEN	**-0.9**	14.6	**-0.1**	45.6	**0.4**	26.7	**-1.6**	33.6	**-8.2**	52.2
CEM	**-6.5**	35.9	**-5.7**	56.1	**-5.2**	42.3	**-7.2**	47.0	**-13.8**	61.7
PTB	**-0.7**	7.4	**0.1**	43.8	**0.6**	23.6	**-1.4**	31.2	**-8.0**	50.7
NMi-VSL	**2.8**	19.8	**3.6**	47.5	**4.1**	29.9	**2.1**	36.2	**-4.5**	53.9
INTI	**-4.7**	13.8	-	-	-	-	-	-	-	-
NMIA	**0.8**	10.7	-	-	-	-	-	-	-	-
NRC	**0.3**	9.6	-	-	-	-	-	-	-	-
VNIIM	**-0.8**	20.1	-	-	-	-	-	-	-	-
METAS	**-1.7**	5.4	**-0.9**	43.5	**-0.4**	23.0	**-2.4**	30.8	**-9.0**	50.4
NIST	**7.2**	16.8	-	-	-	-	-	-	-	-
NIM	**-1.0**	24.1	-	-	-	-	-	-	-	-
BEV	**0.5**	18.4	**1.3**	46.7	**1.8**	28.6	**-0.2**	35.2	**-6.8**	53.2
MIKES	**-0.1**	10.6	**0.7**	44.2	**1.2**	24.3	**-0.8**	31.8	**-7.4**	51.1
INETI	**13.5**	32.1	**14.3**	53.7	**14.8**	38.9	**12.8**	44.0	**6.2**	59.4
OMH	**-0.8**	43.1			**0.5**	48.4	**-1.5**	52.5	**-8.1**	66.0
JV	**-1.3**	22.3	**-0.5**	48.4			**-2.0**	37.4	**-8.6**	54.7
UME	**0.7**	30.3	**1.5**	52.5	**2.0**	37.4			**-6.6**	58.4
CMI	**7.3**	50.1	**8.1**	66.0	**8.6**	54.7	**6.6**	58.4		

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9 and APMP.EM-K9

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

x_i **adjusted value of the measurement reported by laboratory *i* (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)**

$U_{\text{Lab } i}$ **expanded uncertainty of x_i at a 95 % level of confidence**

Lab *i*	x_i / (μV/V)	$U_{\text{Lab } i}$ / (μV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	-1.0	35.0	Feb 2000	Yes	Yes
BEV	0.9	20.1	Apr 2000	No	Yes
MIKES	-9.1	10.0	May 2000	No	Yes
INETI	22.9	40.0	Jun 2000	No	Yes
AREPA	1.9	21.1	Jul 2000	Yes	Yes
NPL	-5.1	13.1	Aug 2000	Yes	Yes
SP	0.9	10.1	Sep 2000	Yes	Yes
IEN	-4.9	15.3	Oct 2000	Yes	Yes
CEM	-2.1	40.0	Nov 2000	Yes	Yes
PTB	-3.8	8.0	Jan 2001	Yes	Yes
NMi-VSL	-3.1	20.0	May 2001	Yes	Yes
OMH	1.0	52.0	Oct 2001	No	Yes
JV	-2.8	24.1	Mar 2002	No	Yes
UME	1.2	30.1	Apr 2002	No	Yes
INTI	-4.6	16.1	Jul 2000	Yes	No
NMIA	0.4	14.1	Nov 2000	Yes	No
NRC	1.4	10.1	Mar 2001	Yes	No
VNIIM	-3.0	20.7	May 2001	Yes	No
METAS	-4.0	7.2	Aug 2001	Yes	Yes
NIST	1.6	17.1	Jan 2002	Yes	No
NIM	-1.7	24.5	May 2002	Yes	No
CMI	0.4	50.0	Dec 2002	No	Yes

Key comparison SIM.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

$\delta_{\text{Lab } i\text{-SIM}}$: **result of measurement carried out by laboratory *i* participant in SIM.EM-K9**

$U_{\text{Lab } i\text{-SIM}}$: **expanded uncertainty (*k* = 2) of $\delta_{\text{Lab } i\text{-SIM}}$**

$u_{\text{Lab } i\text{-SIM}}$: **standard uncertainty (*k* = 1) of $\delta_{\text{Lab } i\text{-SIM}}$**

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$U_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
NIST	4	11.7	Jan to Feb 04
INTI	3.2	20	04 Mar to 16 Apr 04
INMETRO	0	18	28 Jun to 28 Jul 04
CENAM	4.2	15	07 to 24 Aug 04
NRC	2.9	10	Sep to Oct 04

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$u_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
UTE	10	12	18 May to 22 Jun 04

Key comparison APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 3 of the Final Report. They were taken between 2000 and 2004.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9 and APMP.EM-K9

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R =-2.3 µV/V, U_R = 3.4 µV/V

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories *i* and *j* is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.

The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking SIM.EM-K9 to CCEM-K9
INTI, NRC and NIST provide the link between key comparisons CCEM-K9 and SIM.EM-K9.
The linkage process is described in section 11 of the SIM.EM-K9 Final Report.
The degree of equivalence of the laboratory *i* participant in SIM.EM-K9 with respect to the key comparison reference value is given by a pair of terms both expressed in µV/V:
D_i and U_i, its expanded uncertainty (k = 2).
The computation of the degrees of equivalence is explained in the SIM.EM-K9 Final Report.
The degree of equivalence between two laboratories *i* and *j* is not computed for the laboratories participant in key comparison SIM.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes it possible to extend the graph of equivalence to participants in APMP.EM-K9 only.
Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 18 of the Final Report. They are not reported here.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9 and APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

Degrees of equivalence

Lab *i*

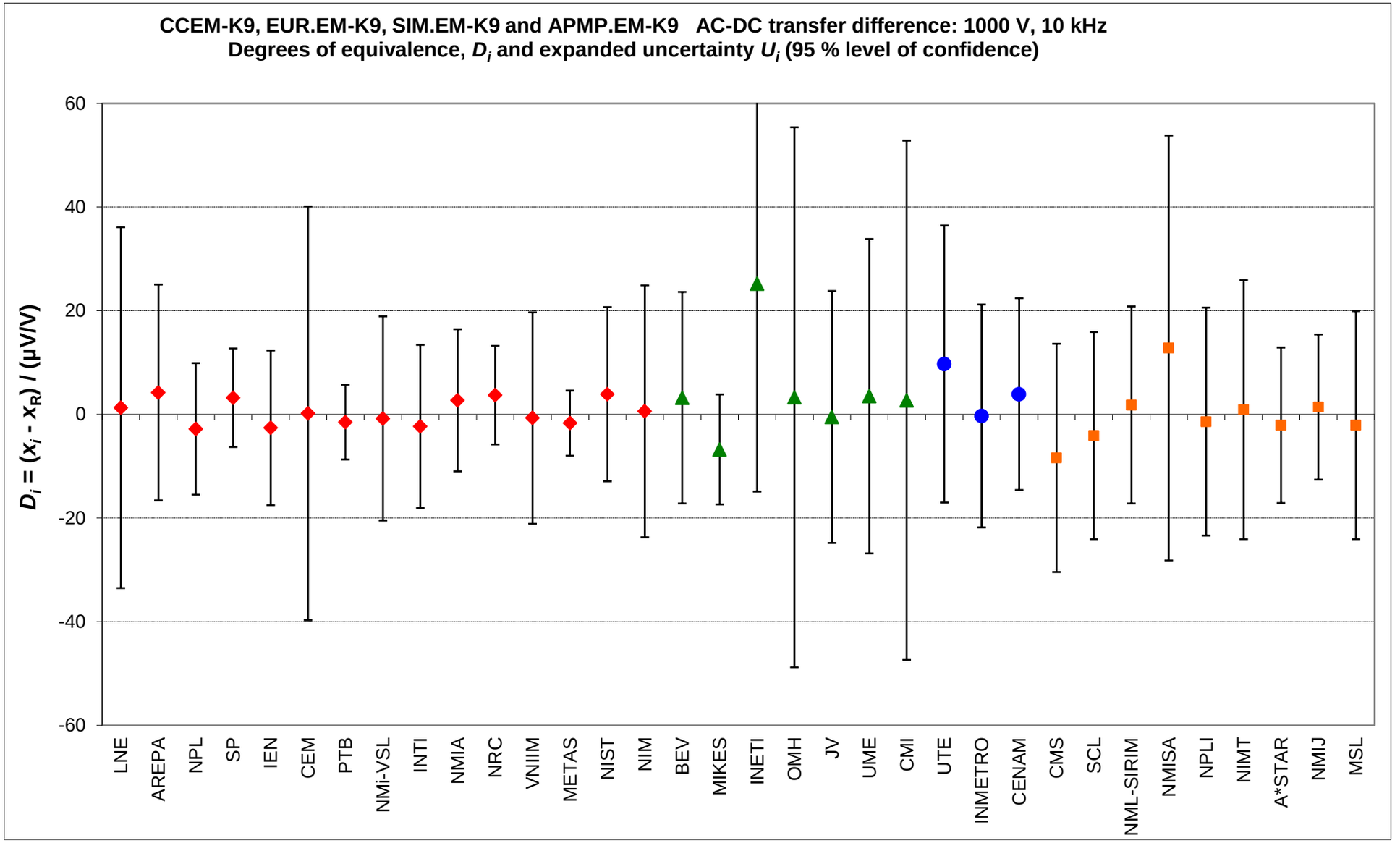
	D_i / (μV/V)	U_i / (μV/V)
LNE	1.3	34.8
AREPA	4.2	20.8
NPL	-2.8	12.7
SP	3.2	9.5
IEN	-2.6	14.9
CEM	0.2	39.9
PTB	-1.5	7.2
NMi-VSL	-0.8	19.7
INTI	-2.3	15.7
NMIA	2.7	13.7
NRC	3.7	9.5
VNIIM	-0.7	20.4
METAS	-1.7	6.3
NIST	3.9	16.8
NIM	0.6	24.3

	D_i / (μV/V)	U_i / (μV/V)
BEV	3.2	20.4
MIKES	-6.8	10.6
INETI	25.2	40.1
OMH	3.3	52.1
JV	-0.5	24.3
UME	3.5	30.3
CMI	2.7	50.1

	D_i / (μV/V)	U_i / (μV/V)
UTE	9.7	26.7
INMETRO	-0.3	21.5
CENAM	3.9	18.5

	D_i / (μV/V)	U_i / (μV/V)
CMS	-8.4	22
SCL	-4.1	20
NML-SIRIM	1.8	19
NMISA	12.8	41
NPLI	-1.4	22
NIMT	0.9	25
A*STAR	-2.1	15
NMIJ	1.4	14
MSL	-2.1	22

Red: participants in CCEM-K9
Green: participants in EUROMET.EM-K9 only
Blue: participants in SIM.EM-K9 only
Orange: participants in APMP.EM-K9



Red diamonds: participants in CCEM-K9 ; **Green triangles:** participants in EUROMET.EM-K9
Blue circles: participants in SIM.EM-K9 only ; **Orange squares**: participants in APMP.EM-K9

Key comparisons CCEM-K9 and EUROMET.EM-K9

Matrix of Equivalence

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

Pair-wise degrees of equivalence involving participants in SIM.EM-K9 and APMP.EM-K9 are not given here.

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	LNE		AREPA		NPL		SP		IEN		CEM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**1.3**	34.8			**-2.9**	40.9	**4.1**	37.4	**-1.9**	36.5	**3.9**	38.2	**1.1**	53.2
AREPA	**4.2**	20.8	**2.9**	40.9			**7.0**	24.9	**1.0**	23.4	**6.8**	26.1	**4.0**	45.3
NPL	**-2.8**	12.7	**-4.1**	37.4	**-7.0**	24.9			**-6.0**	16.6	**-0.2**	20.2	**-3.0**	42.1
SP	**3.2**	9.5	**1.9**	36.5	**-1.0**	23.4	**6.0**	16.6			**5.8**	18.4	**3.0**	41.3
IEN	**-2.6**	14.9	**-3.9**	38.2	**-6.8**	26.1	**0.2**	20.2	**-5.8**	18.4			**-2.8**	42.9
CEM	**0.2**	39.9	**-1.1**	53.2	**-4.0**	45.3	**3.0**	42.1	**-3.0**	41.3	**2.8**	42.9		
PTB	**-1.5**	7.2	**-2.8**	36.0	**-5.7**	19.6	**1.3**	15.4	**-4.7**	12.9	**1.1**	17.3	**-1.7**	40.8
NMi-VSL	**-0.8**	19.7	**-2.1**	40.4	**-5.0**	29.1	**2.0**	24.0	**-4.0**	22.5	**1.8**	25.2	**-1.0**	44.8
INTI	**-2.3**	15.7	**-3.6**	38.6	**-6.5**	26.6	**0.5**	20.8	**-5.5**	19.1	**0.3**	22.3	**-2.5**	43.2
NMIA	**2.7**	13.7	**1.4**	37.8	**-1.5**	25.4	**5.5**	19.3	**-0.5**	17.4	**5.3**	20.9	**2.5**	42.5
NRC	**3.7**	9.5	**2.4**	36.5	**-0.5**	23.4	**6.5**	16.6	**0.5**	14.3	**6.3**	18.4	**3.5**	41.3
VNIIM	**-0.7**	20.4	**-2.0**	40.7	**-4.9**	29.6	**2.1**	24.5	**-3.9**	23.1	**1.9**	25.8	**-0.9**	45.1
METAS	**-1.7**	6.3	**-3.0**	35.8	**-5.9**	22.3	**1.1**	15.0	**-4.9**	12.5	**0.9**	17.0	**-1.9**	40.7
NIST	**3.9**	16.8	**2.6**	39.0	**-0.3**	27.2	**6.7**	21.6	**0.7**	19.9	**6.5**	23.0	**3.7**	43.6
NIM	**0.6**	24.3	**-0.7**	42.8	**-3.6**	32.4	**3.4**	27.8	**-2.6**	26.6	**3.2**	28.9	**0.4**	47.0
BEV	**3.2**	20.4	**1.9**	40.4	**-1.0**	29.2	**6.0**	24.0	**0.0**	22.5	**5.8**	25.3	**3.0**	44.8
MIKES	**-6.8**	10.6	**-8.1**	36.5	**-11.0**	23.4	**-4.0**	16.5	**-10.0**	14.3	**-4.2**	18.3	**-7.0**	41.3
INETI	**25.2**	40.1	**23.9**	53.2	**21.0**	45.3	**28.0**	42.1	**22.0**	41.3	**27.8**	42.9	**25.0**	56.6
OMH	**3.3**	52.1	**2.0**	62.7	**-0.9**	56.2	**6.1**	53.7	**0.1**	53.0	**5.9**	54.3	**3.1**	65.7
JV	**-0.5**	24.3	**-1.8**	42.5	**-4.7**	32.1	**2.3**	27.5	**-3.7**	26.2	**2.1**	28.6	**-0.7**	46.7
UME	**3.5**	30.3	**2.2**	46.2	**-0.7**	36.8	**6.3**	32.9	**0.3**	31.8	**6.1**	33.8	**3.3**	50.1
CMI	**2.7**	50.1	**1.4**	61.1	**-1.5**	54.3	**5.5**	51.7	**-0.5**	51.1	**5.3**	52.3	**2.5**	64.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	PTB		NMi-VSL		INTI		NMIA		NRC		VNIIM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**1.3**	34.8	**2.8**	36.0	**2.1**	40.4	**3.6**	38.6	**-1.4**	37.8	**-2.4**	36.5	**2.0**	40.7
AREPA	**4.2**	20.8	**5.7**	19.6	**5.0**	29.1	**6.5**	26.6	**1.5**	25.4	**0.5**	23.4	**4.9**	29.6
NPL	**-2.8**	12.7	**-1.3**	15.4	**-2.0**	24.0	**-0.5**	20.8	**-5.5**	19.3	**-6.5**	16.6	**-2.1**	24.5
SP	**3.2**	9.5	**4.7**	12.9	**4.0**	22.5	**5.5**	19.1	**0.5**	17.4	**-0.5**	14.3	**3.9**	23.1
IEN	**-2.6**	14.9	**-1.1**	17.3	**-1.8**	25.2	**-0.3**	22.3	**-5.3**	20.9	**-6.3**	18.4	**-1.9**	25.8
CEM	**0.2**	39.9	**1.7**	40.8	**1.0**	44.8	**2.5**	43.2	**-2.5**	42.5	**-3.5**	41.3	**0.9**	45.1
PTB	**-1.5**	7.2			**-0.7**	21.6	**0.8**	18.0	**-4.2**	16.3	**-5.2**	12.9	**-0.8**	22.2
NMi-VSL	**-0.8**	19.7	**0.7**	21.6			**1.5**	25.7	**-3.5**	24.5	**-4.5**	22.5	**-0.1**	28.8
INTI	**-2.3**	15.7	**-0.8**	18.0	**-1.5**	25.7			**-5.0**	21.5	**-6.0**	19.1	**-1.6**	26.3
NMIA	**2.7**	13.7	**4.2**	16.3	**3.5**	24.5	**5.0**	21.5			**-1.0**	17.4	**3.4**	25.1
NRC	**3.7**	9.5	**5.2**	12.9	**4.5**	22.5	**6.0**	19.1	**1.0**	17.4			**4.4**	23.1
VNIIM	**-0.7**	20.4	**0.8**	22.2	**0.1**	28.8	**1.6**	26.3	**-3.4**	25.1	**-4.4**	23.1		
METAS	**-1.7**	6.3	**-0.2**	10.8	**-0.9**	21.3	**0.6**	17.7	**-4.4**	15.9	**-5.4**	12.5	**-1.0**	22.0
NIST	**3.9**	16.8	**5.4**	18.9	**4.7**	26.4	**6.2**	23.5	**1.2**	22.2	**0.2**	19.9	**4.6**	26.9
NIM	**0.6**	24.3	**2.1**	25.8	**1.4**	31.7	**2.9**	29.4	**-2.1**	28.3	**-3.1**	26.6	**1.3**	32.1
BEV	**3.2**	20.4	**4.7**	21.7	**4.0**	28.4	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-6.8**	10.6	**-5.3**	12.9	**-6.0**	22.4	**-**	-	**-**	-	**-**	-	**-**	-
INETI	**25.2**	40.1	**26.7**	40.8	**26.0**	44.8	**-**	-	**-**	-	**-**	-	**-**	-
OMH	**3.3**	52.1	**4.8**	52.7	**4.1**	55.8	**-**	-	**-**	-	**-**	-	**-**	-
JV	**-0.5**	24.3	**1.0**	25.4	**0.3**	31.4	**-**	-	**-**	-	**-**	-	**-**	-
UME	**3.5**	30.3	**5.0**	31.2	**4.3**	36.2	**-**	-	**-**	-	**-**	-	**-**	-
CMI	**2.7**	50.1	**4.2**	50.7	**3.5**	53.9	**-**	-	**-**	-	**-**	-	**-**	-

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	METAS		NIST		NIM		BEV		MIKES		INETI	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**1.3**	34.8	**3.0**	35.8	**-2.6**	39.0	**0.7**	42.8	**-1.9**	40.4	**8.1**	36.5	**-23.9**	53.2
AREPA	**4.2**	20.8	**5.9**	22.3	**0.3**	27.2	**3.6**	32.4	**1.0**	29.2	**11.0**	23.4	**-21.0**	45.3
NPL	**-2.8**	12.7	**-1.1**	15.0	**-6.7**	21.6	**-3.4**	27.8	**-6.0**	24.0	**4.0**	16.5	**-28.0**	42.1
SP	**3.2**	9.5	**4.9**	12.5	**-0.7**	19.9	**2.6**	26.6	**0.0**	22.5	**10.0**	14.3	**-22.0**	41.3
IEN	**-2.6**	14.9	**-0.9**	17.0	**-6.5**	23.0	**-3.2**	28.9	**-5.8**	25.3	**4.2**	18.3	**-27.8**	42.9
CEM	**0.2**	39.9	**1.9**	40.7	**-3.7**	43.6	**-0.4**	47.0	**-3.0**	44.8	**7.0**	41.3	**-25.0**	56.6
PTB	**-1.5**	7.2	**0.2**	10.8	**-5.4**	18.9	**-2.1**	25.8	**-4.7**	21.7	**5.3**	12.9	**-26.7**	40.8
NMi-VSL	**-0.8**	19.7	**0.9**	21.3	**-4.7**	26.4	**-1.4**	31.7	**-4.0**	28.4	**6.0**	22.4	**-26.0**	44.8
INTI	**-2.3**	15.7	**-0.6**	17.7	**-6.2**	23.5	**-2.9**	29.4	-	-	-	-	-	-
NMIA	**2.7**	13.7	**4.4**	15.9	**-1.2**	22.2	**2.1**	28.3	-	-	-	-	-	-
NRC	**3.7**	9.5	**5.4**	12.5	**-0.2**	19.9	**3.1**	26.6	-	-	-	-	-	-
VNIIM	**-0.7**	20.4	**1.0**	22.0	**-4.6**	26.9	**-1.3**	32.1	-	-	-	-	-	-
METAS	**-1.7**	6.3			**-5.6**	18.6	**-2.3**	25.6	**-4.9**	21.4	**5.1**	12.4	**-26.9**	40.7
NIST	**3.9**	16.8	**5.6**	18.6			**3.3**	29.9	-	-	-	-	-	-
NIM	**0.6**	24.3	**2.3**	25.6	**-3.3**	29.9			-	-	-	-	-	-
BEV	**3.2**	20.4	**4.9**	21.4	**-**	-	**-**	-			**10.0**	22.5	**-22.0**	44.8
MIKES	**-6.8**	10.6	**-5.1**	12.4	**-**	-	**-**	-	**-10.0**	22.5			**-32.0**	41.3
INETI	**25.2**	40.1	**26.9**	40.7	**-**	-	**-**	-	**22.0**	44.8	**32.0**	41.3		
OMH	**3.3**	52.1	**5.0**	52.5	**-**	-	**-**	-	**0.1**	55.8	**10.1**	53.0	**-21.9**	65.7
JV	**-0.5**	24.3	**1.2**	25.2	**-**	-	**-**	-	**-3.7**	31.4	**6.3**	26.1	**-25.7**	46.7
UME	**3.5**	30.3	**5.2**	31.0	**-**	-	**-**	-	**0.3**	36.2	**10.3**	31.8	**-21.7**	50.1
CMI	**2.7**	50.1	**4.4**	50.6	**-**	-	**-**	-	**-0.5**	53.9	**9.5**	51.0	**-22.5**	64.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 10 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	OMH D_{ij} / (μV/V)	OMH U_{ij} / (μV/V)	JV D_{ij} / (μV/V)	JV U_{ij} / (μV/V)	UME D_{ij} / (μV/V)	UME U_{ij} / (μV/V)	CMI D_{ij} / (μV/V)	CMI U_{ij} / (μV/V)
LNE	**1.3**	34.8	**-2.0**	62.7	**1.8**	42.5	**-2.2**	46.2	**-1.4**	61.1
AREPA	**4.2**	20.8	**0.9**	56.2	**4.7**	32.1	**0.7**	36.8	**1.5**	54.3
NPL	**-2.8**	12.7	**-6.1**	53.7	**-2.3**	27.5	**-6.3**	32.9	**-5.5**	51.7
SP	**3.2**	9.5	**-0.1**	53.0	**3.7**	26.2	**-0.3**	31.8	**0.5**	51.1
IEN	**-2.6**	14.9	**-5.9**	54.3	**-2.1**	28.6	**-6.1**	33.8	**-5.3**	52.3
CEM	**0.2**	39.9	**-3.1**	65.7	**0.7**	46.7	**-3.3**	50.1	**-2.5**	64.1
PTB	**-1.5**	7.2	**-4.8**	52.7	**-1.0**	25.4	**-5.0**	31.2	**-4.2**	50.7
NMi-VSL	**-0.8**	19.7	**-4.1**	55.8	**-0.3**	31.4	**-4.3**	36.2	**-3.5**	53.9
INTI	**-2.3**	15.7	-	-	-	-	-	-	-	-
NMIA	**2.7**	13.7	-	-	-	-	-	-	-	-
NRC	**3.7**	9.5	-	-	-	-	-	-	-	-
VNIIM	**-0.7**	20.4	-	-	-	-	-	-	-	-
METAS	**-1.7**	6.3	**-5.0**	52.5	**-1.2**	25.2	**-5.2**	31.0	**-4.4**	50.6
NIST	**3.9**	16.8	-	-	-	-	-	-	-	-
NIM	**0.6**	24.3	-	-	-	-	-	-	-	-
BEV	**3.2**	20.4	**-0.1**	55.8	**3.7**	31.4	**-0.3**	36.2	**0.5**	53.9
MIKES	**-6.8**	10.6	**-10.1**	53.0	**-6.3**	26.1	**-10.3**	31.8	**-9.5**	51.0
INETI	**25.2**	40.1	**21.9**	65.7	**25.7**	46.7	**21.7**	50.1	**22.5**	64.1
OMH	**3.3**	52.1			**3.8**	57.4	**-0.2**	60.1	**0.6**	72.2
JV	**-0.5**	24.3	**-3.8**	57.4			**-4.0**	38.6	**-3.2**	55.6
UME	**3.5**	30.3	**0.2**	60.1	**4.0**	38.6			**0.8**	58.4
CMI	**2.7**	50.1	**-0.6**	72.2	**3.2**	55.6	**-0.8**	58.4		

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

x_i **adjusted value of the measurement reported by laboratory *i* (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)**

$U_{\text{Lab } i}$ **expanded uncertainty of x_i at a 95 % level of confidence**

Lab *i*	x_i / (μV/V)	$U_{\text{Lab } i}$ / (μV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	-8.0	35.0	Feb 2000	Yes	Yes
BEV	0.1	24.1	Apr 2000	No	Yes
MIKES	-16.8	10.9	May 2000	No	Yes
INETI	29.1	52.0	Jun 2000	No	Yes
AREPA	0.1	26.0	Jul 2000	Yes	Yes
NPL	-10.9	23.1	Aug 2000	Yes	Yes
SP	-2.9	11.1	Sep 2000	Yes	Yes
IEN	-11.8	25.1	Oct 2000	Yes	Yes
CEM	-6.9	44.0	Nov 2000	Yes	Yes
PTB	-7.2	8.0	Jan 2001	Yes	Yes
NMi-VSL	-10.1	25.0	May 2001	Yes	Yes
OMH	-20.6	80.0	Oct 2001	No	Yes
JV	-7.6	28.0	Mar 2002	No	Yes
UME	-0.6	40.0	Apr 2002	No	Yes
INTI	-10.2	20.0	Jul 2000	Yes	No
NMIA	-2.2	16.1	Nov 2000	Yes	No
NRC	0.8	10.1	Mar 2001	Yes	No
VNIIM	-10.1	32.4	May 2001	Yes	No
METAS	-6.8	7.1	Aug 2001	Yes	Yes
NIST	0.5	16.3	Jan 2002	Yes	No
NIM	-3.8	29.2	May 2002	Yes	No
CMI	-1.2	62.0	Dec 2002	No	Yes

Key comparison SIM.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

$\delta_{\text{Lab } i\text{-SIM}}$: **result of measurement carried out by laboratory *i* participant in SIM.EM-K9**

$U_{\text{Lab } i\text{-SIM}}$: **expanded uncertainty (*k* = 2) of $\delta_{\text{Lab } i\text{-SIM}}$**

$u_{\text{Lab } i\text{-SIM}}$: **standard uncertainty (*k* = 1) of $\delta_{\text{Lab } i\text{-SIM}}$**

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$U_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
NIST	1	14.1	Jan to Feb 04
INTI	6.1	33	04 Mar to 16 Apr 04
INMETRO	-2	18	28 Jun to 28 Jul 04
CENAM	3.9	17	07 to 24 Aug 04
NRC	-2.2	10	Sep to Oct 04

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$u_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
UTE	11	11	18 May to 22 Jun 04

Key comparison APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 3 of the Final Report. They were taken between 2000 and 2004.

Key comparison SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

Measurement results of the participants in key comparison SIM.EM-K9.1 are given in Table IV of the Final Report. They were taken in 2012.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R =-5.2 µV/V, U_R = 3.7 µV/V

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories *i* and *j* is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the CCEM-K9 Final Report and EUROMET.EM-K9 Final

The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking SIM.EM-K9 to CCEM-K9

INTI, NRC and NIST provide the link between key comparisons CCEM-K9 and SIM.EM-K9.
The linkage process is described in section 11 of the SIM.EM-K9 Final Report.
The degree of equivalence of the laboratory *i* participant in SIM.EM-K9 with respect to the key comparison reference value is given by a pair of terms both expressed in µV/V:
D_i and U_i, its expanded uncertainty (k = 2).
The computation of the degrees of equivalence is explained in the SIM.EM-K9 Final Report.
The degree of equivalence between two laboratories *i* and *j* is not computed for the laboratories participant in key comparison SIM.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes it possible to extend the graph of equivalence to participants in APMP.EM-K9 only.
Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 19 of the Final Report. They are not reported here.

Linking SIM.EM-K9.1 to CCEM-K9

The linkage process is based on the results of the common participant, the LNE, and is detailed in Section 9 of the SIM.EM-K9.1 Final Report. This makes it possible to extend the graph of equivalence to INMETRO.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

Degrees of equivalence

Lab *i*

	D_i / (μV/V)	U_i / (μV/V)
LNE	-2.8	34.8
AREPA	5.3	25.7
NPL	-5.7	22.8
SP	2.3	10.5
IEN	-6.6	24.8
CEM	-1.7	43.8
PTB	-2.0	7.1
NMi-VSL	-4.9	24.7
INTI	-5.0	19.7
NMIA	3.0	15.7
NRC	6.0	9.4
VNIIM	-4.9	32.2
METAS	-1.6	6.1
NIST	5.7	15.9
NIM	1.4	29.0

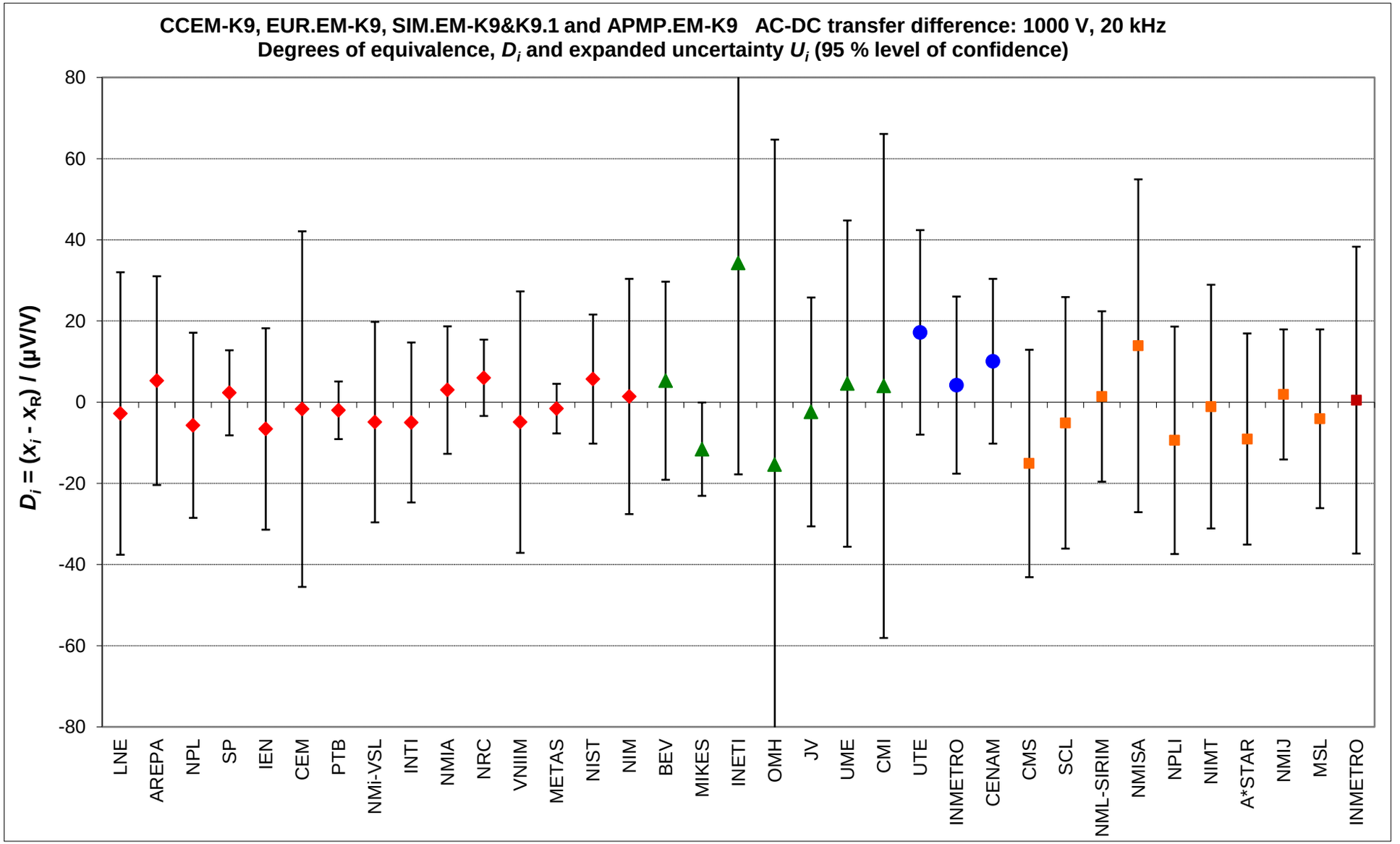
	D_i / (μV/V)	U_i / (μV/V)
BEV	5.3	24.4
MIKES	-11.6	11.5
INETI	34.3	52.1
OMH	-15.4	80.1
JV	-2.4	28.2
UME	4.6	40.2
CMI	4.0	62.1

	D_i / (μV/V)	U_i / (μV/V)
UTE	17.2	25.2
INMETRO	4.2	21.8
CENAM	10.1	20.3

	D_i / (μV/V)	U_i / (μV/V)
CMS	-15.1	28
SCL	-5.1	31
NML-SIRIM	1.4	21
NMISA	13.9	41
NPLI	-9.4	28
NIMT	-1.1	30
A*STAR	-9.1	26
NMIJ	1.9	16
MSL	-4.1	22

	D_i / (μV/V)	U_i / (μV/V)
INMETRO	0.5	37.8

Red: participants in CCEM-K9
Green: participants in EUROMET.EM-K9 only
Blue: participants in SIM.EM-K9 only
Orange: participants in APMP.EM-K9
Brown: participant in SIM.EM-K9.1 only



Red diamonds: participants in CCEM-K9 ; **Green triangles:** participants in EUROMET.EM-K9
Blue circles: participants in SIM.EM-K9 only ; **Orange squares**: participants in APMP.EM-K9 ; **Brown square**: participant in SIM.EM-K9.1 only

Key comparisons CCEM-K9 and EUROMET.EM-K9

Matrix of Equivalence

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

Pair-wise degrees of equivalence involving participants in SIM.EM-K9 and APMP.EM-K9 are not given here.

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	LNE		AREPA		NPL		SP		IEN		CEM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-2.8**	34.8			**-8.1**	43.7	**2.9**	42.0	**-5.1**	36.8	**3.8**	43.1	**-1.1**	56.3
AREPA	**5.3**	25.7	**8.1**	43.7			**11.0**	34.8	**3.0**	28.3	**11.9**	36.2	**7.0**	51.2
NPL	**-5.7**	22.8	**-2.9**	42.0	**-11.0**	34.8			**-8.0**	25.7	**0.9**	34.2	**-4.0**	49.7
SP	**2.3**	10.5	**5.1**	36.8	**-3.0**	28.3	**8.0**	25.7			**8.9**	27.5	**4.0**	45.4
IEN	**-6.6**	24.8	**-3.8**	43.1	**-11.9**	36.2	**-0.9**	34.2	**-8.9**	27.5			**-4.9**	50.7
CEM	**-1.7**	43.8	**1.1**	56.3	**-7.0**	51.2	**4.0**	49.7	**-4.0**	45.4	**4.9**	50.7		
PTB	**-2.0**	7.1	**0.8**	36.0	**-7.3**	24.8	**3.7**	24.5	**-4.3**	13.7	**4.6**	26.4	**-0.3**	44.8
NMi-VSL	**-4.9**	24.7	**-2.1**	43.1	**-10.2**	36.1	**0.8**	34.1	**-7.2**	27.4	**1.7**	35.5	**-3.2**	50.7
INTI	**-5.0**	19.7	**-2.2**	40.4	**-10.3**	32.9	**0.7**	30.6	**-7.3**	22.9	**1.6**	32.1	**-3.3**	48.4
NMIA	**3.0**	15.7	**5.8**	38.6	**-2.3**	30.6	**8.7**	28.2	**0.7**	19.6	**9.6**	29.9	**4.7**	46.9
NRC	**6.0**	9.4	**8.8**	36.5	**0.7**	27.9	**11.7**	25.3	**3.7**	15.1	**12.6**	27.1	**7.7**	45.2
VNIIM	**-4.9**	32.2	**-2.1**	47.7	**-10.2**	41.6	**0.8**	39.8	**-7.2**	34.3	**1.7**	41.0	**-3.2**	54.7
METAS	**-1.6**	6.1	**1.2**	35.8	**-6.9**	27.0	**4.1**	24.2	**-3.9**	13.2	**5.0**	26.1	**0.1**	44.6
NIST	**5.7**	15.9	**8.5**	38.7	**0.4**	30.7	**11.4**	28.3	**3.4**	19.8	**12.3**	30.0	**7.4**	47.0
NIM	**1.4**	29.0	**4.2**	45.6	**-3.9**	39.1	**7.1**	37.3	**-0.9**	31.3	**8.0**	38.6	**3.1**	52.9
BEV	**5.3**	24.4	**8.1**	42.5	**0.0**	35.5	**11.0**	33.4	**3.0**	26.6	**11.9**	34.8	**7.0**	50.2
MIKES	**-11.6**	11.5	**-8.8**	36.7	**-16.9**	28.2	**-5.9**	25.6	**-13.9**	15.6	**-5.0**	27.4	**-9.9**	45.4
INETI	**34.3**	52.1	**37.1**	62.7	**29.0**	58.2	**40.0**	56.9	**32.0**	53.2	**40.9**	57.8	**36.0**	68.2
OMH	**-15.4**	80.1	**-12.6**	87.4	**-20.7**	84.2	**-9.7**	83.3	**-17.7**	80.8	**-8.8**	83.9	**-13.7**	91.4
JV	**-2.4**	28.2	**0.4**	44.9	**-7.7**	38.3	**3.3**	36.3	**-4.7**	30.2	**4.2**	37.7	**-0.7**	52.2
UME	**4.6**	40.2	**7.4**	53.2	**-0.7**	47.8	**10.3**	46.2	**2.3**	41.6	**11.2**	47.3	**6.3**	59.5
CMI	**4.0**	62.1	**6.8**	71.2	**-1.3**	67.3	**9.7**	66.2	**1.7**	63.0	**10.6**	66.9	**5.7**	76.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	PTB		NMi-VSL		INTI		NMIA		NRC		VNIIM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-2.8**	34.8	**-0.8**	36.0	**2.1**	43.1	**2.2**	40.4	**-5.8**	38.6	**-8.8**	36.5	**2.1**	47.7
AREPA	**5.3**	25.7	**7.3**	24.8	**10.2**	36.1	**10.3**	32.9	**2.3**	30.6	**-0.7**	27.9	**10.2**	41.6
NPL	**-5.7**	22.8	**-3.7**	24.5	**-0.8**	34.1	**-0.7**	30.6	**-8.7**	28.2	**-11.7**	25.3	**-0.8**	39.8
SP	**2.3**	10.5	**4.3**	13.7	**7.2**	27.4	**7.3**	22.9	**-0.7**	19.6	**-3.7**	15.1	**7.2**	34.3
IEN	**-6.6**	24.8	**-4.6**	26.4	**-1.7**	35.5	**-1.6**	32.1	**-9.6**	29.9	**-12.6**	27.1	**-1.7**	41.0
CEM	**-1.7**	43.8	**0.3**	44.8	**3.2**	50.7	**3.3**	48.4	**-4.7**	46.9	**-7.7**	45.2	**3.2**	54.7
PTB	**-2.0**	7.1			**2.9**	26.3	**3.0**	21.6	**-5.0**	18.0	**-8.0**	12.9	**2.9**	33.4
NMi-VSL	**-4.9**	24.7	**-2.9**	26.3			**0.1**	32.1	**-7.9**	29.8	**-10.9**	27.0	**0.0**	41.0
INTI	**-5.0**	19.7	**-3.0**	21.6	**-0.1**	32.1			**-8.0**	25.7	**-11.0**	22.5	**-0.1**	38.1
NMIA	**3.0**	15.7	**5.0**	18.0	**7.9**	29.8	**8.0**	25.7			**-3.0**	19.1	**7.9**	36.2
NRC	**6.0**	9.4	**8.0**	12.9	**10.9**	27.0	**11.0**	22.5	**3.0**	19.1			**10.9**	34.0
VNIIM	**-4.9**	32.2	**-2.9**	33.4	**0.0**	41.0	**0.1**	38.1	**-7.9**	36.2	**-10.9**	34.0		
METAS	**-1.6**	6.1	**0.4**	10.7	**3.3**	26.0	**3.4**	21.3	**-4.6**	17.6	**-7.6**	12.4	**3.3**	33.2
NIST	**5.7**	15.9	**7.7**	18.2	**10.6**	29.9	**10.7**	25.9	**2.7**	23.0	**-0.3**	19.2	**10.6**	36.3
NIM	**1.4**	29.0	**3.4**	30.3	**6.3**	38.5	**6.4**	35.4	**-1.6**	33.4	**-4.6**	30.9	**6.3**	43.7
BEV	**5.3**	24.4	**7.3**	25.4	**10.2**	34.8	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-11.6**	11.5	**-9.6**	13.6	**-6.7**	27.3	**-**	-	**-**	-	**-**	-	**-**	-
INETI	**34.3**	52.1	**36.3**	52.7	**39.2**	57.7	**-**	-	**-**	-	**-**	-	**-**	-
OMH	**-15.4**	80.1	**-13.4**	80.4	**-10.5**	83.9	**-**	-	**-**	-	**-**	-	**-**	-
JV	**-2.4**	28.2	**-0.4**	29.2	**2.5**	37.6	**-**	-	**-**	-	**-**	-	**-**	-
UME	**4.6**	40.2	**6.6**	40.8	**9.5**	47.2	**-**	-	**-**	-	**-**	-	**-**	-
CMI	**4.0**	62.1	**6.0**	62.6	**8.9**	66.9	**-**	-	**-**	-	**-**	-	**-**	-

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	METAS D_{ij} / (μV/V)	METAS U_{ij} / (μV/V)	NIST D_{ij} / (μV/V)	NIST U_{ij} / (μV/V)	NIM D_{ij} / (μV/V)	NIM U_{ij} / (μV/V)	BEV D_{ij} / (μV/V)	BEV U_{ij} / (μV/V)	MIKES D_{ij} / (μV/V)	MIKES U_{ij} / (μV/V)	INETI D_{ij} / (μV/V)	INETI U_{ij} / (μV/V)
LNE	**-2.8**	34.8	**-1.2**	35.8	**-8.5**	38.7	**-4.2**	45.6	**-8.1**	42.5	**8.8**	36.7	**-37.1**	62.7
AREPA	**5.3**	25.7	**6.9**	27.0	**-0.4**	30.7	**3.9**	39.1	**0.0**	35.5	**16.9**	28.2	**-29.0**	58.2
NPL	**-5.7**	22.8	**-4.1**	24.2	**-11.4**	28.3	**-7.1**	37.3	**-11.0**	33.4	**5.9**	25.6	**-40.0**	56.9
SP	**2.3**	10.5	**3.9**	13.2	**-3.4**	19.8	**0.9**	31.3	**-3.0**	26.6	**13.9**	15.6	**-32.0**	53.2
IEN	**-6.6**	24.8	**-5.0**	26.1	**-12.3**	30.0	**-8.0**	38.6	**-11.9**	34.8	**5.0**	27.4	**-40.9**	57.8
CEM	**-1.7**	43.8	**-0.1**	44.6	**-7.4**	47.0	**-3.1**	52.9	**-7.0**	50.2	**9.9**	45.4	**-36.0**	68.2
PTB	**-2.0**	7.1	**-0.4**	10.7	**-7.7**	18.2	**-3.4**	30.3	**-7.3**	25.4	**9.6**	13.6	**-36.3**	52.7
NMi-VSL	**-4.9**	24.7	**-3.3**	26.0	**-10.6**	29.9	**-6.3**	38.5	**-10.2**	34.8	**6.7**	27.3	**-39.2**	57.7
INTI	**-5.0**	19.7	**-3.4**	21.3	**-10.7**	25.9	**-6.4**	35.4	-	-	-	-	-	-
NMIA	**3.0**	15.7	**4.6**	17.6	**-2.7**	23.0	**1.6**	33.4	-	-	-	-	-	-
NRC	**6.0**	9.4	**7.6**	12.4	**0.3**	19.2	**4.6**	30.9	-	-	-	-	-	-
VNIIM	**-4.9**	32.2	**-3.3**	33.2	**-10.6**	36.3	**-6.3**	43.7	-	-	-	-	-	-
METAS	**-1.6**	6.1			**-7.3**	17.8	**-3.0**	30.1	**-6.9**	25.2	**10.0**	13.1	**-35.9**	52.5
NIST	**5.7**	15.9	**7.3**	17.8			**4.3**	33.5	-	-	-	-	-	-
NIM	**1.4**	29.0	**3.0**	30.1	**-4.3**	33.5			-	-	-	-	-	-
BEV	**5.3**	24.4	**6.9**	25.2	**-**	-	**-**	-			**16.9**	26.5	**-29.0**	57.4
MIKES	**-11.6**	11.5	**-10.0**	13.1	**-**	-	**-**	-	**-16.9**	26.5			**-45.9**	53.2
INETI	**34.3**	52.1	**35.9**	52.5	**-**	-	**-**	-	**29.0**	57.4	**45.9**	53.2		
OMH	**-15.4**	80.1	**-13.8**	80.4	**-**	-	**-**	-	**-20.7**	83.6	**-3.8**	80.8	**-49.7**	95.5
JV	**-2.4**	28.2	**-0.8**	28.9	**-**	-	**-**	-	**-7.7**	37.0	**9.2**	30.1	**-36.7**	59.1
UME	**4.6**	40.2	**6.2**	40.7	**-**	-	**-**	-	**-0.7**	46.7	**16.2**	41.5	**-29.7**	65.7
CMI	**4.0**	62.1	**5.6**	62.5	**-**	-	**-**	-	**-1.3**	66.6	**15.6**	63.0	**-30.3**	81.0

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 20 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	OMH		JV		UME		CMI	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-2.8**	34.8	**12.6**	87.4	**-0.4**	44.9	**-7.4**	53.2	**-6.8**	71.2
AREPA	**5.3**	25.7	**20.7**	84.2	**7.7**	38.3	**0.7**	47.8	**1.3**	67.3
NPL	**-5.7**	22.8	**9.7**	83.3	**-3.3**	36.3	**-10.3**	46.2	**-9.7**	66.2
SP	**2.3**	10.5	**17.7**	80.8	**4.7**	30.2	**-2.3**	41.6	**-1.7**	63.0
IEN	**-6.6**	24.8	**8.8**	83.9	**-4.2**	37.7	**-11.2**	47.3	**-10.6**	66.9
CEM	**-1.7**	43.8	**13.7**	91.4	**0.7**	52.2	**-6.3**	59.5	**-5.7**	76.1
PTB	**-2.0**	7.1	**13.4**	80.4	**0.4**	29.2	**-6.6**	40.8	**-6.0**	62.6
NMi-VSL	**-4.9**	24.7	**10.5**	83.9	**-2.5**	37.6	**-9.5**	47.2	**-8.9**	66.9
INTI	**-5.0**	19.7	-	-	-	-	-	-	-	-
NMIA	**3.0**	15.7	-	-	-	-	-	-	-	-
NRC	**6.0**	9.4	-	-	-	-	-	-	-	-
VNIIM	**-4.9**	32.2	-	-	-	-	-	-	-	-
METAS	**-1.6**	6.1	**13.8**	80.4	**0.8**	28.9	**-6.2**	40.7	**-5.6**	62.5
NIST	**5.7**	15.9	-	-	-	-	-	-	-	-
NIM	**1.4**	29.0	-	-	-	-	-	-	-	-
BEV	**5.3**	24.4	**20.7**	83.6	**7.7**	37.0	**0.7**	46.7	**1.3**	66.6
MIKES	**-11.6**	11.5	**3.8**	80.8	**-9.2**	30.1	**-16.2**	41.5	**-15.6**	63.0
INETI	**34.3**	52.1	**49.7**	95.5	**36.7**	59.1	**29.7**	65.7	**30.3**	81.0
OMH	**-15.4**	80.1			**-13.0**	84.8	**-20.0**	89.5	**-19.4**	101.3
JV	**-2.4**	28.2	**13.0**	84.8			**-7.0**	48.9	**-6.4**	68.1
UME	**4.6**	40.2	**20.0**	89.5	**7.0**	48.9			**0.6**	73.8
CMI	**4.0**	62.1	**19.4**	101.3	**6.4**	68.1	**-0.6**	73.8		

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

x_i **adjusted value of the measurement reported by laboratory *i* (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)**

$U_{\text{Lab } i}$ **expanded uncertainty of x_i at a 95 % level of confidence**

Lab *i*	x_i / (μV/V)	$U_{\text{Lab } i}$ / (μV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	-31.7	69.0	Feb 2000	Yes	Yes
BEV	-	-	Apr 2000	No	Yes
MIKES	-47.2	23.3	May 2000	No	Yes
INETI	33.9	68.0	Jun 2000	No	Yes
AREPA	-18.1	41.0	Jul 2000	Yes	Yes
NPL	-27.1	32.0	Aug 2000	Yes	Yes
SP	-15.1	15.1	Sep 2000	Yes	Yes
IEN	-30.9	37.2	Oct 2000	Yes	Yes
CEM	-36.1	64.0	Nov 2000	Yes	Yes
PTB	-21.9	10.0	Jan 2001	Yes	Yes
NMi-VSL	-25.2	35.0	May 2001	Yes	Yes
OMH	-45.2	120.0	Oct 2001	No	Yes
JV	-19.5	42.0	Mar 2002	No	Yes
UME	-13.5	44.0	Apr 2002	No	Yes
INTI	-24.0	24.1	Jul 2000	Yes	No
NMIA	-15.0	28.0	Nov 2000	Yes	No
NRC	-12.0	12.1	Mar 2001	Yes	No
VNIIM	-42.2	51.6	May 2001	Yes	No
METAS	-21.2	10.1	Aug 2001	Yes	Yes
NIST	-23.2	21.5	Jan 2002	Yes	No
NIM	-22.7	45.4	May 2002	Yes	No
CMI	-28.0	78.0	Dec 2002	No	Yes

Key comparison SIM.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

$\delta_{\text{Lab } i\text{-SIM}}$: **result of measurement carried out by laboratory *i* participant in SIM.EM-K9**

$U_{\text{Lab } i\text{-SIM}}$: **expanded uncertainty (*k* = 2) of** $\delta_{\text{Lab } i\text{-SIM}}$

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$U_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
NIST	18	15.4	Jan to Feb 04
INTI	-1.7	37	04 Mar to 16 Apr 04
INMETRO	-9	18	28 Jun to 28 Jul 04
CENAM	3.3	27	07 to 24 Aug 04
NRC	-10.6	13	Sep to Oct 04

Key comparison APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 3 of the Final Report. They were taken between 2000 and 2004.

Key comparison SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

Measurement results of the participants in key comparison SIM.EM-K9.1 are given in Table IV of the Final Report. They were taken in 2012.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R = -19.9 µV/V, U_R = 5.0 µV/V

The degree of equivalence of laboratory i relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories i and j is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.

The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking SIM.EM-K9 to CCEM-K9

INTI, NRC and NIST provide the link between key comparisons CCEM-K9 and SIM.EM-K9.
The linkage process is described in section 11 of the SIM.EM-K9 Final Report.
The degree of equivalence of the laboratory i participant in SIM.EM-K9 with respect to the key comparison reference value is given by a pair of terms both expressed in µV/V:
D_i and U_i, its expanded uncertainty (k = 2).
The computation of the degrees of equivalence is explained in the SIM.EM-K9 Final Report.
The degree of equivalence between two laboratories i and j is not computed for the laboratories participant in key comparison SIM.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes it possible to extend the graph of equivalence to participants in APMP.EM-K9 only.
Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 20 of the Final Report. They are not reported here.

Linking SIM.EM-K9.1 to CCEM-K9

The linkage process is based on the results of the common participant, the LNE, and is detailed in Section 9 of the SIM.EM-K9.1 Final Report. This makes it possible to extend the graph of equivalence to INMETRO.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

Degrees of equivalence

Lab *i*

	D_i / (µV/V)	U_i / (µV/V)
LNE	-11.8	68.8
AREPA	1.8	40.7
NPL	-7.2	31.6
SP	4.8	14.2
IEN	-11.0	36.9
CEM	-16.2	63.8
PTB	-2.0	8.7
NMi-VSL	-5.3	34.6
INTI	-4.1	23.6
NMIA	4.9	27.5
NRC	7.9	11.0
VNIIM	-22.3	51.4
METAS	-1.3	8.8
NIST	-3.3	20.9
NIM	-2.8	45.1

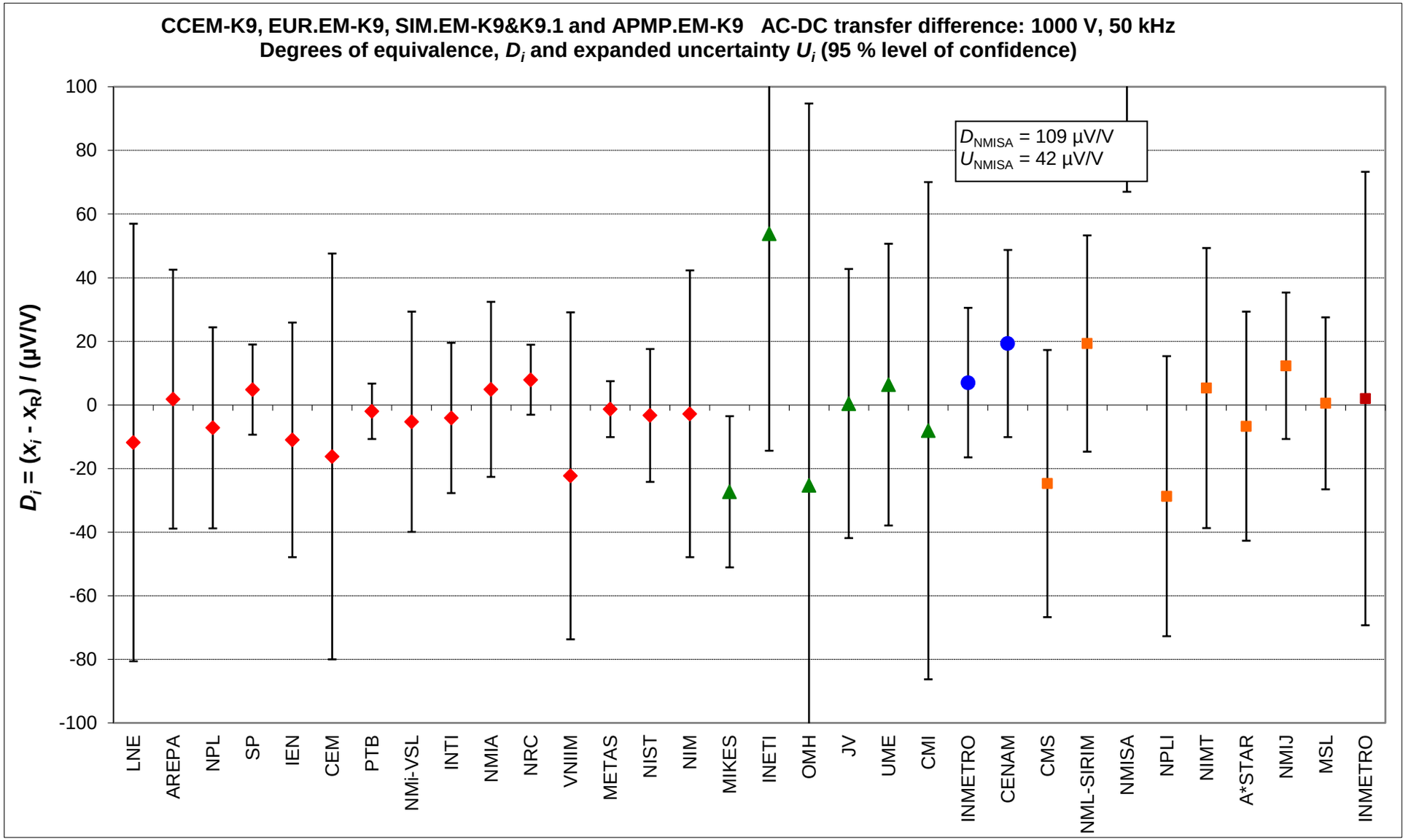
	D_i / (µV/V)	U_i / (µV/V)
BEV	-	-
MIKES	-27.3	23.8
INETI	53.8	68.2
OMH	-25.3	120.1
JV	0.4	42.3
UME	6.4	44.3
CMI	-8.1	78.2

	D_i / (µV/V)	U_i / (µV/V)
UTE	-	-
INMETRO	7.0	23.5
CENAM	19.3	29.4

	D_i / (µV/V)	U_i / (µV/V)
CMS	-24.7	42
SCL	-	-
NML-SIRIM	19.3	34
NMISA	109	42
NPLI	-28.7	44
NIMT	5.3	44
A*STAR	-6.7	36
NMIJ	12.3	23
MSL	0.5	27

	D_i / (µV/V)	U_i / (µV/V)
INMETRO	2.0	71.3

Red: participants in CCEM-K9
Green: participants in EUROMET.EM-K9 only
Blue: participants in SIM.EM-K9 only
Orange: participants in APMP.EM-K9
Brown: participant in SIM.EM-K9.1 only



Red diamonds: participants in CCEM-K9 ; **Green triangles:** participants in EUROMET.EM-K9
Blue circles: participants in SIM.EM-K9 only ; **Orange squares**: participants in APMP.EM-K9 ; **Brown square**: participant in SIM.EM-K9.1 only

Key comparisons CCEM-K9 and EUROMET.EM-K9

Matrix of Equivalence

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

Pair-wise degrees of equivalence involving participants in SIM.EM-K9 and APMP.EM-K9 are not given here.

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	LNE		AREPA		NPL		SP		IEN		CEM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-11.8**	68.8			**-13.6**	80.3	**-4.6**	76.1	**-16.6**	70.7	**-0.8**	78.4	**4.4**	94.2
AREPA	**1.8**	40.7	**13.6**	80.3			**9.0**	52.1	**-3.0**	43.7	**12.8**	55.4	**18.0**	76.1
NPL	**-7.2**	31.6	**4.6**	76.1	**-9.0**	52.1			**-12.0**	35.4	**3.8**	49.1	**9.0**	71.6
SP	**4.8**	14.2	**16.6**	70.7	**3.0**	43.7	**12.0**	35.4			**15.8**	40.2	**21.0**	65.8
IEN	**-11.0**	36.9	**0.8**	78.4	**-12.8**	55.4	**-3.8**	49.1	**-15.8**	40.2			**5.2**	74.1
CEM	**-16.2**	63.8	**-4.4**	94.2	**-18.0**	76.1	**-9.0**	71.6	**-21.0**	65.8	**-5.2**	74.1		
PTB	**-2.0**	8.7	**9.8**	69.8	**-3.8**	39.8	**5.2**	33.6	**-6.8**	18.2	**9.0**	38.6	**14.2**	64.8
NMi-VSL	**-5.3**	34.6	**6.5**	77.4	**-7.1**	54.0	**1.9**	47.5	**-10.1**	38.2	**5.7**	51.1	**10.9**	73.0
INTI	**-4.1**	23.6	**7.7**	73.1	**-5.9**	47.6	**3.1**	40.1	**-8.9**	28.5	**6.9**	44.4	**12.1**	68.4
NMIA	**4.9**	27.5	**16.7**	74.5	**3.1**	49.7	**12.1**	42.6	**0.1**	31.9	**15.9**	46.6	**21.1**	69.9
NRC	**7.9**	11.0	**19.7**	70.1	**6.1**	42.8	**15.1**	34.3	**3.1**	19.4	**18.9**	39.2	**24.1**	65.2
VNIIM	**-22.3**	51.4	**-10.5**	86.2	**-24.1**	66.0	**-15.1**	60.8	**-27.1**	53.8	**-11.3**	63.7	**-6.1**	82.3
METAS	**-1.3**	8.8	**10.5**	69.8	**-3.1**	42.3	**5.9**	33.6	**-6.1**	18.2	**9.7**	38.6	**14.9**	64.8
NIST	**-3.3**	20.9	**8.5**	72.3	**-5.1**	46.3	**3.9**	38.6	**-8.1**	26.3	**7.7**	43.0	**12.9**	67.6
NIM	**-2.8**	45.1	**9.0**	82.6	**-4.6**	61.2	**4.4**	55.6	**-7.6**	47.9	**8.2**	58.7	**13.4**	78.5
BEV	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-27.3**	23.8	**-15.5**	72.9	**-29.1**	47.2	**-20.1**	39.6	**-32.1**	27.8	**-16.3**	43.9	**-11.1**	68.2
INETI	**53.8**	68.2	**65.6**	96.9	**52.0**	79.5	**61.0**	75.2	**49.0**	69.7	**64.8**	77.6	**70.0**	93.4
OMH	**-25.3**	120.1	**-13.5**	138.5	**-27.1**	126.9	**-18.1**	124.2	**-30.1**	121.0	**-14.3**	125.7	**-9.1**	136.0
JV	**0.4**	42.3	**12.2**	80.8	**-1.4**	58.7	**7.6**	52.9	**-4.4**	44.7	**11.4**	56.2	**16.6**	76.6
UME	**6.4**	44.3	**18.2**	81.9	**4.6**	60.2	**13.6**	54.5	**1.6**	46.6	**17.4**	57.7	**22.6**	77.7
CMI	**-8.1**	78.2	**3.7**	104.2	**-9.9**	88.2	**-0.9**	84.4	**-12.9**	79.5	**2.9**	86.5	**8.1**	100.9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	PTB		NMi-VSL		INTI		NMIA		NRC		VNIIM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-11.8**	68.8	**-9.8**	69.8	**-6.5**	77.4	**-7.7**	73.1	**-16.7**	74.5	**-19.7**	70.1	**10.5**	86.2
AREPA	**1.8**	40.7	**3.8**	39.8	**7.1**	54.0	**5.9**	47.6	**-3.1**	49.7	**-6.1**	42.8	**24.1**	66.0
NPL	**-7.2**	31.6	**-5.2**	33.6	**-1.9**	47.5	**-3.1**	40.1	**-12.1**	42.6	**-15.1**	34.3	**15.1**	60.8
SP	**4.8**	14.2	**6.8**	18.2	**10.1**	38.2	**8.9**	28.5	**-0.1**	31.9	**-3.1**	19.4	**27.1**	53.8
IEN	**-11.0**	36.9	**-9.0**	38.6	**-5.7**	51.1	**-6.9**	44.4	**-15.9**	46.6	**-18.9**	39.2	**11.3**	63.7
CEM	**-16.2**	63.8	**-14.2**	64.8	**-10.9**	73.0	**-12.1**	68.4	**-21.1**	69.9	**-24.1**	65.2	**6.1**	82.3
PTB	**-2.0**	8.7			**3.3**	36.5	**2.1**	26.1	**-6.9**	29.8	**-9.9**	15.7	**20.3**	52.6
NMi-VSL	**-5.3**	34.6	**-3.3**	36.5			**-1.2**	42.5	**-10.2**	44.9	**-13.2**	37.1	**17.0**	62.4
INTI	**-4.1**	23.6	**-2.1**	26.1	**1.2**	42.5			**-9.0**	37.0	**-12.0**	27.0	**18.2**	57.0
NMIA	**4.9**	27.5	**6.9**	29.8	**10.2**	44.9	**9.0**	37.0			**-3.0**	30.6	**27.2**	58.8
NRC	**7.9**	11.0	**9.9**	15.7	**13.2**	37.1	**12.0**	27.0	**3.0**	30.6			**30.2**	53.0
VNIIM	**-22.3**	51.4	**-20.3**	52.6	**-17.0**	62.4	**-18.2**	57.0	**-27.2**	58.8	**-30.2**	53.0		
METAS	**-1.3**	8.8	**0.7**	14.3	**4.0**	36.5	**2.8**	26.2	**-6.2**	29.8	**-9.2**	15.8	**21.0**	52.6
NIST	**-3.3**	20.9	**-1.3**	23.8	**2.0**	41.1	**0.8**	32.3	**-8.2**	35.4	**-11.2**	24.7	**19.0**	55.9
NIM	**-2.8**	45.1	**-0.8**	46.5	**2.5**	57.4	**1.3**	51.5	**-7.7**	53.4	**-10.7**	47.0	**19.5**	68.8
BEV	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-27.3**	23.8	**-25.3**	25.4	**-22.0**	42.1	**-**	-	**-**	-	**-**	-	**-**	-
INETI	**53.8**	68.2	**55.8**	68.8	**59.1**	76.5	**-**	-	**-**	-	**-**	-	**-**	-
OMH	**-25.3**	120.1	**-23.3**	120.5	**-20.0**	125.0	**-**	-	**-**	-	**-**	-	**-**	-
JV	**0.4**	42.3	**2.4**	43.2	**5.7**	54.7	**-**	-	**-**	-	**-**	-	**-**	-
UME	**6.4**	44.3	**8.4**	45.2	**11.7**	56.3	**-**	-	**-**	-	**-**	-	**-**	-
CMI	**-8.1**	78.2	**-6.1**	78.7	**-2.8**	85.5	**-**	-	**-**	-	**-**	-	**-**	-

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	METAS		NIST		NIM		BEV		MIKES		INETI	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-11.8**	68.8	**-10.5**	69.8	**-8.5**	72.3	**-9.0**	82.6	**-**	-	**15.5**	72.9	**-65.6**	96.9
AREPA	**1.8**	40.7	**3.1**	42.3	**5.1**	46.3	**4.6**	61.2	**-**	-	**29.1**	47.2	**-52.0**	79.5
NPL	**-7.2**	31.6	**-5.9**	33.6	**-3.9**	38.6	**-4.4**	55.6	**-**	-	**20.1**	39.6	**-61.0**	75.2
SP	**4.8**	14.2	**6.1**	18.2	**8.1**	26.3	**7.6**	47.9	**-**	-	**32.1**	27.8	**-49.0**	69.7
IEN	**-11.0**	36.9	**-9.7**	38.6	**-7.7**	43.0	**-8.2**	58.7	**-**	-	**16.3**	43.9	**-64.8**	77.6
CEM	**-16.2**	63.8	**-14.9**	64.8	**-12.9**	67.6	**-13.4**	78.5	**-**	-	**11.1**	68.2	**-70.0**	93.4
PTB	**-2.0**	8.7	**-0.7**	14.3	**1.3**	23.8	**0.8**	46.5	**-**	-	**25.3**	25.4	**-55.8**	68.8
NMi-VSL	**-5.3**	34.6	**-4.0**	36.5	**-2.0**	41.1	**-2.5**	57.4	**-**	-	**22.0**	42.1	**-59.1**	76.5
INTI	**-4.1**	23.6	**-2.8**	26.2	**-0.8**	32.3	**-1.3**	51.5	-	-	-	-	-	-
NMIA	**4.9**	27.5	**6.2**	29.8	**8.2**	35.4	**7.7**	53.4	-	-	-	-	-	-
NRC	**7.9**	11.0	**9.2**	15.8	**11.2**	24.7	**10.7**	47.0	-	-	-	-	-	-
VNIIM	**-22.3**	51.4	**-21.0**	52.6	**-19.0**	55.9	**-19.5**	68.8	-	-	-	-	-	-
METAS	**-1.3**	8.8			**2.0**	23.8	**1.5**	46.6	**-**	-	**26.0**	25.4	**-55.1**	68.8
NIST	**-3.3**	20.9	**-2.0**	23.8			**-0.5**	50.3	-	-	-	-	-	-
NIM	**-2.8**	45.1	**-1.5**	46.6	**0.5**	50.3			-	-	-	-	-	-
BEV	**-**	-	**-**	-	**-**	-	**-**	-			**-**	-	**-**	-
MIKES	**-27.3**	23.8	**-26.0**	25.4	**-**	-	**-**	-	**-**	-			**-81.1**	71.9
INETI	**53.8**	68.2	**55.1**	68.8	**-**	-	**-**	-	**-**	-	**81.1**	71.9		
OMH	**-25.3**	120.1	**-24.0**	120.5	**-**	-	**-**	-	**-**	-	**2.0**	122.3	**-79.1**	138.0
JV	**0.4**	42.3	**1.7**	43.2	**-**	-	**-**	-	**-**	-	**27.7**	48.1	**-53.4**	80.0
UME	**6.4**	44.3	**7.7**	45.2	**-**	-	**-**	-	**-**	-	**33.7**	49.8	**-47.4**	81.0
CMI	**-8.1**	78.2	**-6.8**	78.7	**-**	-	**-**	-	**-**	-	**19.2**	81.5	**-61.9**	103.5

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 50 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	OMH D_{ij} / (μV/V)	OMH U_{ij} / (μV/V)	JV D_{ij} / (μV/V)	JV U_{ij} / (μV/V)	UME D_{ij} / (μV/V)	UME U_{ij} / (μV/V)	CMI D_{ij} / (μV/V)	CMI U_{ij} / (μV/V)
LNE	**-11.8**	68.8	**13.5**	138.5	**-12.2**	80.8	**-18.2**	81.9	**-3.7**	104.2
AREPA	**1.8**	40.7	**27.1**	126.9	**1.4**	58.7	**-4.6**	60.2	**9.9**	88.2
NPL	**-7.2**	31.6	**18.1**	124.2	**-7.6**	52.9	**-13.6**	54.5	**0.9**	84.4
SP	**4.8**	14.2	**30.1**	121.0	**4.4**	44.7	**-1.6**	46.6	**12.9**	79.5
IEN	**-11.0**	36.9	**14.3**	125.7	**-11.4**	56.2	**-17.4**	57.7	**-2.9**	86.5
CEM	**-16.2**	63.8	**9.1**	136.0	**-16.6**	76.6	**-22.6**	77.7	**-8.1**	100.9
PTB	**-2.0**	8.7	**23.3**	120.5	**-2.4**	43.2	**-8.4**	45.2	**6.1**	78.7
NMi-VSL	**-5.3**	34.6	**20.0**	125.0	**-5.7**	54.7	**-11.7**	56.3	**2.8**	85.5
INTI	**-4.1**	23.6	-	-	-	-	-	-	-	-
NMIA	**4.9**	27.5	-	-	-	-	-	-	-	-
NRC	**7.9**	11.0	-	-	-	-	-	-	-	-
VNIIM	**-22.3**	51.4	-	-	-	-	-	-	-	-
METAS	**-1.3**	8.8	**24.0**	120.5	**-1.7**	43.2	**-7.7**	45.2	**6.8**	78.7
NIST	**-3.3**	20.9	-	-	-	-	-	-	-	-
NIM	**-2.8**	45.1	-	-	-	-	-	-	-	-
BEV	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-27.3**	23.8	**-2.0**	122.3	**-27.7**	48.1	**-33.7**	49.8	**-19.2**	81.5
INETI	**53.8**	68.2	**79.1**	138.0	**53.4**	80.0	**47.4**	81.0	**61.9**	103.5
OMH	**-25.3**	120.1			**-25.7**	127.2	**-31.7**	127.9	**-17.2**	143.2
JV	**0.4**	42.3	**25.7**	127.2			**-6.0**	60.9	**8.5**	88.6
UME	**6.4**	44.3	**31.7**	127.9	**6.0**	60.9			**14.5**	89.6
CMI	**-8.1**	78.2	**17.2**	143.2	**-8.5**	88.6	**-14.5**	89.6		

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

x_i adjusted value of the measurement reported by laboratory *i* (see on page 13 of the CCEM-K9 Final Report and on page 11 of the EUROMET.EM-K9 Final Report)

$U_{\text{Lab } i}$ expanded uncertainty of x_i at a 95 % level of confidence

Lab *i*	x_i / (μV/V)	$U_{\text{Lab } i}$ / (μV/V)	Date of measurement	Participant in	
				CCEM-K9	EUROMET.EM-K9
LNE	-73.6	69.0	Feb 2000	Yes	Yes
BEV	-	-	Apr 2000	No	Yes
MIKES	-93.4	82.1	May 2000	No	Yes
INETI	36.4	102.0	Jun 2000	No	Yes
AREPA	-52.6	81.0	Jul 2000	Yes	Yes
NPL	-63.6	62.0	Aug 2000	Yes	Yes
SP	-42.6	23.1	Sep 2000	Yes	Yes
IEN	-66.5	79.4	Oct 2000	Yes	Yes
CEM	-62.6	98.0	Nov 2000	Yes	Yes
PTB	-56.6	30.0	Jan 2001	Yes	Yes
NMi-VSL	-61.4	50.0	May 2001	Yes	Yes
OMH	-80.2	200.0	Oct 2001	No	Yes
JV	-41.5	68.0	Mar 2002	No	Yes
UME	-41.1	66.0	Apr 2002	No	Yes
INTI	-55.8	40.0	Jul 2000	Yes	No
NMIA	-40.8	41.0	Nov 2000	Yes	No
NRC	-53.8	24.0	Mar 2001	Yes	No
VNIIM	-30.4	101.0	May 2001	Yes	No
METAS	-49.8	28.0	Aug 2001	Yes	Yes
NIST	-59.2	29.2	Jan 2002	Yes	No
NIM	-72.7	59.6	May 2002	Yes	No
CMI	-63.8	112.0	Dec 2002	No	Yes

Key comparison SIM.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

$\delta_{\text{Lab } i\text{-SIM}}$: **result of measurement carried out by laboratory *i* participant in SIM.EM-K9**

$U_{\text{Lab } i\text{-SIM}}$: **expanded uncertainty (*k* = 2) of $\delta_{\text{Lab } i\text{-SIM}}$**

Lab *i*	$\delta_{\text{Lab } i\text{-SIM}}$ / µV/V	$U_{\text{Lab } i\text{-SIM}}$ / µV/V	Date of measurement
NIST	-35	23.4	Jan to Feb 04
INTI	10.5	74	04 Mar to 16 Apr 04
INMETRO	-25	42	28 Jun to 28 Jul 04
CENAM	3.9	27	07 to 24 Aug 04
NRC	-18	25	Sep to Oct 04

Key comparison APMP.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

Measurement results of the participants in key comparison APMP.EM-K9 are given in Table 3 of the Final Report. They were taken between 2000 and 2004.

Key comparison SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

Measurement results of the participants in key comparison SIM.EM-K9.1 are given in Table IV of the Final Report. They were taken in 2012.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

Key comparisons CCEM-K9 and EUROMET.EM-K9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

The key comparison reference value, x_R, is computed as the weighted average of the adjusted values obtained by the CCEM-K9 participants. Its expanded uncertainty is $U_R = 2u_R$, where u_R is the standard uncertainty of the weighted average. All adjusted values from CCEM-K9 participants have been taken into account in the calculation, except the value of AREPA, which is traceable to PTB.

x_R = -53.1 µV/V, U_R = 10.0 µV/V

The degree of equivalence of laboratory *i* relative to the key comparison reference value is given by two terms:
$D_i = (x_i - x_R)$ and its expanded uncertainty U_i at a 95 % level of confidence computed as explained on page 15 of the CCEM-K9 Final Report and on page 12 of the EUROMET.EM-K9 Final Report, both expressed in µV/V.

The degree of equivalence between two laboratories *i* and *j* is given by two terms:
$D_{ij} = (D_i - D_j)$ and its expanded uncertainty U_{ij} at a 95 % level of confidence computed as explained in the Appendices 1 of the CCEM-K9 Final Report and EUROMET.EM-K9 Final Report, both expressed in µV/V.

The CCEM-K9 Matrix of equivalence is extended with degrees of equivalence between participants in EUROMET.EM-K9.

Linking SIM.EM-K9 to CCEM-K9

INTI, NRC and NIST provide the link between key comparisons CCEM-K9 and SIM.EM-K9.
The linkage process is described in section 11 of the SIM.EM-K9 Final Report.
The degree of equivalence of the laboratory *i* participant in SIM.EM-K9 with respect to the key comparison reference value is given by a pair of terms both expressed in µV/V:
D_i and U_i, its expanded uncertainty (k = 2).
The computation of the degrees of equivalence is explained in the SIM.EM-K9 Final Report.
The degree of equivalence between two laboratories *i* and *j* is not computed for the laboratories participant in key comparison SIM.EM-K9.

Linking APMP.EM-K9 to CCEM-K9

The linkage process is based on the results of the common participants, NMIA and PTB, and is detailed in Sections 8 and 9 of the APMP.EM-K9 Final Report. This makes it possible to extend the graph of equivalence to participants in APMP.EM-K9 only.
Pair-wise degrees of equivalence inside APMP.EM-K9 are given in Table 21 of the Final Report. They are not reported here.

Linking SIM.EM-K9.1 to CCEM-K9

The linkage process is based on the results of the common participant, the LNE, and is detailed in Section 9 of the SIM.EM-K9.1 Final Report. This makes it possible to extend the graph of equivalence to INMETRO.

Key comparisons CCEM-K9, EUROMET.EM-K9, SIM.EM-K9, APMP.EM-K9 and SIM.EM-K9.1

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

Degrees of equivalence

Lab *i*

	D_i / (µV/V)	U_i / (µV/V)
LNE	-20.5	68.3
AREPA	0.5	80.4
NPL	-10.5	61.2
SP	10.5	20.8
IEN	-13.4	78.8
CEM	-9.5	97.5
PTB	-3.5	28.3
NMi-VSL	-8.3	49.0
INTI	-2.7	38.7
NMIA	12.3	39.8
NRC	-0.7	21.8
VNIIM	22.7	100.5
METAS	3.3	26.2
NIST	-6.1	27.4
NIM	-19.6	58.8

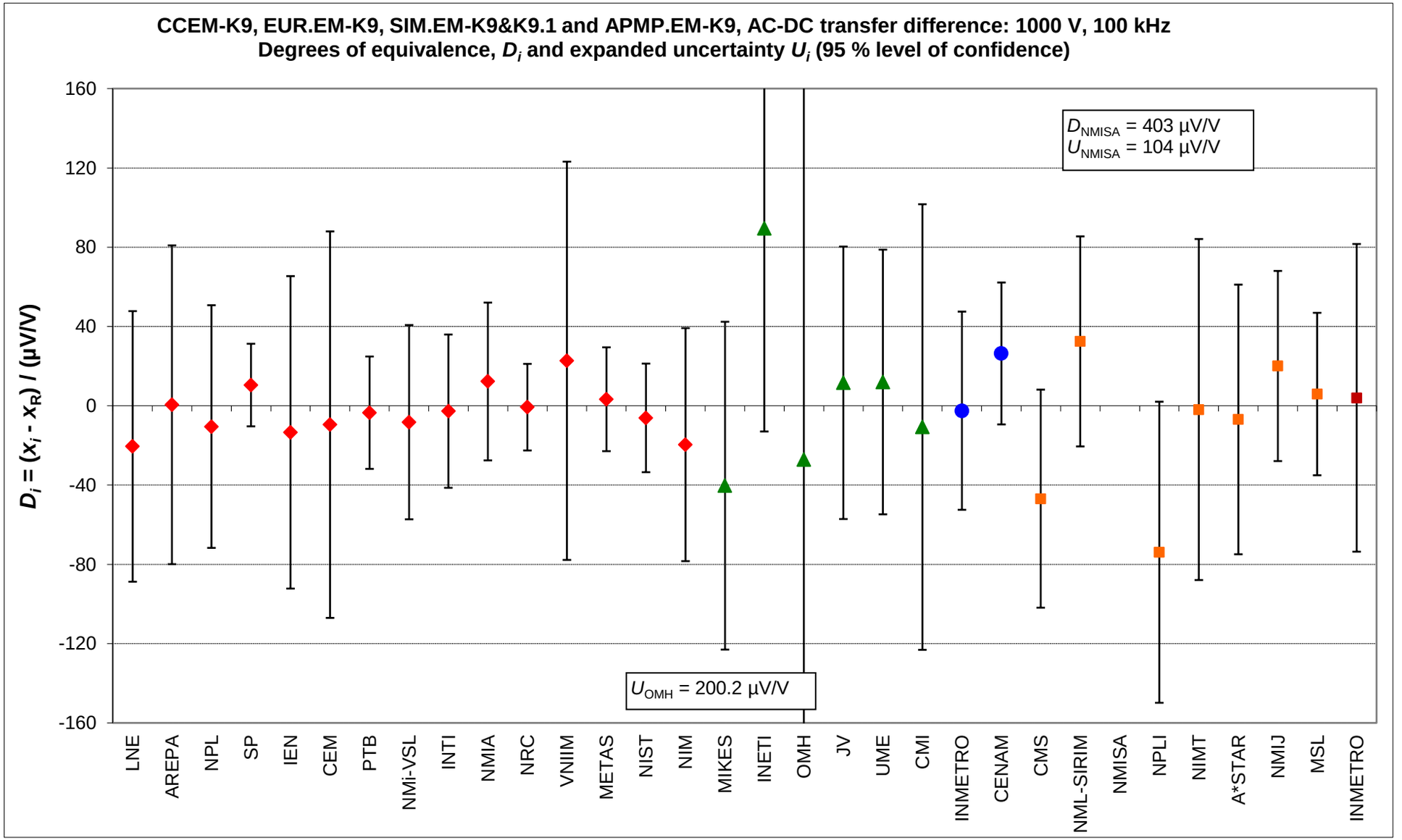
	D_i / (µV/V)	U_i / (µV/V)
BEV	-	-
MIKES	-40.3	82.7
INETI	89.5	102.5
OMH	-27.1	200.2
JV	11.6	68.7
UME	12.0	66.8
CMI	-10.7	112.4

	D_i / (µV/V)	U_i / (µV/V)
UTE	-	-
INMETRO	-2.5	50.0
CENAM	26.4	35.8

	D_i / (µV/V)	U_i / (µV/V)
CMS	-46.9	55
SCL	-	-
NML-SIRIM	32.5	53
NMISA	403	104
NPLI	-73.9	76
NIMT	-1.9	86
A*STAR	-6.9	68
NMIJ	20.1	48
MSL	5.9	41

	D_i / (µV/V)	U_i / (µV/V)
INMETRO	4.0	77.6

Red: participants in CCEM-K9
Green: participants in EUROMET.EM-K9 only
Blue: participants in SIM.EM-K9 only
Orange: participants in APMP.EM-K9
Brown: participant in SIM.EM-K9.1 only



Red diamonds: participants in CCEM-K9 ; **Green triangles:** participants in EUROMET.EM-K9
Blue circles: participants in SIM.EM-K9 only ; **Orange squares**: participants in APMP.EM-K9 ; **Brown square**: participant in SIM.EM-K9.1 only

Key comparisons CCEM-K9 and EUROMET.EM-K9

Matrix of Equivalence

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

Pair-wise degrees of equivalence involving participants in SIM.EM-K9 and APMP.EM-K9 are not given here.

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	LNE		AREPA		NPL		SP		IEN		CEM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-20.5**	68.3			**-21.0**	106.5	**-10.0**	92.8	**-31.0**	72.8	**-7.1**	105.2	**-11.0**	119.9
AREPA	**0.5**	80.4	**21.0**	106.5			**11.0**	102.1	**-10.0**	84.3	**13.9**	113.5	**10.0**	127.2
NPL	**-10.5**	61.2	**10.0**	92.8	**-11.0**	102.1			**-21.0**	66.2	**2.9**	100.8	**-1.0**	116.0
SP	**10.5**	20.8	**31.0**	72.8	**10.0**	84.3	**21.0**	66.2			**23.9**	82.7	**20.0**	100.7
IEN	**-13.4**	78.8	**7.1**	105.2	**-13.9**	113.5	**-2.9**	100.8	**-23.9**	82.7			**-3.9**	126.2
CEM	**-9.5**	97.5	**11.0**	119.9	**-10.0**	127.2	**1.0**	116.0	**-20.0**	100.7	**3.9**	126.2		
PTB	**-3.5**	28.3	**17.0**	75.3	**-4.0**	75.3	**7.0**	68.9	**-14.0**	37.9	**9.9**	84.9	**6.0**	102.5
NMi-VSL	**-8.3**	49.0	**12.2**	85.3	**-8.8**	95.2	**2.2**	79.7	**-18.8**	55.1	**5.1**	93.9	**1.2**	110.1
INTI	**-2.7**	38.7	**17.8**	79.8	**-3.2**	90.4	**7.8**	73.8	**-13.2**	46.2	**10.7**	89.0	**6.8**	105.9
NMIA	**12.3**	39.8	**32.8**	80.3	**11.8**	90.8	**22.8**	74.4	**1.8**	47.1	**25.7**	89.4	**21.8**	106.3
NRC	**-0.7**	21.8	**19.8**	73.1	**-1.2**	84.5	**9.8**	66.5	**-11.2**	33.4	**12.7**	83.0	**8.8**	100.9
VNIIM	**22.7**	100.5	**43.2**	122.4	**22.2**	129.5	**33.2**	118.6	**12.2**	103.7	**36.1**	128.5	**32.2**	140.8
METAS	**3.3**	26.2	**23.8**	74.5	**2.8**	85.8	**13.8**	68.1	**-7.2**	36.3	**16.7**	84.2	**12.8**	102.0
NIST	**-6.1**	27.4	**14.4**	75.0	**-6.6**	86.2	**4.4**	68.6	**-16.6**	37.3	**7.3**	84.6	**3.4**	102.3
NIM	**-19.6**	58.8	**0.9**	91.2	**-20.1**	100.6	**-9.1**	86.1	**-30.1**	64.0	**-6.2**	99.3	**-10.1**	114.8
BEV	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-40.3**	82.7	**-19.8**	107.3	**-40.8**	115.4	**-29.8**	102.9	**-50.8**	85.3	**-26.9**	114.3	**-30.8**	127.9
INETI	**89.5**	102.5	**110.0**	123.2	**89.0**	130.3	**100.0**	119.4	**79.0**	104.6	**102.9**	129.3	**99.0**	141.5
OMH	**-27.1**	200.2	**-6.6**	211.6	**-27.6**	215.8	**-16.6**	209.4	**-37.6**	201.4	**-13.7**	215.2	**-17.6**	222.8
JV	**11.6**	68.7	**32.1**	96.9	**11.1**	105.8	**22.1**	92.1	**1.1**	71.9	**25.0**	104.6	**21.1**	119.3
UME	**12**	66.8	**32.5**	95.5	**11.5**	104.5	**22.5**	90.6	**1.5**	70.0	**25.4**	103.3	**21.5**	118.2
CMI	**-10.7**	112.4	**9.8**	131.6	**-11.2**	138.3	**-0.2**	128.1	**-21.2**	114.4	**2.7**	137.3	**-1.2**	148.9

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	PTB		NMi-VSL		INTI		NMIA		NRC		VNIIM	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-20.5**	68.3	**-17.0**	75.3	**-12.2**	85.3	**-17.8**	79.8	**-32.8**	80.3	**-19.8**	73.1	**-43.2**	122.4
AREPA	**0.5**	80.4	**4.0**	75.3	**8.8**	95.2	**3.2**	90.4	**-11.8**	90.8	**1.2**	84.5	**-22.2**	129.5
NPL	**-10.5**	61.2	**-7.0**	68.9	**-2.2**	79.7	**-7.8**	73.8	**-22.8**	74.4	**-9.8**	66.5	**-33.2**	118.6
SP	**10.5**	20.8	**14.0**	37.9	**18.8**	55.1	**13.2**	46.2	**-1.8**	47.1	**11.2**	33.4	**-12.2**	103.7
IEN	**-13.4**	78.8	**-9.9**	84.9	**-5.1**	93.9	**-10.7**	89.0	**-25.7**	89.4	**-12.7**	83.0	**-36.1**	128.5
CEM	**-9.5**	97.5	**-6.0**	102.5	**-1.2**	110.1	**-6.8**	105.9	**-21.8**	106.3	**-8.8**	100.9	**-32.2**	140.8
PTB	**-3.5**	28.3			**4.8**	58.4	**-0.8**	50.0	**-15.8**	50.9	**-2.8**	38.5	**-26.2**	105.4
NMi-VSL	**-8.3**	49.0	**-4.8**	58.4			**-5.6**	64.1	**-20.6**	64.7	**-7.6**	55.5	**-31.0**	112.7
INTI	**-2.7**	38.7	**0.8**	50.0	**5.6**	64.1			**-15.0**	57.3	**-2.0**	46.7	**-25.4**	108.7
NMIA	**12.3**	39.8	**15.8**	50.9	**20.6**	64.7	**15.0**	57.3			**13.0**	47.6	**-10.4**	109.1
NRC	**-0.7**	21.8	**2.8**	38.5	**7.6**	55.5	**2.0**	46.7	**-13.0**	47.6			**-23.4**	103.9
VNIIM	**22.7**	100.5	**26.2**	105.4	**31.0**	112.7	**25.4**	108.7	**10.4**	109.1	**23.4**	103.9		
METAS	**3.3**	26.2	**6.8**	41.1	**11.6**	57.4	**6.0**	48.9	**-9.0**	49.7	**4.0**	36.9	**-19.4**	104.9
NIST	**-6.1**	27.4	**-2.6**	41.9	**2.2**	58.0	**-3.4**	49.6	**-18.4**	50.4	**-5.4**	37.8	**-28.8**	105.2
NIM	**-19.6**	58.8	**-16.1**	66.8	**-11.3**	77.8	**-16.9**	71.8	**-31.9**	72.4	**-18.9**	64.3	**-42.3**	117.3
BEV	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-40.3**	82.7	**-36.8**	87.5	**-32.0**	96.2	**-**	-	**-**	-	**-**	-	**-**	-
INETI	**89.5**	102.5	**93.0**	106.4	**97.8**	113.6	**-**	-	**-**	-	**-**	-	**-**	-
OMH	**-27.1**	200.2	**-23.6**	202.3	**-18.8**	206.2	**-**	-	**-**	-	**-**	-	**-**	-
JV	**11.6**	68.7	**15.1**	74.4	**19.9**	84.5	**-**	-	**-**	-	**-**	-	**-**	-
UME	**12**	66.8	**15.5**	72.5	**20.3**	82.9	**-**	-	**-**	-	**-**	-	**-**	-
CMI	**-10.7**	112.4	**-7.2**	116.0	**-2.4**	122.7	**-**	-	**-**	-	**-**	-	**-**	-

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	METAS D_{ij} / (μV/V)	METAS U_{ij} / (μV/V)	NIST D_{ij} / (μV/V)	NIST U_{ij} / (μV/V)	NIM D_{ij} / (μV/V)	NIM U_{ij} / (μV/V)	BEV D_{ij} / (μV/V)	BEV U_{ij} / (μV/V)	MIKES D_{ij} / (μV/V)	MIKES U_{ij} / (μV/V)	INETI D_{ij} / (μV/V)	INETI U_{ij} / (μV/V)
LNE	**-20.5**	68.3	**-23.8**	74.5	**-14.4**	75.0	**-0.9**	91.2	**-**	-	**19.8**	107.3	**-110.0**	123.2
AREPA	**0.5**	80.4	**-2.8**	85.8	**6.6**	86.2	**20.1**	100.6	**-**	-	**40.8**	115.4	**-89.0**	130.3
NPL	**-10.5**	61.2	**-13.8**	68.1	**-4.4**	68.6	**9.1**	86.1	**-**	-	**29.8**	102.9	**-100.0**	119.4
SP	**10.5**	20.8	**7.2**	36.3	**16.6**	37.3	**30.1**	64.0	**-**	-	**50.8**	85.3	**-79.0**	104.6
IEN	**-13.4**	78.8	**-16.7**	84.2	**-7.3**	84.6	**6.2**	99.3	**-**	-	**26.9**	114.3	**-102.9**	129.3
CEM	**-9.5**	97.5	**-12.8**	102.0	**-3.4**	102.3	**10.1**	114.8	**-**	-	**30.8**	127.9	**-99.0**	141.5
PTB	**-3.5**	28.3	**-6.8**	41.1	**2.6**	41.9	**16.1**	66.8	**-**	-	**36.8**	87.5	**-93.0**	106.4
NMi-VSL	**-8.3**	49.0	**-11.6**	57.4	**-2.2**	58.0	**11.3**	77.8	**-**	-	**32.0**	96.2	**-97.8**	113.6
INTI	**-2.7**	38.7	**-6.0**	48.9	**3.4**	49.6	**16.9**	71.8	-	-	-	-	-	-
NMIA	**12.3**	39.8	**9.0**	49.7	**18.4**	50.4	**31.9**	72.4	-	-	-	-	-	-
NRC	**-0.7**	21.8	**-4.0**	36.9	**5.4**	37.8	**18.9**	64.3	-	-	-	-	-	-
VNIIM	**22.7**	100.5	**19.4**	104.9	**28.8**	105.2	**42.3**	117.3	-	-	-	-	-	-
METAS	**3.3**	26.2			**9.4**	40.5	**22.9**	65.9	**-**	-	**43.6**	86.8	**-86.2**	105.8
NIST	**-6.1**	27.4	**-9.4**	40.5			**13.5**	66.4	-	-	-	-	-	-
NIM	**-19.6**	58.8	**-22.9**	65.9	**-13.5**	66.4			-	-	-	-	-	-
BEV	**-**	-	**-**	-	**-**	-	**-**	-			**-**	-	**-**	-
MIKES	**-40.3**	82.7	**-43.6**	86.8	**-**	-	**-**	-	**-**	-			**-129.8**	131.0
INETI	**89.5**	102.5	**86.2**	105.8	**-**	-	**-**	-	**-**	-	**129.8**	131.0		
OMH	**-27.1**	200.2	**-30.4**	202.0	**-**	-	**-**	-	**-**	-	**13.2**	216.2	**-116.6**	224.6
JV	**11.6**	68.7	**8.3**	73.6	**-**	-	**-**	-	**-**	-	**51.9**	106.7	**-77.9**	122.6
UME	**12**	66.8	**8.7**	71.7	**-**	-	**-**	-	**-**	-	**52.3**	105.4	**-77.5**	121.5
CMI	**-10.7**	112.4	**-14.0**	115.5	**-**	-	**-**	-	**-**	-	**29.6**	138.9	**-100.2**	151.5

MEASURAND : AC-DC transfer difference
VOLTAGE : 1000 V
FREQUENCY : 100 kHz

Lab *j* ⇨

Lab *i* ⇩

	D_i / (μV/V)	U_i / (μV/V)	OMH		JV		UME		CMI	
			D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)	D_{ij} / (μV/V)	U_{ij} / (μV/V)
LNE	**-20.5**	68.3	**6.6**	211.6	**-32.1**	96.9	**-32.5**	95.5	**-9.8**	131.6
AREPA	**0.5**	80.4	**27.6**	215.8	**-11.1**	105.8	**-11.5**	104.5	**11.2**	138.3
NPL	**-10.5**	61.2	**16.6**	209.4	**-22.1**	92.1	**-22.5**	90.6	**0.2**	128.1
SP	**10.5**	20.8	**37.6**	201.4	**-1.1**	71.9	**-1.5**	70.0	**21.2**	114.4
IEN	**-13.4**	78.8	**13.7**	215.2	**-25.0**	104.6	**-25.4**	103.3	**-2.7**	137.3
CEM	**-9.5**	97.5	**17.6**	222.8	**-21.1**	119.3	**-21.5**	118.2	**1.2**	148.9
PTB	**-3.5**	28.3	**23.6**	202.3	**-15.1**	74.4	**-15.5**	72.5	**7.2**	116.0
NMi-VSL	**-8.3**	49.0	**18.8**	206.2	**-19.9**	84.5	**-20.3**	82.9	**2.4**	122.7
INTI	**-2.7**	38.7	-	-	-	-	-	-	-	-
NMIA	**12.3**	39.8	-	-	-	-	-	-	-	-
NRC	**-0.7**	21.8	-	-	-	-	-	-	-	-
VNIIM	**22.7**	100.5	-	-	-	-	-	-	-	-
METAS	**3.3**	26.2	**30.4**	202.0	**-8.3**	73.6	**-8.7**	71.7	**14.0**	115.5
NIST	**-6.1**	27.4	-	-	-	-	-	-	-	-
NIM	**-19.6**	58.8	-	-	-	-	-	-	-	-
BEV	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-
MIKES	**-40.3**	82.7	**-13.2**	216.2	**-51.9**	106.7	**-52.3**	105.4	**-29.6**	138.9
INETI	**89.5**	102.5	**116.6**	224.6	**77.9**	122.6	**77.5**	121.5	**100.2**	151.5
OMH	**-27.1**	200.2			**-38.7**	211.3	**-39.1**	210.7	**-16.4**	229.3
JV	**11.6**	68.7	**38.7**	211.3			**-0.4**	94.8	**22.3**	131.1
UME	**12**	66.8	**39.1**	210.7	**0.4**	94.8			**22.7**	130.0
CMI	**-10.7**	112.4	**16.4**	229.3	**-22.3**	131.1	**-22.7**	130.0		