

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison CCEM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 1.0, 53 Hz

NOMINAL VALUE : 600 VA, 600 W

x_i : deviation from nominal measured by laboratory i

u_i : standard combined uncertainty of x_i

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
NRC	29	6	Jun 96
NIST	26	7	Jul 96
PTB	23	7	Aug 96
SP	-10	15	Sep 96
NIST	27	7	Oct 96
NMIA	31	7	Nov 96
MSL	66	34	Dec 96
NIST	22	7	Feb 97
NPL	38	16	Mar 97
INRIM	23	15	Apr 97
NIST	21	7	May 97
INTI	42	10	Aug 97
NIST	22	7	Sep 97
NIST	20	7	Nov 97
NIM	37	6	Mar 98
NIST	14	7	Apr 98
VNIIM	30	9	Jun 98
NRC	14	6	Sep 98
NIST	9	7	Nov 98
SPRING Singapore	38	31	Dec 98
CSIR-NML	-21	30	Feb 99
NIST	8	7	Mar 99

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
PTB	15	5	May 99
NIST	8	7	Jun 99
INMETRO	6	30	Aug 99
CENAM	19	17	Aug 99
NIST	10	7	Sep 99
NIST	9	7	Jun 00
NIM	20	6	Jul 00
MSL	20	14	Aug 00
NIST	17	7	Aug 00
CSIR-NML	13	40	Sep 00
SP	27	15	Oct 00
NIST	21	7	Nov 00

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 1.0, 53 Hz

NOMINAL VALUE : 600 VA, 600 W

x_{i-EUR} : deviation from nominal measured by laboratory i

u_{i-EUR} : combined standard uncertainty of x_{i-EUR}

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
PTB	-61	11	Nov 96
PTB	-57	11	Feb 97
NPL	-51	16	Mar 97
PTB	-42	11	Apr 97
INRIM	-47	15	Apr 97
PTB	-59	11	May 97
SP	-79	15	Jun 97
AREPA	-49	47	Jun 97
PTB	-53	11	Jul 97
NMi-VSL*	84	-	Aug 97
INETI	-49	36	Oct 97
SMD	9	19	Dec 97
PTB	-49	11	Dec 97
BEV	-104	35	Feb 98
PTB	-47	11	Feb 98
METAS	-59	27	Mar 98
PTB	-41	11	Mar 98
MIKES*	-	-	Apr 98
PTB	-35	11	May 98
CMI	-40	35	Jun 98
OMH	0	85	Jun 98
PTB	-47	11	Jul 98

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
JV	-18	35	Aug 98
PTB	-54	11	Sep 98
UME*	-	-	Oct 98
PTB	-50	11	Nov 98
CEM	-50	33	Dec 98
PTB	-59	11	Jan 99
GUM	-26	38	Feb 99
PTB	-61	11	Feb 99
PTB	-44	11	Oct 99
MIKES	-9	17	Dec 99
PTB	-48	11	Dec 99
NMi-VSL	-30	5	Apr 00
UME	-24	36	Nov 00
PTB	-32	11	Mar 01
PTB	-28	11	Apr 01

Key comparison EUROMET.EM-K5.1

The results of measurements obtained by the participants in EUROMET.EM-K5.1 are given in Table 2 on page 7 of the Final Report.

Key comparison SIM.EM-K5

The results of measurements obtained by the participants in SIM.EM-K5 are given in Tables B.1 to B.8 on pages 29 to 36 of the Final Report.

*Laboratories having discovered errors in their measurement systems and having therefore asked for repetition of their measurements. The first measurement results made by these laboratories have not been used in the final results.

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison CCEM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lead, 53 Hz
 NOMINAL VALUE : 600 VA, 300 W

x_i : deviation from nominal measured by laboratory i
 u_i : standard combined uncertainty of x_i

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
NRC	26	6	Jun 96
NIST	17	7	Jul 96
PTB	9	7	Aug 96
SP	-5	11	Sep 96
NIST	20	7	Oct 96
NMIA	15	8	Nov 96
MSL	27	24	Dec 96
NIST	17	7	Feb 97
NPL	2	13	Mar 97
INRIM	4	15	Apr 97
NIST	12	7	May 97
INTI	20	17	Aug 97
NIST	15	7	Sep 97
NIST	12	7	Nov 97
NIM	-2	4	Mar 98
NIST	5	7	Apr 98
VNIIM	-8	14	Jun 98
NRC	11	6	Sep 98
NIST	5	7	Nov 98
SPRING Singapore	3	31	Dec 98
CSIR-NML	-6	30	Feb 99
NIST	6	7	Mar 99

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
PTB	-1	5	May 99
NIST	8	7	Jun 99
INMETRO	21	30	Aug 99
CENAM	4	17	Aug 99
NIST	4	7	Sep 99
NIST	11	7	Jun 00
NIM	23	6	Jul 00
MSL	16	15	Aug 00
NIST	12	7	Aug 00
CSIR-NML	-1	40	Sep 00
SP	6	11	Oct 00
NIST	11	7	Nov 00

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lead, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

x_{i-EUR} : deviation from nominal measured by laboratory i

u_{i-EUR} : combined standard uncertainty of x_{i-EUR}

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
PTB	-23	10	Nov 96
PTB	-21	10	Feb 97
NPL	-22	14	Mar 97
PTB	-12	10	Apr 97
INRIM	-11	15	Apr 97
PTB	-24	10	May 97
SP	-30	10	Jun 97
AREPA	-38	50	Jun 97
PTB	-21	10	Jul 97
NMi-VSL*	15	-	Aug 97
INETI	-26	76	Oct 97
SMD	4	19	Dec 97
PTB	-17	10	Dec 97
BEV	-34	35	Feb 98
PTB	-16	10	Feb 98
METAS	-3	24	Mar 98
PTB	-15	10	Mar 98
MIKES*	-	-	Apr 98
PTB	-10	10	May 98
CMI	-35	30	Jun 98
OMH	-35	85	Jun 98
PTB	-14	10	Jul 98

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
JV	-2	35	Aug 98
PTB	-15	10	Sep 98
UME*	-	-	Oct 98
PTB	-18	10	Nov 98
CEM	-68	33	Dec 98
PTB	-20	10	Jan 99
GUM	-9	37	Feb 99
PTB	-20	10	Feb 99
PTB	-17	10	Oct 99
MIKES	-8	10	Dec 99
PTB	-17	10	Dec 99
NMi-VSL	-30	25	Apr 00
UME	29	36	Nov 00
PTB	-9	10	Mar 01
PTB	4	10	Apr 01

Key comparison EUROMET.EM-K5.1

The results of measurements obtained by the participants in EUROMET.EM-K5.1 are given in Table 2 on page 7 of the Final Report.

Key comparison SIM.EM-K5

The results of measurements obtained by the participants in SIM.EM-K5 are given in Tables B.1 to B.8 on pages 29 to 36 of the Final Report.

*Laboratories having discovered errors in their measurement systems and having therefore asked for repetition of their measurements. The first measurement results made by these laboratories have not been used in the final results.

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison CCEM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lag, 53 Hz
 NOMINAL VALUE : 600 VA, 300 W

x_i : deviation from nominal measured by laboratory i
 u_i : standard combined uncertainty of x_i

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
NRC	-27	6	Jun 96
NIST	-24	7	Jul 96
PTB	-18	7	Aug 96
SP	-43	11	Sep 96
NIST	-22	7	Oct 96
NMIA	-20	8	Nov 96
MSL	-4	24	Dec 96
NIST	-25	7	Feb 97
NPL	-4	13	Mar 97
INRIM	-21	15	Apr 97
NIST	-20	7	May 97
INTI	-20	17	Aug 97
NIST	-21	7	Sep 97
NIST	-26	7	Nov 97
NIM	1	4	Mar 98
NIST	-27	7	Apr 98
VNIIM	-53	14	Jun 98
NRC	-37	6	Sep 98
NIST	-30	7	Nov 98
SPRING Singapore	-17	31	Dec 98
CSIR-NML	-45	30	Feb 99
NIST	-32	7	Mar 99

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
PTB	-18	5	May 99
NIST	-34	7	Jun 99
INMETRO	-56	30	Aug 99
CENAM	-28	17	Aug 99
NIST	-30	7	Sep 99
NIST	-28	7	Jun 00
NIM	-36	6	Jul 00
MSL	-37	15	Aug 00
NIST	-21	7	Aug 00
CSIR-NML	-14	40	Sep 00
SP	-14	11	Oct 00
NIST	-22	7	Nov 00

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

x_{i-EUR} : deviation from nominal measured by laboratory i

u_{i-EUR} : combined standard uncertainty of x_{i-EUR}

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
PTB	-40	10	Nov 96
PTB	-42	10	Feb 97
NPL	-30	14	Mar 97
PTB	-33	10	Apr 97
INRIM	-37	15	Apr 97
PTB	-43	10	May 97
SP	-54	10	Jun 97
AREPA	-35	50	Jun 97
PTB	-43	10	Jul 97
NMi-VSL*	-5	-	Aug 97
INETI	-30	97	Oct 97
SMD	1	19	Dec 97
PTB	-39	10	Dec 97
BEV	-45	35	Feb 98
PTB	-38	10	Feb 98
METAS	-52	24	Mar 98
PTB	-35	10	Mar 98
MIKES*	-	-	Apr 98
PTB	-33	10	May 98
CMI	-50	30	Jun 98
OMH	28	85	Jun 98
PTB	-37	10	Jul 98

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
JV	-12	35	Aug 98
PTB	-39	10	Sep 98
UME*	-	-	Oct 98
PTB	-35	10	Nov 98
CEM	36	33	Dec 98
PTB	-41	10	Jan 99
GUM	-23	37	Feb 99
PTB	-45	10	Feb 99
PTB	-28	10	Oct 99
MIKES	-7	10	Dec 99
PTB	-28	10	Dec 99
NMi-VSL	-5	25	Apr 00
UME	-55	36	Nov 00
PTB	-18	10	Mar 01
PTB	-12	10	Apr 01

Key comparison EUROMET.EM-K5.1

The results of measurements obtained by the participants in EUROMET.EM-K5.1 are given in Table 2 on page 7 of the Final Report.

Key comparison SIM.EM-K5

The results of measurements obtained by the participants in SIM.EM-K5 are given in Tables B.1 to B.8 on pages 29 to 36 of the Final Report.

*Laboratories having discovered errors in their measurement systems and having therefore asked for repetition of their measurements. The first measurement results made by these laboratories have not been used in the final results.

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison CCEM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lead, 53 Hz
 NOMINAL VALUE : 600 VA, 0 W

x_i : deviation from nominal measured by laboratory i
 u_i : standard combined uncertainty of x_i

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
NRC	-7	5	Jun 96
NIST	-13	6	Jul 96
PTB	-20	6	Aug 96
SP	-18	9	Sep 96
NIST	-7	6	Oct 96
NMIA	-3	7	Nov 96
MSL	-12	18	Dec 96
NIST	-14	6	Feb 97
NPL	-41	14	Mar 97
INRIM	-27	15	Apr 97
NIST	-16	6	May 97
INTI	-9	19	Aug 97
NIST	-13	6	Sep 97
NIST	-13	6	Nov 97
NIM	-40	5	Mar 98
NIST	-20	6	Apr 98
VNIIM	-8	12	Jun 98
NRC	-15	5	Sep 98
NIST	-17	6	Nov 98
SPRING Singapore	-36	31	Dec 98
CSIR-NML	-32	30	Feb 99
NIST	-18	6	Mar 99

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
PTB	-22	5	May 99
NIST	-18	6	Jun 99
INMETRO	-14	30	Aug 99
CENAM	-34	27	Aug 99
NIST	-23	6	Sep 99
NIST	-15	6	Jun 00
NIM	-14	6	Jul 00
MSL	-18	16	Aug 00
NIST	-12	6	Aug 00
CSIR-NML	-43	40	Sep 00
SP	-25	9	Oct 00
NIST	-21	6	Nov 00

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lead, 53 Hz
NOMINAL VALUE : 600 VA, 0 W

x_{i-EUR} : deviation from nominal measured by laboratory i
 u_{i-EUR} : combined standard uncertainty of x_{i-EUR}

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
PTB	13	10	Nov 96
PTB	12	10	Feb 97
NPL	5	14	Mar 97
PTB	13	10	Apr 97
INRIM	21	15	Apr 97
PTB	9	10	May 97
SP	18	8	Jun 97
AREPA	-13	70	Jun 97
PTB	5	10	Jul 97
NMi-VSL*	-120	-	Aug 97
INETI	-208	241	Oct 97
SMD	17	14	Dec 97
PTB	10	10	Dec 97
BEV	11	110	Feb 98
PTB	9	10	Feb 98
METAS	31	23	Mar 98
PTB	7	10	Mar 98
MIKES*	-	-	Apr 98
PTB	8	10	May 98
CMI	-50	25	Jun 98
OMH	45	85	Jun 98
PTB	14	10	Jul 98

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
JV	6	35	Aug 98
PTB	13	10	Sep 98
UME*	-	-	Oct 98
PTB	10	10	Nov 98
CEM	-	-	Dec 98
PTB	12	10	Jan 99
GUM	16	37	Feb 99
PTB	12	10	Feb 99
PTB	8	10	Oct 99
MIKES	-3	6	Dec 99
PTB	8	10	Dec 99
NMi-VSL	-10	85	Apr 00
UME	10	36	Nov 00
PTB	16	10	Mar 01
PTB	20	10	Apr 01

Key comparison EUROMET.EM-K5.1

The results of measurements obtained by the participants in EUROMET.EM-K5.1 are given in Table 2 on page 7 of the Final Report.

Key comparison SIM.EM-K5

The results of measurements obtained by the participants in SIM.EM-K5 are given in Tables B.1 to B.8 on pages 29 to 36 of the Final Report.

*Laboratories having discovered errors in their measurement systems and having therefore asked for repetition of their measurements. The first measurement results made by these laboratories have not been used in the final results.

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison CCEM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lag, 53 Hz
 NOMINAL VALUE : 600 VA, 0 W

x_i : deviation from nominal measured by laboratory i
 u_i : standard combined uncertainty of x_i

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
NRC	-68	5	Jun 96
NIST	-59	6	Jul 96
PTB	-53	6	Aug 96
SP	-60	9	Sep 96
NIST	-63	6	Oct 96
NMIA	-62	7	Nov 96
MSL	-73	18	Dec 96
NIST	-54	6	Feb 97
NPL	-44	14	Mar 97
INRIM	-58	16	Apr 97
NIST	-52	6	May 97
INTI	-50	19	Aug 97
NIST	-53	6	Sep 97
NIST	-55	6	Nov 97
NIM	-37	4	Mar 98
NIST	-55	6	Apr 98
VNIIM	-70	12	Jun 98
NRC	-73	5	Sep 98
NIST	-57	6	Nov 98
SPRING Singapore	-65	31	Dec 98
CSIR-NML	-54	30	Feb 99
NIST	-58	6	Mar 99

Lab i	x_i / (μ W/VA)	u_i / (μ W/VA)	Date of measurement
PTB	-56	5	May 99
NIST	-59	6	Jun 99
INMETRO	-77	30	Aug 99
CENAM	-55	27	Aug 99
NIST	-60	6	Sep 99
NIST	-54	6	Jun 00
NIM	-72	6	Jul 00
MSL	-69	16	Aug 00
NIST	-52	6	Aug 00
CSIR-NML	-57	40	Sep 00
SP	-47	9	Oct 00
NIST	-57	6	Nov 00

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

Key comparison EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 0 W

x_{i-EUR} : deviation from nominal measured by laboratory i

u_{i-EUR} : combined standard uncertainty of x_{i-EUR}

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
PTB	-8	10	Nov 96
PTB	-12	10	Feb 97
NPL	-3	14	Mar 97
PTB	-10	10	Apr 97
INRIM	-10	15	Apr 97
PTB	-14	10	May 97
SP	-13	8	Jun 97
AREPA	-14	70	Jun 97
PTB	20	10	Jul 97
NMi-VSL*	15	-	Aug 97
INETI	4	148	Oct 97
SMD	9	14	Dec 97
PTB	-17	10	Dec 97
BEV	-3	110	Feb 98
PTB	-19	10	Feb 98
METAS	-24	23	Mar 98
PTB	-16	10	Mar 98
MIKES*	-	-	Apr 98
PTB	-14	10	May 98
CMI	-130	25	Jun 98
OMH	-37	85	Jun 98
PTB	-14	10	Jul 98

Lab i	x_{i-EUR} / (μ W/VA)	u_{i-EUR} / (μ W/VA)	Date of measurement
JV	-13	35	Aug 98
PTB	-13	10	Sep 98
UME*	-	-	Oct 98
PTB	-10	10	Nov 98
CEM	-	-	Dec 98
PTB	-8	10	Jan 99
GUM	7	37	Feb 99
PTB	-8	10	Feb 99
PTB	2	10	Oct 99
MIKES	-1	6	Dec 99
PTB	-1	10	Dec 99
NMi-VSL	12	85	Apr 00
UME	-15	36	Nov 00
PTB	12	10	Mar 01
PTB	16	10	Apr 01

Key comparison EUROMET.EM-K5.1

The results of measurements obtained by the participants in EUROMET.EM-K5.1 are given in Table 2 on page 7 of the Final Report.

Key comparison SIM.EM-K5

The results of measurements obtained by the participants in SIM.EM-K5 are given in Tables B.1 to B.8 on pages 29 to 36 of the Final Report.

*Laboratories having discovered errors in their measurement systems and having therefore asked for repetition of their measurements. The first measurement results made by these laboratories have not been used in the final results.

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

MEASURAND : Electric power at 120 V, 5 A, 53 Hz

POWER FACTOR : 1.0, 0.5 Lead, 0.5 Lag, 0.0 Lead, 0.0 Lag

Key comparison CCEM-K5

For each power factor, the key comparison reference value, x_R , is calculated as the weighted mean of the difference between laboratory i and the predicted value, based on measurements performed at the pilot laboratory. Its standard uncertainty, u_R , is calculated as the uncertainty of the weighted mean of the differences.

Power factor	x_R / ($\mu\text{W}/\text{VA}$)	u_R / ($\mu\text{W}/\text{VA}$)
1.0	7	5
0.5 Lead	-1	5
0.5 Lag	-1	5
0.0 Lead	0	5
0.0 Lag	-3	5

The degree of equivalence of each laboratory with respect to the key comparison reference value is given by a pair of terms: D_i and U_i , its expanded uncertainty ($k = 2$), both expressed in $\mu\text{W}/\text{VA}$. The derivation of these terms can be found in the CCEM-K5 Final Report. The degree of equivalence between two laboratories is given by a pair of terms: D_{ij} and U_{ij} , its expanded uncertainty ($k = 2$), both expressed in $\mu\text{W}/\text{VA}$. The derivation of these terms can be found in the CCEM-K5 Final Report.

Linking EUROMET.EM-K5 and EUROMET.EM-K5.1 to CCEM-K5

For each power factor the linkage between EUROMET.EM-K5 and CCEM-K5, or EUROMET.EM-K5.1 and CCEM-K5, is computed as explained in the corresponding Linkage Report.

The INRIM, NPL and PTB ensure the linkage between EUROMET.EM-K5 and CCEM-K5, and PTB between EUROMET.EM-K5.1 and CCEM-K5

Linking SIM.EM-K5.1 to CCEM-K5

It was possible to link SIM.EM-K5 results to those of CCEM-K5 for the power factors 1.0, 0.5 Lead and 0.5 Lag as explained in the Addendum to the SIM.EM-K5 Final Report.

NIST, NRC, INTI, INMETRO and CENAM ensure the linkage.

It follows that the tables of degrees of equivalence relative to the key comparison reference values and the graphs of equivalence obtained for CCEM-K5 can be extended to include results from the EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5 participants. The full matrices of equivalence are given here for CCEM-K5 and EUROMET.EM-K5 only.

Pair-wise degrees of equivalence involving EUROMET.EM-K5.1 participants are available in Tables 6.1 to 6.5 of the EUROMET.EM-K5.1 Linkage Report.

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

MEASURAND : Electric power at 120 V, 5 A, 53 Hz

POWER FACTOR : 1.0

Lab <i>i</i>	D_i	U_i	D_i	U_i	
	/ (μ W/VA)		/ (μ W/VA)		
NIST	-7	12	AREPA	-1	97
NMIA	-1	14	INETI	-3	76
NPL	8	32	SMD	54	46
INRIM	-7	30	BEV	-58	75
INTI	15	20	METAS	-13	60
VNIIM	10	18	CMI	6	75
NRC	-4	14	MKEH	47	172
NMC, A*STAR	22	62	JV	29	74
PTB	0	10	CEM	-2	71
INMETRO	-9	60	GUM	23	80
CENAM	4	34	MIKES	42	43
NIM	-1	12	VSL	18	27
MSL	-2	28	UME	15	77
NMISA	-12	80			
SP	1	30			
			UME	0	25
			BIM	-14	74
			SMU	16	60
			MKEH	8	64
			INM (RO)	24	83
			DMDM	23	48
			MIKES	6	35
			VSL	-15	19
			NPLI	-15	81
			LNE	5	32
			UMTS	18	34
			UTE	9	23
			CENAMEP AIP	8	63
			INM (CO)	14	111

Black: participants in CCEM-K5

Blue: participants in EUROMET.EM-K5

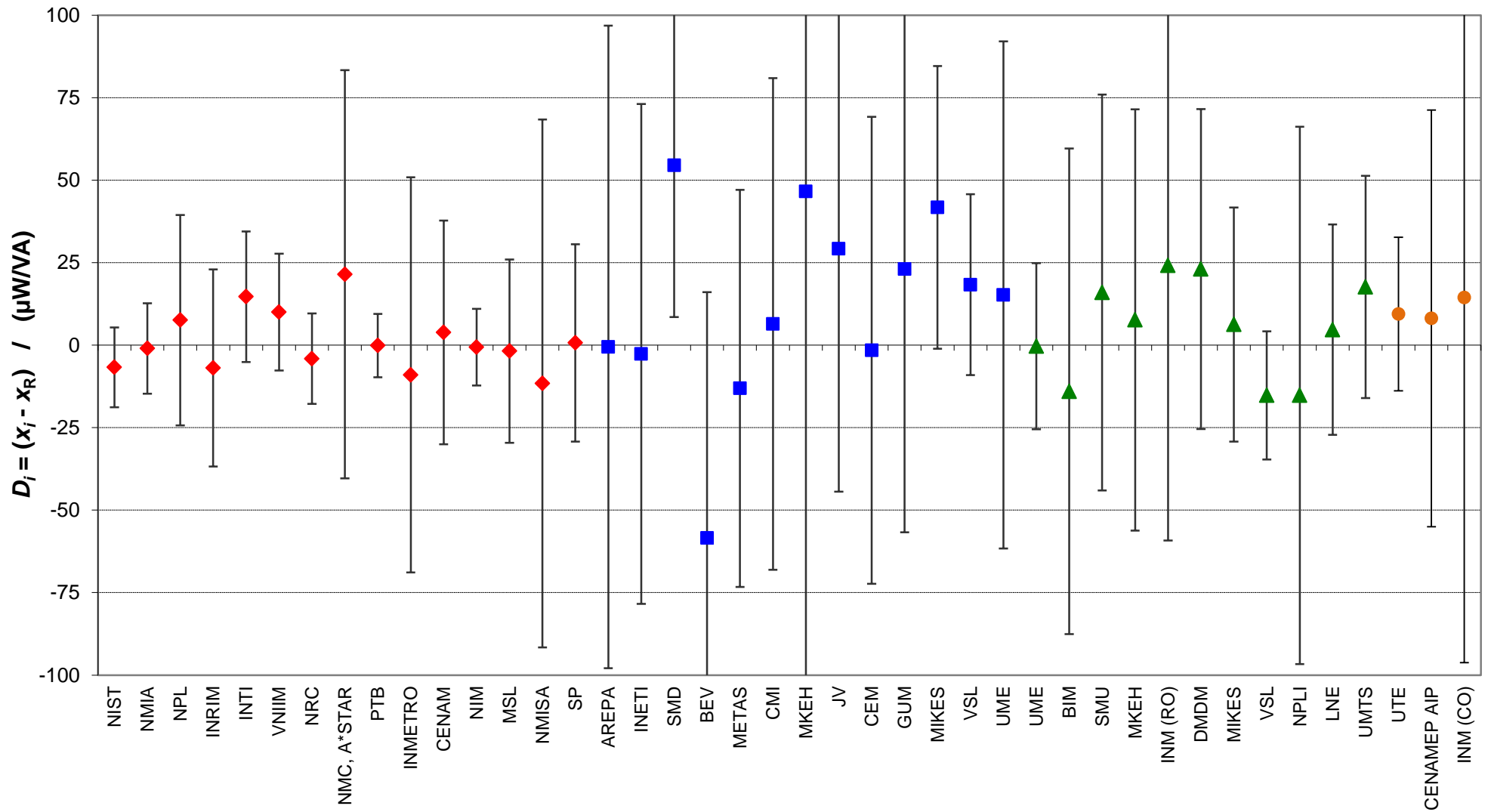
Green: participants in EUROMET.EM-K5.1

Red: participants in SIM.EM-K5

The laboratories' acronyms used in this table have been updated in December 2014

The acronym "UMTS" stands for SE "Ukrmetrteststandard"

CCEM-K5, EUROMET.EM-K5 & K5.1 and SIM.EM-K5 Power factor 1.0
Degrees of equivalence: [D_i and expanded uncertainty U_i ($k = 2$)]



Red diamonds: participants in CCEM-K5

Blue squares: participants in EUROMET.EM-K5 only

Green triangles: participants in EUROMET.EM-K5.1 only

Orange circles: participants in SIM.EM-K5 only

$U_{MKEH} = 172 \mu W/VA$

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

MEASURAND : Electric power at 120 V, 5 A, 53 Hz

POWER FACTOR : 0.5 Lead

Lab <i>i</i>	D_i	U_i	D_i	U_i	
	/ (μ W/VA)		/ (μ W/VA)		
NIST	1	12	AREPA	-30	102
NMIA	-1	16	INETI	-19	152
NPL	-12	26	SMD	11	44
INRIM	-10	30	BEV	-28	73
INTI	9	34	METAS	3	53
VNIIM	-15	28	CMI	-28	64
NRC	5	12	MKEH	-28	171
NMC, A*STAR	-3	62	JV	5	72
PTB	-7	10	CEM	-60	69
INMETRO	15	60	GUM	-1	78
CENAM	-2	34	MIKES	0	29
NIM	13	12	VSL	-23	54
MSL	5	30	UME	29	76
NMISA	-14	80			
SP	-8	22			
			UME	-6	24
			BIM	2	95
			SMU	18	62
			MKEH	-12	62
			INM (RO)	25	83
			DMDM	17	40
			MIKES	0	29
			VSL	-23	23
			NPLI	3	67
			LNE	-5	23
			UMTS	-54	93
			UTE	5	42
			CENAMEP AIP	33	94
			INM (CO)	33	111

Black: participants in CCEM-K5

Blue: participants in EUROMET.EM-K5

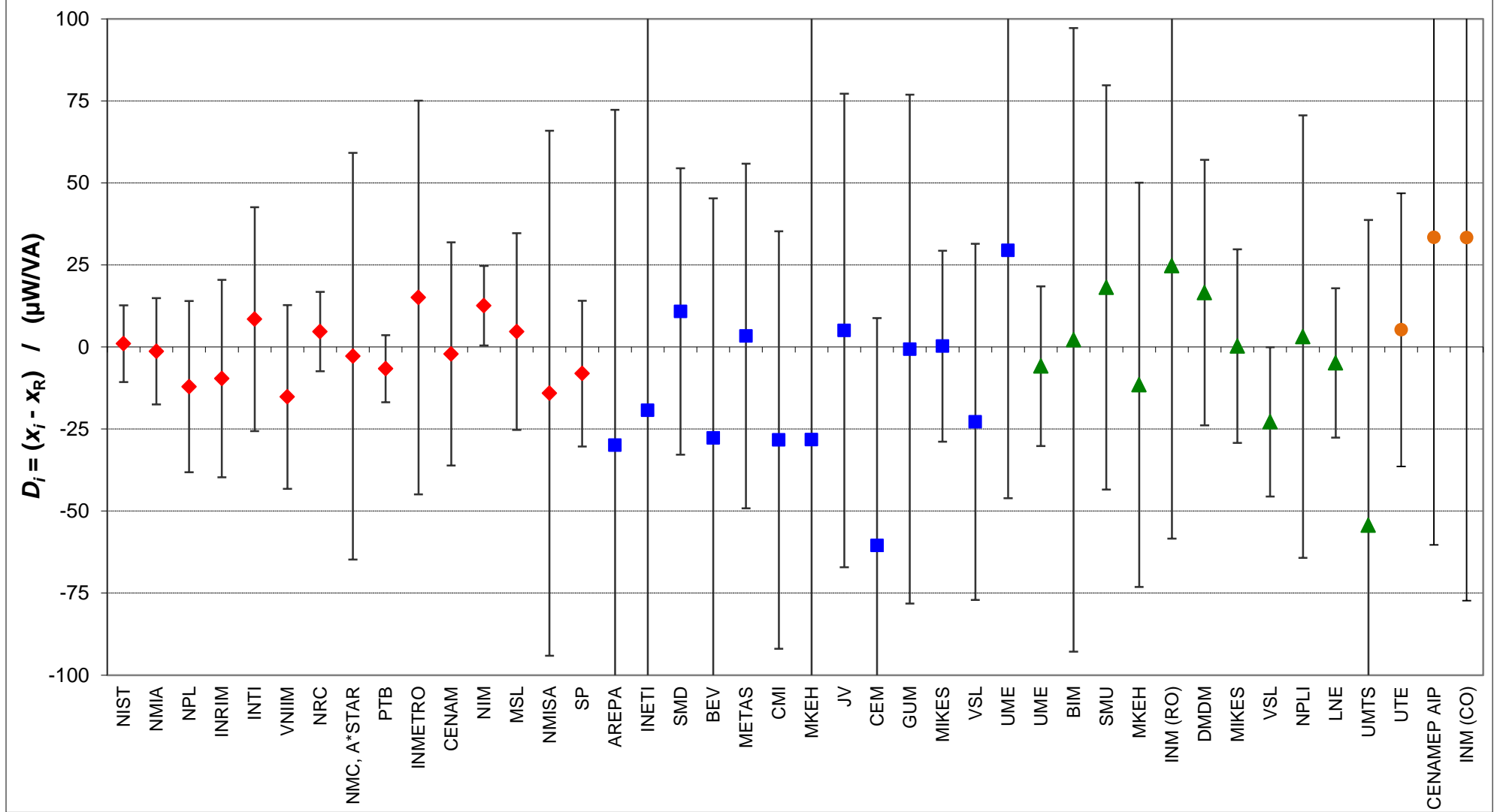
Green: participants in EUROMET.EM-K5.1

Red: participants in SIM.EM-K5

The laboratories' acronyms used in this table have been updated in December 2014

The acronym "UMTS" stands for SE "Ukrmetrteststandard"

CCEM-K5, EUROMET.EM-K5 & K5.1 and SIM.EM-K5 Power factor 0.5 Lead
Degrees of equivalence: [D_i and expanded uncertainty $U_i (k = 2)$]



Red diamonds: participants in CCEM-K5

Blue squares: participants in EUROMET.EM-K5 only

Green triangles: participants in EUROMET.EM-K5.1 only

Orange circles: participants in SIM.EM-K5 only

$U_{INETI} = 152 \mu W/VA$

$U_{MKEH} = 171 \mu W/VA$

Key comparisons CCEM-K5, EUROMET.EM-K5, EUROMET.EM-K5.1 and SIM.EM-K5

MEASURAND : Electric power at 120 V, 5 A, 53 Hz

POWER FACTOR : 0.5 Lag

Lab <i>i</i>	D_i	U_i	D_i	U_i
	I (μ W/VA)		I (μ W/VA)	
NIST	1	12	AREPA	14
NMIA	3	16	INETI	18
NPL	19	26	SMD	49
INRIM	2	30	BEV	3
INTI	4	34	METAS	-4
VNIIM	-25	28	CMI	-3
NRC	-3	12	MKEH	75
NMC, A*STAR	13	62	JV	35
PTB	12	10	CEM	82
INMETRO	-26	60	GUM	23
CENAM	2	34	MIKES	33
NIM	-14	12	VSL	32
MSL	-16	30	UME	-25
NMISA	3	80		
SP	1	22		
			UME	9
			BIM	-2
			SMU	7
			MKEH	9
			INM (RO)	8
			DMDM	46
			MIKES	11
			VSL	-4
			NPLI	10
			LNE	15
			UMTS	77
			UTE	9
			CENAMEP AIP	-20
			INM (CO)	-7

Black: participants in CCEM-K5

Blue: participants in EUROMET.EM-K5

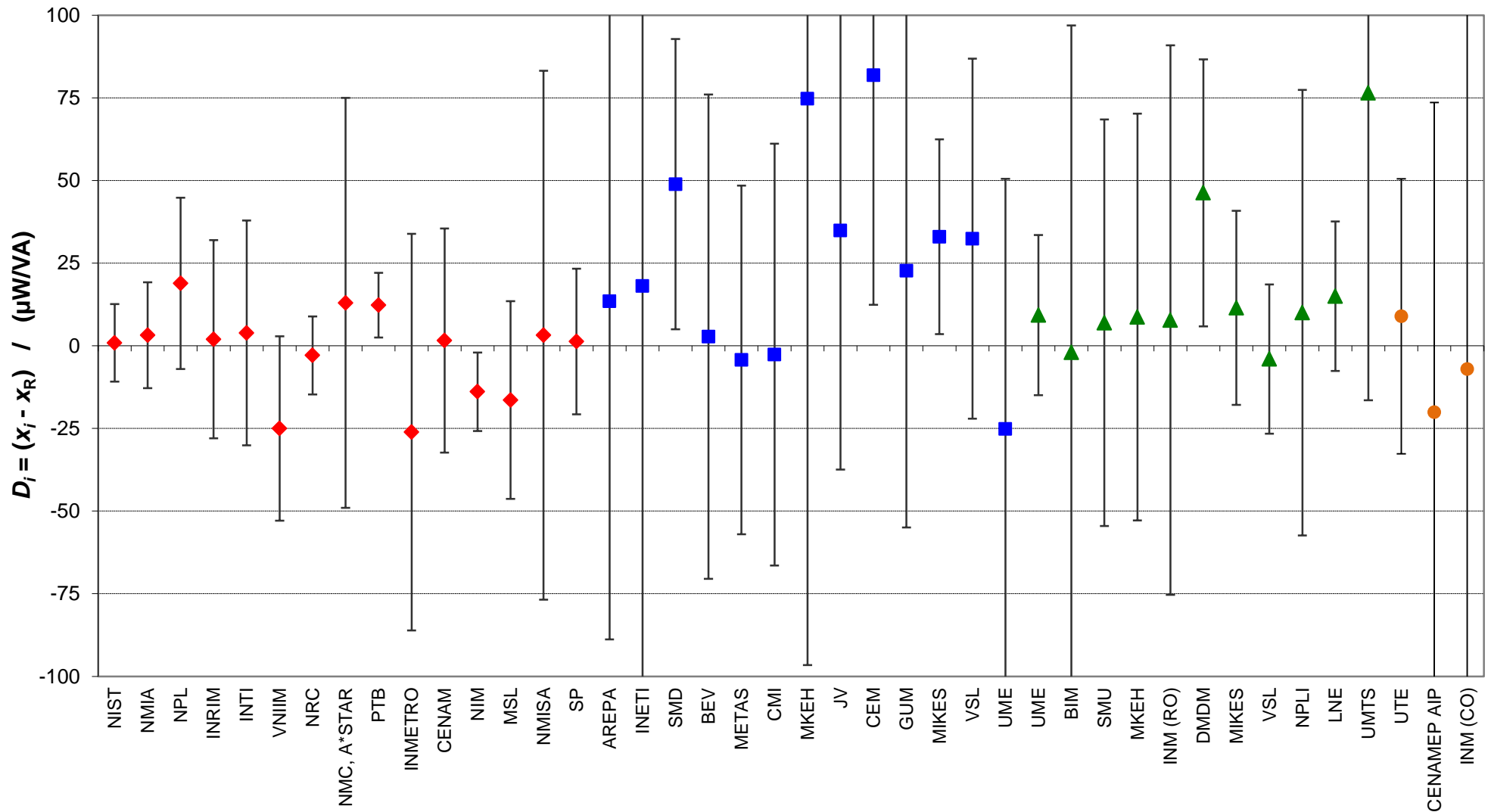
Green: participants in EUROMET.EM-K5.1

Red: participants in SIM.EM-K5

The laboratories' acronyms used in this table have been updated in December 2014

The acronym "UMTS" stands for SE "Ukrmetrteststandard"

CCEM-K5, EUROMET.EM-K5 & K5.1 and SIM.EM-K5 Power factor 0.5 Lag
 Degrees of equivalence: [D_i and expanded uncertainty $U_i (k = 2)$]



Red diamonds: participants in CCEM-K5

Blue squares: participants in EUROMET.EM-K5 only

Green triangles: participants in EUROMET.EM-K5.1 only

Orange circles: participants in SIM.EM-K5 only

$U_{INETI} = 195 \mu W/VA$

$U_{INM(CO)} = 132 \mu W/VA$

Key comparisons CCEM-K5, EUROMET.EM-K5 and EUROMET.EM-K5.1

MEASURAND : Electric power at 120 V, 5 A, 53 Hz

POWER FACTOR : 0.0 Lead

Lab <i>i</i>	D_i	U_i	D_i	U_i	
	I (μ W/VA)		I (μ W/VA)		
NIST	0	9	AREPA	-34	141
NMIA	9	15	INETI	-230	482
NPL	-28	29	SMD	-4	34
INRIM	-14	31	BEV	-10	221
INTI	6	39	METAS	10	50
VNIIM	9	25	CMI	-71	54
NRC	7	12	MKEH	24	171
NMC, A*STAR	-18	62	JV	-14	72
PTB	-4	12	CEM	-	-
INMETRO	4	60	GUM	-5	77
CENAM	-16	54	MIKES	-25	23
NIM	3	13	VSL	-33	171
MSL	-1	33	UME	-16	74
NMISA	-26	80			
SP	-9	19			
			UME	-9	25
			BIM	19	105
			SMU	4	64
			MKEH	-19	62
			INM (RO)	23	83
			DMDM	-9	39
			MIKES	0	28
			VSL	4	25
			NPLI	12	64
			LNE	-5	19
			UMTS	-9	147

Black: participants in CCEM-K5

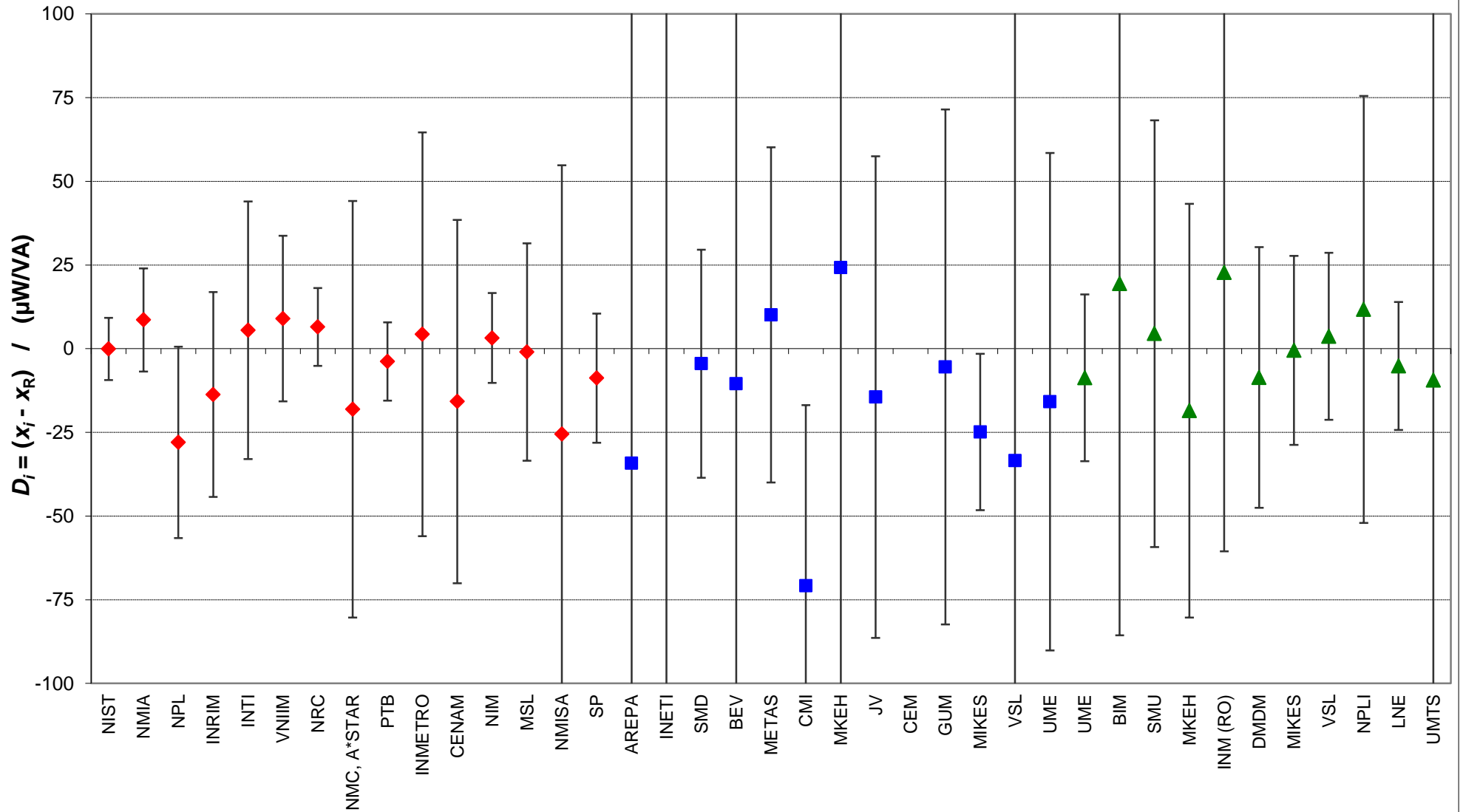
Blue: participants in EUROMET.EM-K5

Green: participants in EUROMET.EM-K5.1

The laboratories' acronyms used in this table have been updated in December 2014

The acronym "UMTS" stands for SE "Ukrmetrteststandard"

CCEM-K5, EUROMET.EM-K5 and EUROMET.EM-K5.1 Power factor 0.0 Lead
 Degrees of equivalence: [D_i and expanded uncertainty $U_i (k = 2)$]



Red diamonds: participants in CCEM-K5

Blue squares: participants in EUROMET.EM-K5 only

Green triangles: participants in EUROMET.EM-K5.1 only

$U_{AREPA} = 141 \mu\text{W/VA}$ $U_{VSL} = 171 \mu\text{W/VA}$

$D_{INETI} = -230 \mu\text{W/VA}$ and $U_{INETI} = 482 \mu\text{W/VA}$

$U_{BEV} = 221 \mu\text{W/VA}$

$U_{MKEH} = 171 \mu\text{W/VA}$

$U_{UMTS} = 147 \mu\text{W/VA}$

Key comparisons CCEM-K5, EUROMET.EM-K5 and EUROMET.EM-K5.1

MEASURAND : Electric power at 120 V, 5 A, 53 Hz

POWER FACTOR : 0.0 Lag

Lab <i>i</i>	D_i	U_i	D_i	U_i
	I (μ W/VA)		I (μ W/VA)	
NIST	3	9	AREPA	6
NMIA	-2	15	INETI	25
NPL	14	28	SMD	31
INRIM	0	32	BEV	18
INTI	7	38	METAS	-3
VNIIM	-11	24	CMI	-110
NRC	-11	11	MKEH	-18
NMC, A*STAR	-4	62	JV	5
PTB	7	11	CEM	-
INMETRO	-13	60	GUM	20
CENAM	9	54	MIKES	1
NIM	-7	13	VSL	11
MSL	-4	32	UME	-22
NMISA	7	80		
SP	17	19		
			UME	-1
			BIM	1
			SMU	-11
			MKEH	1
			INM (RO)	-16
			DMDM	14
			MIKES	3
			VSL	14
			NPLI	-8
			LNE	7
			UMTS	19

Black: participants in CCEM-K5

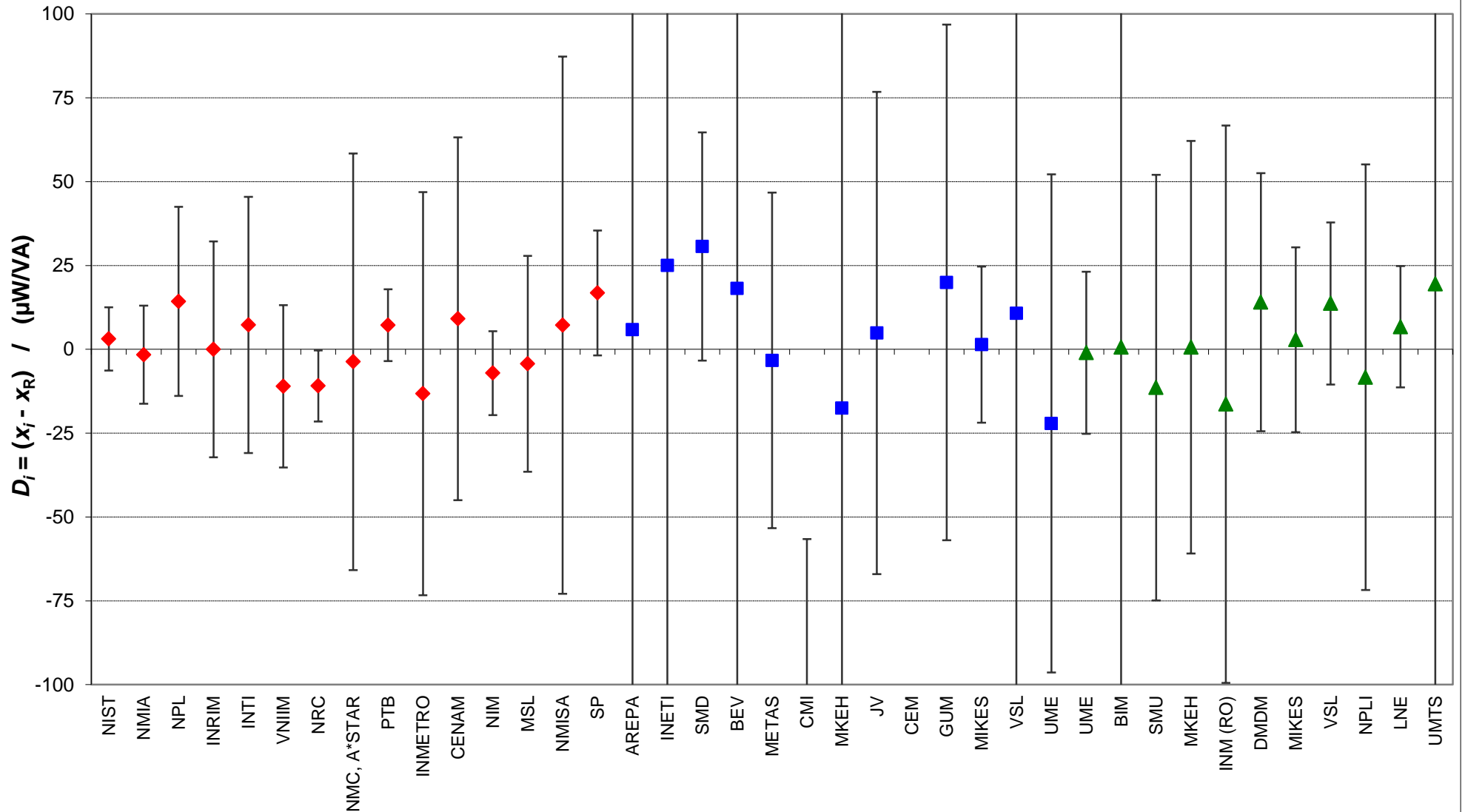
Blue: participants in EUROMET.EM-K5

Green: participants in EUROMET.EM-K5.1

The laboratories' acronyms used in this table have been updated in December 2014

The acronym "UMTS" stands for SE "Ukrmetrteststandard"

CCEM-K5, EUROMET.EM-K5 and EUROMET.EM-K5.1 Power factor 0.0 Lag
 Degrees of equivalence: [D_i and expanded uncertainty U_i ($k = 2$)]



Red diamonds: participants in CCEM-K5

Blue squares: participants in EUROMET.EM-K5 only

Green triangles: participants in EUROMET.EM-K5.1 only

$U_{AREPA} = 141 \mu\text{W/VA}$

$U_{MKEH} = 171 \mu\text{W/VA}$

$U_{VSL} = 171 \mu\text{W/VA}$

$U_{INETI} = 296 \mu\text{W/VA}$

$U_{BEV} = 221 \mu\text{W/VA}$

$U_{BIM} = 103 \mu\text{W/VA}$

$D_{CMI} = -110 \mu\text{W/VA}$ and $U_{CMI} = 54 \mu\text{W/VA}$

$U_{UMTS} = 155 \mu\text{W/VA}$

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 1.0, 53 Hz

NOMINAL VALUE : 600 VA, 600 W

Matrix of equivalence

Lab <i>i</i>	D_i U_i		Lab <i>j</i> \Rightarrow																			
	/ (μ W/VA)		NIST		NMIA		NPL		INRIM		INTI		VNIIM		NRC		SPRING		PTB		INMETRO	
	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
NIST	-7	12																				
NMIA	-1	14	6	20																		
NPL	8	32	14	35	9	35																
INRIM	-7	30	0	33	-6	34	-15	44														
INTI	15	20	21	24	16	25	7	38	22	36												
VNIIM	10	18	17	23	11	24	2	37	17	35	-5	27										
NRC	-4	14	3	20	-3	21	-12	35	3	34	-19	25	-14	23								
SPRING	22	62	28	64	23	64	14	70	28	69	7	65	12	65	26	64						
PTB	0	10	7	17	1	18	-8	34	7	32	-15	23	-10	21	4	18	-22	63				
INMETRO	-9	60	-2	62	-8	62	-17	68	-2	67	-24	64	-19	63	-5	62	-30	86	-9	61		
CENAM	4	34	11	37	5	37	-4	47	11	46	-11	40	-6	39	8	37	-18	71	4	36	13	69
NIM	-1	12	6	18	1	19	-8	35	6	33	-15	24	-11	22	4	19	-22	63	-1	17	8	61
MSL	-2	28	5	31	-1	32	-9	43	5	41	-17	35	-12	34	2	32	-23	68	-2	30	7	66
CSIR-NML	-12	80	-5	81	-11	81	-19	86	-5	86	-26	83	-22	82	-8	81	-33	101	-12	81	-3	100
SP	1	30	7	33	2	34	-7	44	8	43	-14	37	-9	36	5	34	-21	69	1	32	10	67
AREPA	-1	97	6	98	0	98	-9	102	6	101	-16	99	-11	99	3	98	-23	115	-1	99	8	114
INETI	-3	76	4	77	-2	77	-11	81	4	81	-18	78	-13	78	1	77	-25	98	-3	77	6	97
SMD	54	46	61	48	55	48	46	55	61	54	39	50	44	49	58	48	32	77	54	48	63	76
BEV	-58	75	-51	76	-57	76	-66	80	-51	80	-73	77	-68	77	-54	76	-80	97	-58	76	-49	96
METAS	-13	60	-6	61	-12	62	-21	67	-6	66	-28	63	-23	63	-9	62	-35	86	-13	62	-4	85
CMi	6	75	13	75	7	76	-2	80	13	80	-9	77	-4	77	10	76	-16	97	6	76	15	96
OMH	47	172	54	172	48	172	39	174	54	174	32	173	37	173	51	172	25	183	47	173	56	182
JV	29	74	36	75	30	75	21	79	36	79	14	76	19	76	33	75	7	96	29	75	38	95
CEM	-2	71	5	72	-1	72	-10	77	5	76	-17	73	-12	73	2	72	-24	94	-2	72	7	93
GUM	23	80	30	81	24	81	15	85	30	85	8	82	13	82	27	81	1	101	23	81	32	100
MIKES	42	43	49	45	43	45	34	52	49	51	27	47	32	47	46	45	20	75	42	46	51	74
NMi-VSL	18	27	25	31	19	32	10	41	25	40	3	35	8	33	22	32	-4	68	18	32	27	66
UME	15	77	22	78	16	78	7	83	22	82	0	80	5	79	19	78	-7	99	15	78	24	98

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 1.0, 53 Hz

NOMINAL VALUE : 600 VA, 600 W

Matrix of equivalence - continued

Lab <i>i</i>	D_i U_i / (μW/VA)		Lab <i>j</i> →																			
	D_{ij} / (μW/VA)	U_{ij} / (μW/VA)	CENAM		NIM		MSL		CSIR-NML		SP		AREPA		INETI		SMD		BEV		METAS	
NIST	-7	12	-11	37	-6	18	-5	31	5	81	-7	33	-6	98	-4	77	-61	48	51	76	6	61
NMIA	-1	14	-5	37	-1	19	1	32	11	81	-2	34	0	98	2	77	-55	48	57	76	12	62
NPL	8	32	4	47	8	35	9	43	19	86	7	44	9	102	11	81	-46	55	66	80	21	67
INRIM	-7	30	-11	46	-6	33	-5	41	5	86	-8	43	-6	101	-4	81	-61	54	51	80	6	66
INTI	15	20	11	40	15	24	17	35	26	83	14	37	16	99	18	78	-39	50	73	77	28	63
VNIIM	10	18	6	39	11	22	12	34	22	82	9	36	11	99	13	78	-44	49	68	77	23	63
NRC	-4	14	-8	37	-4	19	-2	32	8	81	-5	34	-3	98	-1	77	-58	48	54	76	9	62
SPRING	22	62	18	71	22	63	23	68	33	101	21	69	23	115	25	98	-32	77	80	97	35	86
PTB	0	10	-4	36	1	17	2	30	12	81	-1	32	1	99	3	77	-54	48	58	76	13	62
INMETRO	-9	60	-13	69	-8	61	-7	66	3	100	-10	67	-8	114	-6	97	-63	76	49	96	4	85
CENAM	4	34			5	37	6	44	16	87	3	46	5	103	7	83	-50	57	62	82	17	69
NIM	-1	12	-5	37			1	31	11	81	-1	33	0	98	2	77	-55	48	57	76	12	61
MSL	-2	28	-6	44	-1	31			10	85	-3	41	-1	101	1	81	-56	54	56	80	11	66
CSIR-NML	-12	80	-16	87	-11	81	-10	85			-12	86	-11	126	-9	110	-66	92	46	109	1	100
SP	1	30	-3	46	1	33	3	41	12	86			2	101	4	81	-53	54	59	80	14	66
AREPA	-1	97	-5	103	0	98	1	101	11	126	-2	101			2	120	-55	104	58	119	13	111
INETI	-3	76	-7	83	-2	77	-1	81	9	110	-4	81					-57	84	56	103	10	93
SMD	54	46	50	57	55	48	56	54	66	92	53	54			55	104	57	84			113	83
BEV	-58	75	-62	82	-57	76	-56	80	-46	109	-59	80			-58	119	-56	103	-113	83		-45
METAS	-13	60	-17	69	-12	61	-11	66	-1	100	-14	66			-13	111	-10	93	-68	70	45	92
CMI	6	75	2	82	7	75	8	80	18	109	5	80			7	119	9	103	-48	83	65	102
OMH	47	172	43	175	48	172	49	174	59	190	46	174			47	196	49	186	-8	176	105	185
JV	29	74	25	81	30	75	31	79	41	109	28	79			30	119	32	102	-25	82	88	101
CEM	-2	71	-6	78	-1	72	0	76	10	107	-3	76			-1	117	1	100	-56	80	57	99
GUM	23	80	19	87	24	81	25	84	35	113	22	84			24	123	26	106	-31	88	82	105
MIKES	42	43	38	55	43	45	44	51	54	91	41	51			42	103	44	82	-13	56	100	81
NMi-VSL	18	27	14	44	19	31	20	40	30	85	17	40			19	97	21	76	-36	46	77	75
UME	15	77	11	84	16	78	17	82	27	111	14	82			16	121	18	104	-39	85	74	103

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 1.0, 53 Hz

NOMINAL VALUE : 600 VA, 600 W

Matrix of equivalence - continued

Lab <i>i</i>	D_i U_i		Lab <i>j</i> →															
	/ (μW/VA)		CMI		OMH		JV		CEM		GUM		MIKES		NMI-VSL		UME	
	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
	/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)	
NIST	-7	12	-13	75	-54	172	-36	75	-5	72	-30	81	-49	45	-25	31	-22	78
NMIA	-1	14	-7	76	-48	172	-30	75	1	72	-24	81	-43	45	-19	32	-16	78
NPL	8	32	2	80	-39	174	-21	79	10	77	-15	85	-34	52	-10	41	-7	83
INRIM	-7	30	-13	80	-54	174	-36	79	-5	76	-30	85	-49	51	-25	40	-22	82
INTI	15	20	9	77	-32	173	-14	76	17	73	-8	82	-27	47	-3	35	0	80
VNIIM	10	18	4	77	-37	173	-19	76	12	73	-13	82	-32	47	-8	33	-5	79
NRC	-4	14	-10	76	-51	172	-33	75	-2	72	-27	81	-46	45	-22	32	-19	78
SPRING	22	62	16	97	-25	183	-7	96	24	94	-1	101	-20	75	4	68	7	99
PTB	0	10	-6	76	-47	173	-29	75	2	72	-23	81	-42	46	-18	32	-15	78
INMETRO	-9	60	-15	96	-56	182	-38	95	-7	93	-32	100	-51	74	-27	66	-24	98
CENAM	4	34	-2	82	-43	175	-25	81	6	78	-19	87	-38	55	-14	44	-11	84
NIM	-1	12	-7	75	-48	172	-30	75	1	72	-24	81	-43	45	-19	31	-16	78
MSL	-2	28	-8	80	-49	174	-31	79	0	76	-25	84	-44	51	-20	40	-17	82
CSIR-NML	-12	80	-18	109	-59	190	-41	109	-10	107	-35	113	-54	91	-30	85	-27	111
SP	1	30	-5	80	-46	174	-28	79	3	76	-22	84	-41	51	-17	40	-14	82
AREPA	-1	97	-7	119	-47	196	-30	119	1	117	-24	123	-42	103	-19	97	-16	121
INETI	-3	76	-9	103	-49	186	-32	102	-1	100	-26	106	-44	82	-21	76	-18	104
SMD	54	46	48	83	8	176	25	82	56	80	31	88	13	56	36	46	39	85
BEV	-58	75	-65	102	-105	185	-88	101	-57	99	-82	105	-100	81	-77	75	-74	103
METAS	-13	60	-19	92	-60	180	-42	91	-12	89	-36	96	-55	68	-31	60	-28	94
CMI	6	75			-40	185	-23	101	8	99	-17	105	-35	81	-12	75	-9	103
OMH	47	172	40	185			17	185	48	184	24	187	5	175	28	172	31	186
JV	29	74	23	101	-17	185			31	98	6	105	-13	80	11	74	14	103
CEM	-2	71	-8	99	-48	184	-31	98			-25	103	-43	78	-20	71	-17	101
GUM	23	80	17	105	-24	187	-6	105	25	103			-19	86	5	80	8	107
MIKES	42	43	35	81	-5	175	13	80	43	78	19	86			23	43	27	84
NMI-VSL	18	27	12	75	-28	172	-11	74	20	71	-5	80	-23	43			3	77
UME	15	77	9	103	-31	186	-14	103	17	101	-8	107	-27	84	-3	77		

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lead, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

Matrix of equivalence

Lab <i>i</i>	D_i U_i		Lab <i>j</i> \Rightarrow																			
	/ (μ W/VA)		NIST		NMIA		NPL		INRIM		INTI		VNIIM		NRC		SPRING		PTB		INMETRO	
	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
NIST	1	12																				
NMIA	-1	16	2	21																		
NPL	-12	26			13	30																
INRIM	-10	30	-13	30	-11	31																
INTI	9	34	-11	33	-8	35	3	40														
VNIIM	-15	28	7	37	10	38	21	43	18	46												
NRC	5	12	-16	31	-14	33	-3	39	-6	42	-24	45										
SPRING	-3	62	4	18	6	22	17	30	14	33	-4	37	20	31								
PTB	-7	10	-4	64	-2	65	9	68	7	69	-11	71	12	68	-7	64						
INMETRO	15	60	-8	17	-5	21	6	29	3	33	-15	36	9	31	-11	17	-4	63				
CENAM	-2	34	-8	17	-5	21	6	29	3	33	-15	36	9	31	-11	17	-4	63				
NIM	13	12	14	62	16	63	27	66	25	68	7	69	30	67	11	62	18	87	22	61		
MSL	5	30	-3	37	-1	38	10	44	8	46	-11	49	13	45	-7	37	1	71	5	36	-17	69
CSIR-NML	-14	80	12	18	14	22	25	30	22	33	4	37	28	32	8	19	15	64	19	17	-3	62
SP	-8	22	4	33	6	35	17	41	14	43	-4	46	20	42	0	33	8	69	11	33	-10	68
			-15	81	-13	82	-2	85	-5	86	-23	87	1	85	-19	81	-11	102	-7	81	-29	100
			-9	26	-7	28	4	35	2	38	-17	41	7	37	-13	26	-5	66	-2	26	-23	65
AREPA	-30	102	-31	102	-29	103	-18	104	-20	105	-39	107	-15	106	-35	102	-27	119	-23	102	-45	118
INETI	-19	152	-20	153	-18	153	-7	154	-9	154	-28	156	-4	155	-24	153	-16	164	-12	152	-34	164
SMD	11	44	10	44	12	45	23	47	21	50	2	54	26	51	6	44	14	75	18	44	-4	74
BEV	-28	73	-29	73	-27	74	-16	75	-18	77	-37	80	-13	78	-33	73	-25	95	-21	73	-43	94
METAS	3	53	2	53	4	54	15	56	13	58	-6	62	18	59	-2	53	6	81	10	52	-12	79
CFI	-28	64	-29	64	-27	65	-16	66	-18	68	-37	71	-13	69	-33	64	-25	88	-21	64	-43	87
OMH	-28	171	-29	171	-27	172	-16	172	-18	173	-37	174	-13	173	-33	171	-25	182	-21	171	-43	181
JV	5	72	4	72	6	73	17	74	15	76	-4	79	20	77	0	72	8	95	12	72	-10	93
CEM	-60	69	-61	70	-59	70	-48	72	-50	73	-69	77	-45	74	-65	70	-57	92	-53	69	-75	91
GUM	-1	78	-2	78	0	79	11	80	9	81	-10	84	14	82	-6	78	2	99	6	78	-16	98
MIKES	0	29	-1	30	1	32	12	35	10	38	-9	44	15	39	-5	30	3	68	7	29	-15	66
NMI-VSL	-23	54	-24	55	-22	56	-11	57	-13	59	-32	63	-8	60	-28	55	-20	82	-16	54	-38	80
UME	29	76	28	76	30	77	41	78	39	79	20	82	44	80	24	76	32	97	36	76	14	96

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lead, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

Matrix of equivalence - continued

Lab <i>i</i>	D_i U_i / (μW/VA)		Lab <i>j</i> →																			
	D_{ij} / (μW/VA)	U_{ij} / (μW/VA)	CENAM		NIM		MSL		CSIR-NML		SP		AREPA		INETI		SMD		BEV		METAS	
NIST	1	12	3	37	-12	18	-4	33	15	81	9	26	31	102	20	153	-10	44	29	73	-2	53
NMIA	-1	16	1	38	-14	22	-6	35	13	82	7	28	29	103	18	153	-12	45	27	74	-4	54
NPL	-12	26	-10	44	-25	30	-17	41	2	85	-4	35	18	104	7	154	-23	47	16	75	-15	56
INRIM	-10	30	-8	46	-22	33	-14	43	5	86	-2	38	20	105	9	154	-21	50	18	77	-13	58
INTI	9	34	11	49	-4	37	4	46	23	87	17	41	39	107	28	156	-2	54	37	80	6	62
VNIIM	-15	28	-13	45	-28	32	-20	42	-1	85	-7	37	15	106	4	155	-26	51	13	78	-18	59
NRC	5	12	7	37	-8	19	0	33	19	81	13	26	35	102	24	153	-6	44	33	73	2	53
SPRING	-3	62	-1	71	-15	64	-8	69	11	102	5	66	27	119	16	164	-14	75	25	95	-6	81
PTB	-7	10	-5	36	-19	17	-11	33	7	81	2	26	23	102	12	152	-18	44	21	73	-10	52
INMETRO	15	60	17	69	3	62	10	68	29	100	23	65	45	118	34	164	4	74	43	94	12	79
CENAM	-2	34			-15	37	-7	46	12	87	6	41	28	107	17	156	-13	54	26	80	-5	62
NIM	13	12	15	37			8	33	27	81	21	26	43	102	32	153	2	44	41	73	10	53
MSL	5	30	7	46	-8	33			19	86	13	38	35	106	24	155	-6	52	33	78	2	60
CSIR-NML	-14	80	-12	87	-27	81	-19	86			-6	83	16	129	5	172	-25	91	14	108	-17	95
SP	-8	22	-6	41	-21	26	-13	38	6	83			22	102	11	152	-19	44	20	73	-11	53
AREPA	-30	102	-28	107	-43	102	-35	106	-16	129	-22	102			-11	181	-41	107	-2	122	-33	111
INETI	-19	152	-17	156	-32	153	-24	155	-5	172	-11	152	11	181			-30	156	8	167	-23	159
SMD	11	44	13	54	-2	44	6	52	25	91	19	44	41	107	30	156			39	80	7	62
BEV	-28	73	-26	80	-41	73	-33	78	-14	108	-20	73	2	122	-8	167	-39	80			-31	85
METAS	3	53	5	62	-10	53	-2	60	17	95	11	53	33	111	23	159	-7	62	31	85		
CMI	-28	64	-26	71	-41	64	-33	70	-14	102	-20	64	2	117	-9	163	-39	72	-1	92	-32	77
OMH	-28	171	-26	174	-41	171	-33	174	-14	189	-20	171	2	197	-9	227	-39	174	0	184	-32	177
JV	5	72	7	79	-8	72	0	78	19	107	13	72	35	122	24	166	-6	79	33	99	2	84
CEM	-60	69	-58	77	-73	70	-65	75	-46	105	-52	69	-31	120	-41	165	-71	77	-33	96	-64	82
GUM	-1	78	1	84	-14	78	-6	83	13	111	7	78	29	125	19	169	-11	84	27	103	-4	89
MIKES	0	29	2	44	-13	30	-5	41	14	85	8	29	30	102	20	153	-11	44	28	73	-3	53
NMi-VSL	-23	54	-21	63	-36	55	-28	61	-9	96	-15	54	7	112	-4	159	-34	63	5	86	-26	70
UME	29	76	31	82	16	76	24	81	43	110	37	76	59	124	49	168	19	82	57	101	26	87

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lead, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

Matrix of equivalence - continued

Lab <i>i</i>		Lab <i>j</i> →																
		CMI		OMH		JV		CEM		GUM		MIKES		NMI-VSL		UME		
<i>D_i</i>	<i>U_i</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	
/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		
NIST	1	12	29	64	29	171	-4	72	61	70	2	78	1	30	24	55	-28	76
NMIA	-1	16	27	65	27	172	-6	73	59	70	0	79	-1	32	22	56	-30	77
NPL	-12	26	16	66	16	172	-17	74	48	72	-11	80	-12	35	11	57	-41	78
INRIM	-10	30	18	68	18	173	-15	76	50	73	-9	81	-10	38	13	59	-39	79
INTI	9	34	37	71	37	174	4	79	69	77	10	84	9	44	32	63	-20	82
VNIIM	-15	28	13	69	13	173	-20	77	45	74	-14	82	-15	39	8	60	-44	80
NRC	5	12	33	64	33	171	0	72	65	70	6	78	5	30	28	55	-24	76
SPRING	-3	62	25	88	25	182	-8	95	57	92	-2	99	-3	68	20	82	-32	97
PTB	-7	10	21	64	21	171	-12	72	53	69	-6	78	-7	29	16	54	-36	76
INMETRO	15	60	43	87	43	181	10	93	75	91	16	98	15	66	38	80	-14	96
CENAM	-2	34	26	71	26	174	-7	79	58	77	-1	84	-2	44	21	63	-31	82
NIM	13	12	41	64	41	171	8	72	73	70	14	78	13	30	36	55	-16	76
MSL	5	30	33	70	33	174	0	78	65	75	6	83	5	41	28	61	-24	81
CSIR-NML	-14	80	14	102	14	189	-19	107	46	105	-13	111	-14	85	9	96	-43	110
SP	-8	22	20	64	20	171	-13	72	52	69	-7	78	-8	29	15	54	-37	76
AREPA	-30	102	-2	117	-2	197	-35	122	31	120	-29	125	-30	102	-7	112	-59	124
INETI	-19	152	9	163	9	227	-24	166	41	165	-19	169	-20	153	4	159	-49	168
SMD	11	44	39	72	39	174	6	79	71	77	11	84	11	44	34	63	-19	82
BEV	-28	73	1	92	0	184	-33	99	33	96	-27	103	-28	73	-5	86	-57	101
METAS	3	53	32	77	32	177	-2	84	64	82	4	89	3	53	26	70	-26	87
CMI	-28	64			0	180	-33	92	32	89	-28	96	-29	64	-6	79	-58	94
OMH	-28	171	0	180			-33	184	32	183	-28	186	-29	171	-5	177	-58	185
JV	5	72	33	92	33	184			65	96	6	102	5	72	28	86	-24	100
CEM	-60	69	-32	89	-32	183	-65	96			-60	100	-61	69	-38	83	-90	98
GUM	-1	78	28	96	28	186	-6	102	60	100			-1	78	22	90	-30	104
MIKES	0	29	29	64	29	171	-5	72	61	69	1	78			23	55	-29	76
NMI-VSL	-23	54	6	79	5	177	-28	86	38	83	-22	90	-23	55			-52	89
UME	29	76	58	94	58	185	24	100	90	98	30	104	29	76	52	89		

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

Matrix of equivalence

Lab <i>i</i>	D_i U_i		Lab <i>j</i> \Rightarrow																			
	/ (μ W/VA)		NIST		NMIA		NPL		INRIM		INTI		VNIIM		NRC		SPRING		PTB		INMETRO	
	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
NIST	1	12																				
NMIA	3	16	-2	21																		
NPL	19	26	18	29	-18	29																
INRIM	2	30	1	33	-1	33	-1	33														
INTI	4	34	3	37	-3	37	-3	37														
VNIIM	-25	28	-26	31	-28	33	-44	39	-27	42	-29	45										
NRC	-3	12	-4	18	-6	21	-22	29	-5	33	-7	37	22	31								
SPRING	13	62	12	64	10	64	-6	68	11	69	9	71	38	68	16	64						
PTB	12	10	11	17	9	20	-7	29	10	32	8	36	37	30	15	17	-1	63				
INMETRO	-26	60	-27	62	-29	63	-45	66	-28	67	-30	69	-1	67	-23	62	-39	87	-38	61		
CENAM	2	34	1	37	-2	38	-17	43	0	46	-2	49	27	45	5	37	-11	71	-11	36	28	69
NIM	-14	12	-15	18	-17	21	-33	30	-16	33	-18	37	11	31	-11	18	-27	64	-26	17	12	62
MSL	-16	30	-17	33	-20	35	-35	40	-18	43	-20	46	9	42	-14	33	-29	69	-29	32	10	67
CSIR-NML	3	80	2	81	0	82	-16	84	1	86	-1	87	28	85	6	81	-10	102	-9	81	29	100
SP	1	22	0	26	-2	28	-18	35	-1	38	-3	41	26	36	4	26	-12	66	-11	25	27	64
AREPA	14	102	13	103	11	103	-5	104	12	105	10	107	39	106	17	103	1	119	2	102	40	118
INETI	18	195	17	195	15	196	-1	196	16	197	14	198	43	197	21	195	5	205	6	195	44	204
SMD	49	44	48	45	46	46	30	48	47	50	45	55	74	51	52	45	36	75	37	44	75	74
BEV	3	73	2	74	0	74	-16	76	1	77	-1	80	28	78	6	74	-10	96	-9	73	29	94
METAS	-4	53	-5	53	-7	54	-23	56	-6	58	-8	62	21	59	-1	53	-17	81	-16	53	22	79
CMi	-3	64	-4	64	-6	65	-22	67	-5	68	-7	72	22	69	0	64	-16	88	-15	64	23	87
OMH	75	171	74	172	72	172	56	172	73	173	71	174	100	173	78	172	62	182	63	171	101	181
JV	35	72	34	73	32	73	16	75	33	76	31	79	60	77	38	73	22	95	23	72	61	93
CEM	82	69	81	70	79	71	63	72	80	74	78	77	107	74	85	70	69	93	70	70	108	91
GUM	23	78	22	78	20	79	4	80	21	81	19	84	48	82	26	78	10	99	11	78	49	98
MIKES	33	29	32	31	30	32	14	35	31	38	29	44	58	40	36	31	20	68	21	30	59	66
NMi-VSL	32	54	31	55	29	56	13	58	30	60	28	64	57	61	35	55	19	82	20	55	58	81
UME	-25	76	-26	76	-28	77	-44	78	-27	80	-29	83	0	80	-22	76	-38	97	-37	76	1	96

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

Matrix of equivalence - continued

Lab <i>i</i>	D_i U_i / (μW/VA)		Lab <i>j</i> →																			
	D_{ij} / (μW/VA)	U_{ij} / (μW/VA)	CENAM		NIM		MSL		CSIR-NML		SP		AREPA		INETI		SMD		BEV		METAS	
NIST	1	12	-1	37	15	18	17	33	-2	81	0	26	-13	103	-17	195	-48	45	-2	74	5	53
NMIA	3	16	2	38	17	21	20	35	0	82	2	28	-11	103	-15	196	-46	46	0	74	7	54
NPL	19	26	17	43	33	30	35	40	16	84	18	35	5	104	1	196	-30	48	16	76	23	56
INRIM	2	30	0	46	16	33	18	43	-1	86	1	38	-12	105	-16	197	-47	50	-1	77	6	58
INTI	4	34	2	49	18	37	20	46	1	87	3	41	-10	107	-14	198	-45	55	1	80	8	62
VNIIM	-25	28	-27	45	-11	31	-9	42	-28	85	-26	36	-39	106	-43	197	-74	51	-28	78	-21	59
NRC	-3	12	-5	37	11	18	14	33	-6	81	-4	26	-17	103	-21	195	-52	45	-6	74	1	53
SPRING	13	62	11	71	27	64	29	69	10	102	12	66	-1	119	-5	205	-36	75	10	96	17	81
PTB	12	10	11	36	26	17	29	32	9	81	11	25	-2	102	-6	195	-37	44	9	73	16	53
INMETRO	-26	60	-28	69	-12	62	-10	67	-29	100	-27	64	-40	118	-44	204	-75	74	-29	94	-22	79
CENAM	2	34			16	37	18	46	-2	87	0	41	-12	107	-16	198	-47	55	-1	80	6	62
NIM	-14	12	-16	37			3	33	-17	81	-15	26	-28	103	-32	195	-63	45	-17	74	-10	53
MSL	-16	30	-18	46	-3	33			-20	86	-18	38	-30	106	-34	197	-65	52	-19	79	-12	60
CSIR-NML	3	80	2	87	17	81	20	86			2	83	-11	130	-15	211	-46	91	0	108	7	95
SP	1	22	0	41	15	26	18	38	-2	83			-13	102	-17	195	-48	44	-2	74	5	53
AREPA	14	102	12	107	28	103	30	106	11	130	13	102			-5	218	-35	108	11	122	18	111
INETI	18	195	16	198	32	195	34	197	15	211	17	195	5	218			-31	198	15	206	22	200
SMD	49	44	47	55	63	45	65	52	46	91	48	44	35	108	31	198			46	80	53	62
BEV	3	73	1	80	17	74	19	79	0	108	2	74	-11	122	-15	206	-46	80			7	86
METAS	-4	53	-6	62	10	53	12	60	-7	95	-5	53	-18	111	-22	200	-53	62	-7	86		
CMI	-3	64	-5	72	11	64	13	70	-6	102	-4	64	-16	117	-21	203	-52	72	-5	93	2	78
OMH	75	171	73	174	89	172	91	174	72	189	74	171	61	197	57	258	26	175	72	184	79	177
JV	35	72	33	79	49	73	51	78	32	107	34	73	21	122	17	206	-14	80	32	99	39	85
CEM	82	69	80	77	96	70	98	75	79	106	81	70	68	120	64	205	33	77	79	97	86	82
GUM	23	78	21	84	37	78	39	83	20	111	22	78	9	125	5	208	-26	84	20	103	27	89
MIKES	33	29	31	44	47	31	49	41	30	85	32	30	19	103	15	195	-16	45	30	74	37	53
NMi-VSL	32	54	30	64	46	55	48	62	29	96	31	55	19	112	14	201	-16	64	30	87	37	70
UME	-25	76	-27	83	-11	76	-9	81	-28	110	-26	76	-39	124	-43	207	-74	83	-28	101	-21	88

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.5 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 300 W

Matrix of equivalence - continued

Lab <i>i</i>		Lab <i>j</i> →																
		CMI		OMH		JV		CEM		GUM		MIKES		NMI-VSL		UME		
<i>D_i</i>	<i>U_i</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	
/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		
NIST	1	12	4	64	-74	172	-34	73	-81	70	-22	78	-32	31	-31	55	26	76
NMIA	3	16	6	65	-72	172	-32	73	-79	71	-20	79	-30	32	-29	56	28	77
NPL	19	26	22	67	-56	172	-16	75	-63	72	-4	80	-14	35	-13	58	44	78
INRIM	2	30	5	68	-73	173	-33	76	-80	74	-21	81	-31	38	-30	60	27	80
INTI	4	34	7	72	-71	174	-31	79	-78	77	-19	84	-29	44	-28	64	29	83
VNIIM	-25	28	-22	69	-100	173	-60	77	-107	74	-48	82	-58	40	-57	61	0	80
NRC	-3	12	0	64	-78	172	-38	73	-85	70	-26	78	-36	31	-35	55	22	76
SPRING	13	62	16	88	-62	182	-22	95	-69	93	-10	99	-20	68	-19	82	38	97
PTB	12	10	15	64	-63	171	-23	72	-70	70	-11	78	-21	30	-20	55	37	76
INMETRO	-26	60	-23	87	-101	181	-61	93	-108	91	-49	98	-59	66	-58	81	-1	96
CENAM	2	34	5	72	-73	174	-33	79	-80	77	-21	84	-31	44	-30	64	27	83
NIM	-14	12	-11	64	-89	172	-49	73	-96	70	-37	78	-47	31	-46	55	11	76
MSL	-16	30	-13	70	-91	174	-51	78	-98	75	-39	83	-49	41	-48	62	9	81
CSIR-NML	3	80	6	102	-72	189	-32	107	-79	106	-20	111	-30	85	-29	96	28	110
SP	1	22	4	64	-74	171	-34	73	-81	70	-22	78	-32	30	-31	55	26	76
AREPA	14	102	16	117	-61	197	-21	122	-68	120	-9	125	-19	103	-19	112	39	124
INETI	18	195	21	203	-57	258	-17	206	-64	205	-5	208	-15	195	-14	201	43	207
SMD	49	44	52	72	-26	175	14	80	-33	77	26	84	16	45	16	64	74	83
BEV	3	73	5	93	-72	184	-32	99	-79	97	-20	103	-30	74	-30	87	28	101
METAS	-4	53	-2	78	-79	177	-39	85	-86	82	-27	89	-37	53	-37	70	21	88
CMI	-3	64			-77	181	-38	92	-85	90	-25	96	-36	64	-35	79	23	95
OMH	75	171	77	181			40	184	-7	183	52	186	42	172	42	178	100	185
JV	35	72	38	92	-40	184			-47	96	12	102	2	73	2	86	60	101
CEM	82	69	85	90	7	183	47	96			59	100	49	70	49	83	107	99
GUM	23	78	25	96	-52	186	-12	102	-59	100			-10	78	-10	90	48	105
MIKES	33	29	36	64	-42	172	-2	73	-49	70	10	78			1	55	58	76
NMI-VSL	32	54	35	79	-42	178	-2	86	-49	83	10	90	-1	55			58	89
UME	-25	76	-23	95	-100	185	-60	101	-107	99	-48	105	-58	76	-58	89		

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lead, 53 Hz

NOMINAL VALUE : 600 VA, 0 W

Matrix of equivalence

Lab <i>i</i>	D_i U_i / (μW/VA)		Lab <i>j</i> →																				
	D_{ij} / (μW/VA)	U_{ij} / (μW/VA)	NIST		NMIA		NPL		INRIM		INTI		VNIIM		NRC		SPRING		PTB		INMETRO		
NIST	0	9																					
NMIA	9	15																					
NPL	-28	29																					
INRIM	-14	31																					
INTI	6	39																					
VNIIM	9	25																					
NRC	7	12																					
SPRING	-18	62																					
PTB	-4	12																					
INMETRO	4	60																					
CENAM	-16	54																					
NIM	3	13																					
MSL	-1	33																					
CSIR-NML	-26	80																					
SP	-9	19																					
AREPA	-34	141																					
INETI	-230	482																					
SMD	-4	34																					
BEV	-10	221																					
METAS	10	50																					
CFI	-71	54																					
OMH	24	171																					
JV	-14	72																					
CEM	-	-																					
GUM	-5	77																					
MIKES	-25	23																					
NMI-VSL	-33	171																					
UME	-16	74																					

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lead, 53 Hz

NOMINAL VALUE : 600 VA, 0 W

Matrix of equivalence - continued

Lab <i>i</i>	D_i U_i / (μW/VA)		Lab <i>j</i> →																				
	D_{ij} / (μW/VA)	U_{ij} / (μW/VA)	CENAM		NIM		MSL		CSIR-NML		SP		AREPA		INETI		SMD		BEV		METAS		
NIST	0	9	16	56	-3	18	1	35	25	81	9	23	34	142	230	482	4	35	10	221	-10	51	
NMIA	9	15	24	57	5	22	10	37	34	82	17	26	43	142	239	483	13	37	19	221	-1	52	
NPL	-28	29	-12	62	-31	33	-27	44	-3	86	-19	35	6	143	202	483	-24	39	-18	222	-38	53	
INRIM	-14	31	2	63	-17	34	-13	45	12	86	-5	37	20	143	216	483	-10	41	-4	222	-24	55	
INTI	6	39	21	67	2	42	7	51	31	89	14	44	40	147	236	484	10	51	16	224	-4	63	
VNIIM	9	25	25	60	6	29	10	42	35	84	18	32	43	144	239	483	13	42	19	222	-1	56	
NRC	7	12	22	56	3	19	8	35	32	82	15	24	41	142	237	483	11	36	17	221	-3	51	
SPRING	-18	62	-2	83	-21	64	-17	71	7	102	-9	66	16	154	212	486	-14	70	-8	229	-28	79	
PTB	-4	12	12	56	-7	19	-3	35	22	82	5	24	30	141	226	482	0	34	6	221	-14	50	
INMETRO	4	60	20	81	1	62	5	69	30	101	13	64	38	154	234	486	8	69	14	229	-6	78	
CENAM	-16	54			-19	56	-15	64	10	97	-7	58	18	151	214	485	-12	64	-6	227	-26	73	
NIM	3	13	19	56			4	36	29	82	12	24	37	142	233	483	7	36	13	221	-7	51	
MSL	-1	33	15	64	-4	36			25	87	8	38	33	145	229	484	3	47	9	223	-11	60	
CSIR-NML	-26	80	-10	97	-29	82	-25	87			-17	83	8	162	204	489	-22	87	-16	235	-36	94	
SP	-9	19	7	58	-12	24	-8	38	17	83			25	141	221	482	-5	32	1	221	-19	49	
AREPA	-34	141			-18	151	-37	142	-33	145	-8	162	-25				-30	143	-24	261	-44	147	
INETI	-230	482			-214	485	-233	483	-229	484	-204	489	-221				-225	483	-219	530	-240	484	
SMD	-4	34	12	64	-7	36	-3	47	22	87	5	32		-195	502								
BEV	-10	221	6	227	-13	221	-9	223	16	235	-1	221		30	143	225	483		6	222	-15	53	
METAS	10	50	26	73	7	51	11	60	36	94	19	49		24	261	219	530				-21	225	
CMI	-71	54	-55	76	-74	55	-70	63	-45	96	-62	53		44	147	240	484		15	53	21	225	
OMH	24	171	40	179	21	172	25	174	50	189	33	171		-37	149	159	485		-66	57	-60	226	
JV	-14	72	2	90	-17	73	-13	79	12	107	-5	71		58	220	254	511		29	172	35	278	
CEM	-	-												20	156	215	487		-10	74	-4	231	
GUM	-5	77																					
MIKES	-25	23	11	94	-8	78	-4	83	21	111	4	76		29	158	224	488		-1	79	5	232	
NMi-VSL	-33	171	-9	59	-28	26	-24	40	1	83	-16	20		9	141	205	482		-20	30	-14	220	
UME	-16	74	-17	179	-36	172	-32	174	-7	189	-24	171		1	220	196	511		-29	172	-23	278	
			0	92	-19	75	-15	81	10	109	-7	73		18	157	214	487		-11	77	-5	231	

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lead, 53 Hz

NOMINAL VALUE : 600 VA, 0 W

Matrix of equivalence - continued

Lab <i>i</i>	D_i U_i		Lab <i>j</i> →															
	/ (μW/VA)		CMI		OMH		JV		CEM		GUM		MIKES		NMI-VSL		UME	
	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
NIST	0	9	71	54	-24	171	14	72	-	-	5	77	25	24	33	171	16	75
NMIA	9	15	80	56	-15	172	23	73	-	-	14	78	34	27	42	172	25	76
NPL	-28	29	43	57	-52	172	-14	74	-	-	-23	79	-3	30	5	172	-12	76
INRIM	-14	31	57	59	-38	173	0	76	-	-	-9	80	11	33	19	173	2	78
INTI	6	39	77	66	-18	175	20	82	-	-	11	86	31	45	39	175	22	84
VNIIM	9	25	80	59	-15	173	23	76	-	-	14	81	34	34	42	173	25	78
NRC	7	12	78	55	-17	172	21	73	-	-	12	78	32	26	40	172	23	75
SPRING	-18	62	53	82	-42	182	-4	95	-	-	-13	99	7	66	15	182	-2	97
PTB	-4	12	67	54	-28	171	10	72	-	-	1	77	21	23	29	171	12	74
INMETRO	4	60	75	80	-20	181	18	93	-	-	9	97	29	64	37	181	20	95
CENAM	-16	54	55	76	-40	179	-2	90	-	-	-11	94	9	59	17	179	0	92
NIM	3	13	74	55	-21	172	17	73	-	-	8	78	28	26	36	172	19	75
MSL	-1	33	70	63	-25	174	13	79	-	-	4	83	24	40	32	174	15	81
CSIR-NML	-26	80	45	96	-50	189	-12	107	-	-	-21	111	-1	83	7	189	-10	109
SP	-9	19	62	53	-33	171	5	71	-	-	-4	76	16	20	24	171	7	73
AREPA	-34	141	37	149	-58	220	-20	156	-	-	-29	158	-9	141	-1	220	-18	157
INETI	-230	482	-159	485	-254	511	-215	487	-	-	-224	488	-205	482	-196	511	-214	487
SMD	-4	34	66	57	-29	172	10	74	-	-	1	79	20	30	29	172	11	77
BEV	-10	221	60	226	-35	278	4	231	-	-	-5	232	14	220	23	278	5	231
METAS	10	50	81	68	-14	176	25	83	-	-	16	87	35	47	44	176	26	85
CMI	-71	54			-95	177	-56	85	-	-	-65	89	-46	51	-37	177	-55	87
OMH	24	171	95	177			39	183	-	-	30	185	49	170	58	240	40	184
JV	-14	72	56	85	-39	183			-	-	-9	101	10	70	19	183	1	99
CEM	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-
GUM	-5	77	65	89	-30	185	9	101	-	-			19	75	28	186	10	103
MIKES	-25	23	46	51	-49	170	-10	70	-	-	-19	75			9	170	-9	73
NMI-VSL	-33	171	37	177	-58	240	-19	183	-	-	-28	186	-9	170			-18	184
UME	-16	74	55	87	-40	184	-1	99	-	-	-10	103	9	73	18	184		

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 0 W

Matrix of equivalence

Lab <i>i</i>	D_i U_i		Lab <i>j</i> \Rightarrow																			
	/ (μ W/VA)		NIST		NMIA		NPL		INRIM		INTI		VNIIM		NRC		SPRING		PTB		INMETRO	
	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}	D_{ij}	U_{ij}
NIST	3	9																				
NMIA	-2	15	5	19																		
NPL	14	28	-11	31	-16	32																
INRIM	0	32	3	34	-2	36	-14	43														
INTI	7	38	14	43	7	48																
VNIIM	-11	24	-3	34	2	36	-7	48	-7	50												
NRC	-11	11	4	40	9	41	7	50	18	46	18	40	11	73	0	27	-7	67	-18	27	2	65
SPRING	-4	62	-14	27	-9	29	-25	38	-11	41	-18	40	0	27			-7	63	-18	16	2	61
PTB	7	11	-14	16	-9	19	-25	31	-11	35	-18	40	7	67	7	63			-11	63	10	87
INMETRO	-13	60	-7	63	-2	64	-18	69	-4	70	-11	73	18	27	18	16	11	63			20	61
CENAM	9	54	4	16	9	19	-7	31	7	35	0	40	18	27	18	16	11	63				
NIM	-7	13	-16	61	-12	62	-28	67	-13	69	-21	72	-2	65	-2	61	-10	87	-20	61		
MSL	-4	32	6	55	11	57	-5	62	9	63	2	67	20	60	20	56	13	83	2	56	22	81
CSIR-NML	7	80	-10	17	-6	20	-21	32	-7	35	-14	41	4	28	4	18	-3	64	-14	18	6	62
SP	17	19	-7	34	-3	36	-19	43	-4	46	-12	51	7	41	7	35	-1	70	-12	35	9	69
AREPA	6	141	4	81	9	82	-7	85	7	87	0	89	18	84	18	81	11	102	0	81	20	100
INETI	25	296	14	22	18	25	3	35	17	38	10	43	28	31	28	23	21	65	10	23	30	63
SMD	31	34	14	22	18	25	3	35	17	38	10	43	28	31	28	23	21	65	10	23	30	63
BEV	18	221	3	142	8	142	-8	142	6	143	-1	146	17	143	17	142	10	154	-1	141	19	153
METAS	-3	50	22	296	27	296	11	296	25	297	18	298	36	297	36	296	29	302	18	296	38	302
CEM	-	-	28	34	33	36	17	38	31	41	24	50	42	41	42	35	35	70	24	34	44	69
GUM	20	77	15	221	20	221	4	222	18	222	11	224	29	222	29	221	22	229	11	221	31	229
MIKES	1	23	-6	50	-1	52	-17	53	-3	55	-10	62	8	55	8	51	1	79	-10	50	10	78
NMi-VSL	11	171	-113	54	-108	55	-124	56	-110	58	-117	65	-99	58	-99	54	-106	82	-117	54	-97	80
UME	-22	74	-21	171	-16	172	-32	172	-18	173	-25	175	-7	173	-7	171	-14	182	-25	171	-5	181
			2	72	7	73	-9	74	5	75	-2	81	16	75	16	72	9	95	-2	72	18	93
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			17	77	22	78	6	79	20	80	13	85	31	80	31	77	24	98	13	77	33	97
			-2	24	3	27	-13	29	1	32	-6	44	12	33	12	25	5	66	-6	23	14	64
			8	171	13	172	-3	172	11	173	4	175	22	173	22	171	15	182	4	171	24	181
			-25	74	-20	75	-36	76	-22	78	-29	83	-11	78	-11	75	-18	96	-29	74	-9	95

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 0 W

Matrix of equivalence - continued

Lab <i>i</i>	D_i U_i / (μW/VA)		Lab <i>j</i> →																					
	D_{ij} / (μW/VA)	U_{ij} / (μW/VA)	CENAM		NIM		MSL		CSIR-NML		SP		AREPA		INETI		SMD		BEV		METAS			
NIST	3	9	-6	55	10	17	7	34	-4	81	-14	22	-3	142	-22	296	-28	34	-15	221	6	50		
NMIA	-2	15	-11	57	6	20	3	36	-9	82	-18	25	-8	142	-27	296	-33	36	-20	221	1	52		
NPL	14	28	5	62	21	32	19	43	7	85	-3	35	8	142	-11	296	-17	38	-4	222	17	53		
INRIM	0	32	-9	63	7	35	4	46	-7	87	-17	38	-6	143	-25	297	-31	41	-18	222	3	55		
INTI	7	38	-2	67	14	41	12	51	0	89	-10	43	1	146	-18	298	-24	50	-11	224	10	62		
VNIIM	-11	24	-20	60	-4	28	-7	41	-18	84	-28	31	-17	143	-36	297	-42	41	-29	222	-8	55		
NRC	-11	11	-20	56	-4	18	-7	35	-18	81	-28	23	-17	142	-36	296	-42	35	-29	221	-8	51		
SPRING	-4	62	-13	83	3	64	1	70	-11	102	-21	65	-10	154	-29	302	-35	70	-22	229	-1	79		
PTB	7	11	-2	56	14	18	12	35	0	81	-10	23	1	141	-18	296	-24	34	-11	221	10	50		
INMETRO	-13	60	-22	81	-6	62	-9	69	-20	100	-30	63	-19	153	-38	302	-44	69	-31	229	-10	78		
CENAM	9	54			16	56	13	63	2	97	-8	58	3	151	-16	300	-22	63	-9	227	12	73		
NIM	-7	13	-16	56			-3	35	-14	81	-24	23	-13	142	-32	296	-38	36	-25	221	-4	51		
MSL	-4	32	-13	63	3	35			-11	87	-21	38	-10	145	-29	297	-35	46	-22	223	-1	59		
CSIR-NML	7	80	-2	97	14	81	11	87			-10	82	1	162	-18	306	-24	87	-11	235	10	94		
SP	17	19	8	58	24	23	21	38	10	82			11	141	-8	295	-14	31	-1	220	20	48		
AREPA	6	141	-3	151	13	142	10	145	-1	162	-11	141			-19	326	-25	143	-12	261	9	147		
INETI	25	296	16	300	32	296	29	297	18	306	8	295					-6	296	7	368	28	298		
SMD	31	34	22	63	38	36	35	46	24	87	14	31			19	326					28	298		
BEV	18	221	9	227	25	221	22	223	11	235	1	220			25	143	6	296		12	222	34	53	
METAS	-3	50	-12	73	4	51	1	59	-10	94	-20	48			12	261	-7	368	-12	222		21	225	
CMI	-110	54	-119	76	-103	55	-106	62	-117	96	-127	52			-9	147	-28	298	-34	53	-21	225		
OMH	-18	171	-27	179	-11	171	-14	174	-25	189	-35	171			-116	149	-136	299	-141	57	-129	226	-107	68
JV	5	72	-4	90	12	73	9	78	-2	107	-12	71			-23	220	-43	340	-48	172	-36	278	-14	176
CEM	-	-	-	-	-	-	-	-	-	-	-	-			-1	156	-20	303	-26	74	-13	230	8	83
GUM	20	77	11	94	27	78	24	83	13	111	3	76			-	-	-	-	-	-	-	-	-	-
MIKES	1	23	-8	58	8	26	5	39	-6	83	-16	19			14	158	-5	304	-11	79	2	232	23	87
NMi-VSL	11	171	2	179	18	172	15	174	4	189	-6	171			-4	140	-24	295	-29	29	-17	220	5	47
UME	-22	74	-31	92	-15	75	-18	81	-29	109	-39	73			5	220	-14	340	-20	172	-7	278	14	176
															-28	157	-47	303	-53	76	-40	231	-19	85

Key comparisons CCEM-K5 and EUROMET.EM-K5

MEASURAND : Electric power at 120 V, 5 A, power factor 0.0 Lag, 53 Hz

NOMINAL VALUE : 600 VA, 0 W

Matrix of equivalence - continued

Lab <i>i</i>		Lab <i>j</i> →																
		CMI		OMH		JV		CEM		GUM		MIKES		NMI-VSL		UME		
<i>D_i</i>	<i>U_i</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	<i>D_{ij}</i>	<i>U_{ij}</i>	
/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		/ (μW/VA)		
NIST	3	9	113	54	21	171	-2	72	-	-	-17	77	2	24	-8	171	25	74
NMIA	-2	15	108	55	16	172	-7	73	-	-	-22	78	-3	27	-13	172	20	75
NPL	14	28	124	56	32	172	9	74	-	-	-6	79	13	29	3	172	36	76
INRIM	0	32	110	58	18	173	-5	75	-	-	-20	80	-1	32	-11	173	22	78
INTI	7	38	117	65	25	175	2	81	-	-	-13	85	6	44	-4	175	29	83
VNIIM	-11	24	99	58	7	173	-16	75	-	-	-31	80	-12	33	-22	173	11	78
NRC	-11	11	99	54	7	171	-16	72	-	-	-31	77	-12	25	-22	171	11	75
SPRING	-4	62	106	82	14	182	-9	95	-	-	-24	98	-5	66	-15	182	18	96
PTB	7	11	117	54	25	171	2	72	-	-	-13	77	6	23	-4	171	29	74
INMETRO	-13	60	97	80	5	181	-18	93	-	-	-33	97	-14	64	-24	181	9	95
CENAM	9	54	119	76	27	179	4	90	-	-	-11	94	8	58	-2	179	31	92
NIM	-7	13	103	55	11	171	-12	73	-	-	-27	78	-8	26	-18	172	15	75
MSL	-4	32	106	62	14	174	-9	78	-	-	-24	83	-5	39	-15	174	18	81
CSIR-NML	7	80	117	96	25	189	2	107	-	-	-13	111	6	83	-4	189	29	109
SP	17	19	127	52	35	171	12	71	-	-	-3	76	16	19	6	171	39	73
AREPA	6	141	116	149	23	220	1	156	-	-	-14	158	4	140	-5	220	28	157
INETI	25	296	136	299	43	340	20	303	-	-	5	304	24	295	14	340	47	303
SMD	31	34	141	57	48	172	26	74	-	-	11	79	29	29	20	172	53	76
BEV	18	221	129	226	36	278	13	230	-	-	-2	232	17	220	7	278	40	231
METAS	-3	50	107	68	14	176	-8	83	-	-	-23	87	-5	47	-14	176	19	85
CMI	-110	54			-93	177	-115	85	-	-	-130	89	-112	51	-121	177	-88	87
OMH	-18	171	93	177			-22	183	-	-	-37	185	-19	170	-28	240	5	184
JV	5	72	115	85	22	183			-	-	-15	101	3	70	-6	183	27	99
CEM	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-
GUM	20	77	130	89	37	185	15	101	-	-			19	75	9	185	42	103
MIKES	1	23	112	51	19	170	-3	70	-	-	-19	75			-9	170	23	72
NMI-VSL	11	171	121	177	28	240	6	183	-	-	-9	185	9	170			33	184
UME	-22	74	88	87	-5	184	-27	99	-	-	-42	103	-23	72	-33	184		