

ILC/PT Final Report

RMS Clamp Meter / NAPT-CLAMP-309

Date of Issue: 10/17/2011

National Association for Proficiency Testing

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This report presents the measurement results submitted to NAPT along with associated uncertainties. Two comparisons are presented. First, each measurement data point is compared against the established reference value, both in the value reported and the uncertainty associated with that value. Second, each measurement data point is compared to all other test participants along with a comparison of their reported uncertainties.

The ILC/PT consisted of 10 set points. Your organization submitted results for 10 of which 10 had E_n values greater than -1 and less than 1. Most accreditation bodies require the E_n value to be between -1 and 1 to be considered a satisfactory performance in an ILC/PT.

To add clarity and simplification in understanding the results, several additional indicators are included for each reported data point. These include: Participant E_n values, S/U (satisfactory/unsatisfactory) ratings, I W O (in/within/out) ratings, Z-score, mean value of satisfactory results and mean values of all participant reported results. Each set point also has a graph showing additional illustration of the measurement.

The Final Report indicates the performance and capability of multiple laboratories performing like calibrations on a single type of artifact. Results also give each participant a basis for evaluation and perhaps improvement of their calibration performance.

All NAPT ILC/PTs are conducted in accordance with ILAC-G13, requirements for proficiency testing providers.

Thank you for participating in this evaluation. We hope this process has given you a better understanding of your processes. We look forward to your participation in additional NAPT-Sponsored ILC/PTs.

If you have any comments, concerns, or questions regarding this ILC/PT please do not hesitate to contact the Managing Director who is responsible for the content of this report.

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Organization Participating:
Results Reported To:
ILC/PT Performed By:
Date of Participation:

Alpha Controls and Instrumentation
Slava Peciurov
Tony Wheaton
10/03/2011



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FINAL REPORT

RMS Clamp Meter/NAPT-CLAMP-309
Alpha Controls and Instrumentation

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Your organization has been identified as **Lab: B11396** throughout the report.

All artifacts used in this ILC/PT are commercially available instruments, chosen based on their ability to provide the wide characterization and spectrum needed. Specific nominal set points for measurements were determined prior to distribution of the artifact(s). A description of the artifacts is listed below.

Model	Serial Number	Attribute	Manufacturer
337	99261338	AC DC Low Freq	Fluke

Participants were instructed to acquire measurements at predefined set points using their standard calibration procedures.

Established reference values were established in accordance with NAPT Quality Procedure 200-306 and NAPT work instruction 304-1. For additional guidance on this report, please refer to NAPT's Supplemental Guide to Interpretation of Reports, available for download at www.proficiency.org.

The final results presented here may be different from the values issued in your Preliminary Report. The reason is because during the course of each ILC/PT, thorough technical reviews are conducted by NAPT's Technical Director and the Technical Advisor(s) assigned to the ILC/PT. This is done to assure test integrity and look for trends and/or anomalies in the data. By performing these reviews on a scheduled basis we are better able to assist you in the event prompt corrective action is necessary. Any change in the established reference value is based on those reviews.

Notes / Table Descriptors: *The following bullets are meant to assist reader in reviewing tables.*

- Values are rounded to the resolution of the reference data. Rounding does not effect the data analysis and is for reporting purposes only
- All uncertainties are at (or normalized to) K=2 (coverage factor associated with a 2-sigma, 95%, normal distribution)
- $E_n = (\text{Participant's Reported Value} - \text{Reference Value}) / \text{SQRT}(\text{Participant's Reported Uncertainty}^2 + \text{Reference Uncertainty}^2)$
- **S** (Satisfactory): Participant's Computed E_n is within range of +1 to -1
- **U** (Unsatisfactory): Participant's Computed E_n is outside range of +1 to -1
- **I** (In Range): Participant's Reported Value falls in range of Reference Uncertainty
- **W** (Within Range): Participant's Reported Value and Reported Uncertainty overlaps range of Reference Value \pm Reference Uncertainty
- **O** (Out of Range): neither Participant's Reported Value nor Uncertainty falls in range of (Reference Value \pm Reference Uncertainty)
- One star "*" present indicates that the test value is an outlier and falls outside +/- 2 Standard Deviations from the Mean. Two stars "**" present indicates that the test/lab was manually excluded from the calculations and is considered an extreme outlier. . These indicators do not indicate pass or fail performance.
- Z-Score = (Participant's Reported Value - Mean Reference Value) / Standard Deviation
- Blue Text Indicates Revised Data / Red Values Indicate E_n is greater than one



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Analysis of the data Alpha Controls and Instrumentation submitted to NAPT is shown below. In this table, your reported values are compared against the established reference values only.

Individual performance indicators include:

- Your measurement data at each nominal set point
- Reference values and uncertainties of test artifact(s)
- Participant's E_n values, S/U (satisfactory/unsatisfactory) ratings, IWO (in/within/out of range) ratings and Z score

Measurement Description	Reported Value / Reference Value	Reported Uncertainty / Reference Uncertainty	E_n	S/U	IWO	Z Score
1) DC Voltage 150V	150.9 / 150.8	0.1 / 0.1	0.41	S	I	0.76
2) AC Voltage 150V – 60Hz	150.6 / 150.6	0.1 / 0.1	0.22	S	I	0.15
3) DC Current 100A	100.2 / 100.3	0.5 / 0.6	-0.13	S	I	-0.14
4) DC Current 200A	200.3 / 200.4	1.2 / 1.1	-0.08	S	I	-0.15
5) DC Current 500A	501.3 / 501.7	2.3 / 1.5	-0.14	S	I	-0.28
6) AC Current 100A – 60Hz	100.4 / 100.4	0.6 / 0.5	-0.04	S	I	-0.26
7) AC Current 190A – 400Hz	188.2 / 188.1	2.8 / 1.8	0.03	S	I	0.30
8) AC Current 300A – 400Hz	297.2 / 297.0	4.0 / 1.5	0.05	S	I	1.79
9) AC Current 500A – 60Hz	502.5 / 502.3	2.9 / 2.2	0.06	S	I	0.30
10) Resistance 100Ω	100.7 / 100.6	0.1 / 0.1	0.43	S	I	0.45

In the following pages, your reported values are compared to the values reported by other participants enrolled in this ILC/PT. For each nominal set point, mean values of all satisfactory results and mean values of all participant reported results are presented.



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Alpha Controls and Instrumentation

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 1) DC Voltage 150V

Discipline: Electrical - DC/LF Voltage - DC

Nominal Value: 150.0

Measurement Units: V

Established Reference Value: 150.8

Established Reference Uncertainty: 0.1

Mean Value (Satisfactory Results): 150.9

Mean Uncertainty (Satisfactory Results): 0.4

Mean Value (All Participants): 150.9

Mean Uncertainty (All Participants): 0.4

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	150.9	0.1	0.41	S	I	0.76
B00267	150.9	0.0	0.44	S	I	0.76
B00590	150.9	0.1	0.36	S	I	0.76
B00720	150.8	0.1	-0.25	S	I	-0.46
B00768	150.9	0.1	0.41	S	I	0.76
B01085	150.7	0.2	-0.56	S	I	-1.67
B01149	150.9	0.1	0.34	S	I	0.76
B01514	150.7	2.4	-0.06	S	I	-1.67
B11135	151.0	1.6	0.10	S	W	1.97
B11396	150.9	0.1	0.41	S	I	0.76
B11600	150.9	0.1	0.41	S	I	0.76
B11877	150.8	0.3	-0.11	S	I	-0.46
B12168	150.8	0.2	-0.15	S	I	-0.46



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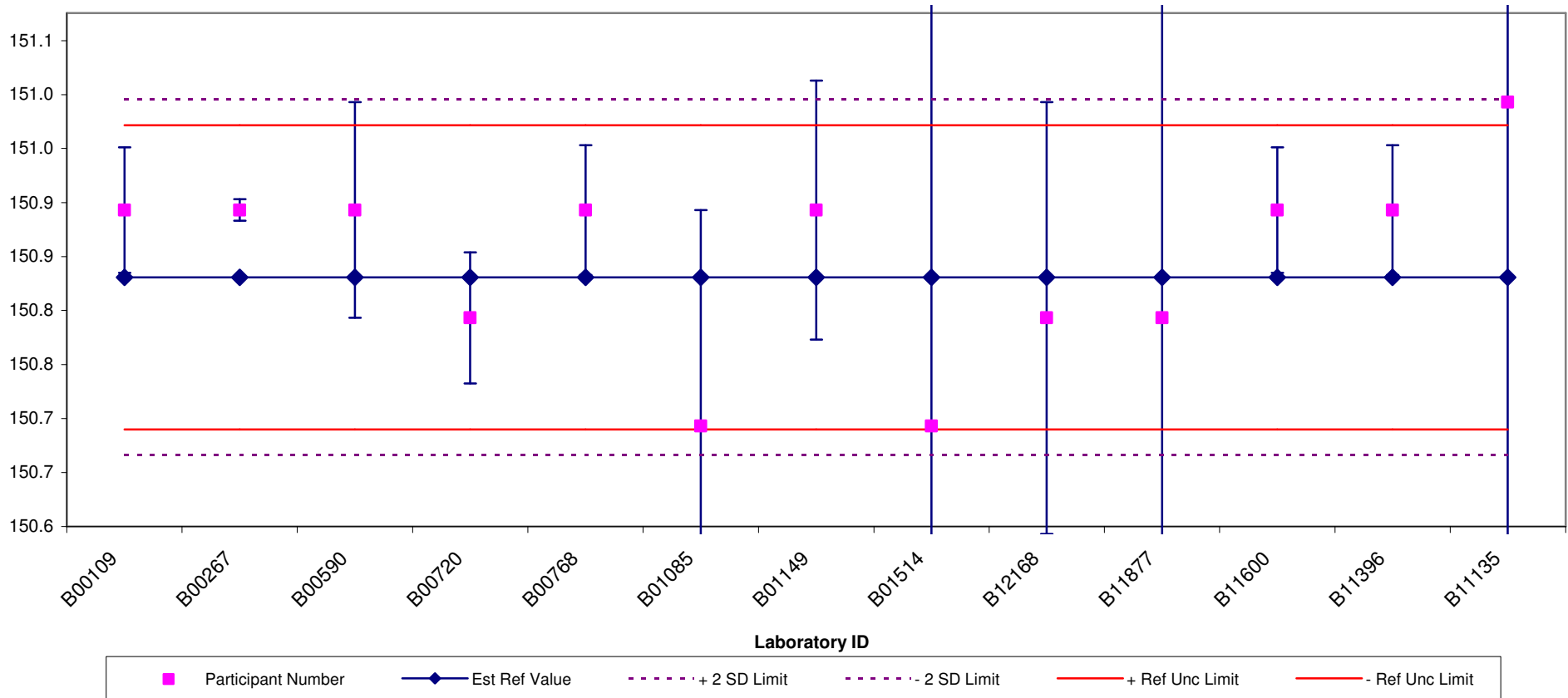
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Alpha Controls and Instrumentation

OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 1) DC Voltage 150V

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RMS Clamp Meter/NAPT-CLAMP-309
Alpha Controls and Instrumentation

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 2) AC Voltage 150V – 60Hz

Discipline: Electrical - DC/LF Voltage - AC

Nominal Value: 150.0

Measurement Units: V

Established Reference Value: 150.6

Established Reference Uncertainty: 0.1

Mean Value (Satisfactory Results): 150.6

Mean Uncertainty (Satisfactory Results): 0.8

Mean Value (All Participants): 150.6

Mean Uncertainty (All Participants): 0.8

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	150.6	0.1	0.22	S	I	0.15
B00267	150.6	0.0	0.24	S	I	0.15
B00590	150.6	0.1	0.17	S	I	0.15
B00720	150.5	0.1	-0.54	S	I	-0.38
B00768	150.6	0.1	0.22	S	I	0.15
B01085	150.4	0.2	-0.75	S	W	-0.91
B01149	150.6	0.1	0.17	S	I	0.15
*B01514	151.1	7.5	0.07	S	W	2.80
B11135	150.8	1.6	0.14	S	W	1.21
B11396	150.6	0.1	0.22	S	I	0.15
B11600	150.6	0.1	0.21	S	I	0.15
B11877	150.5	0.5	-0.14	S	I	-0.38
B12168	150.5	0.2	-0.31	S	I	-0.38



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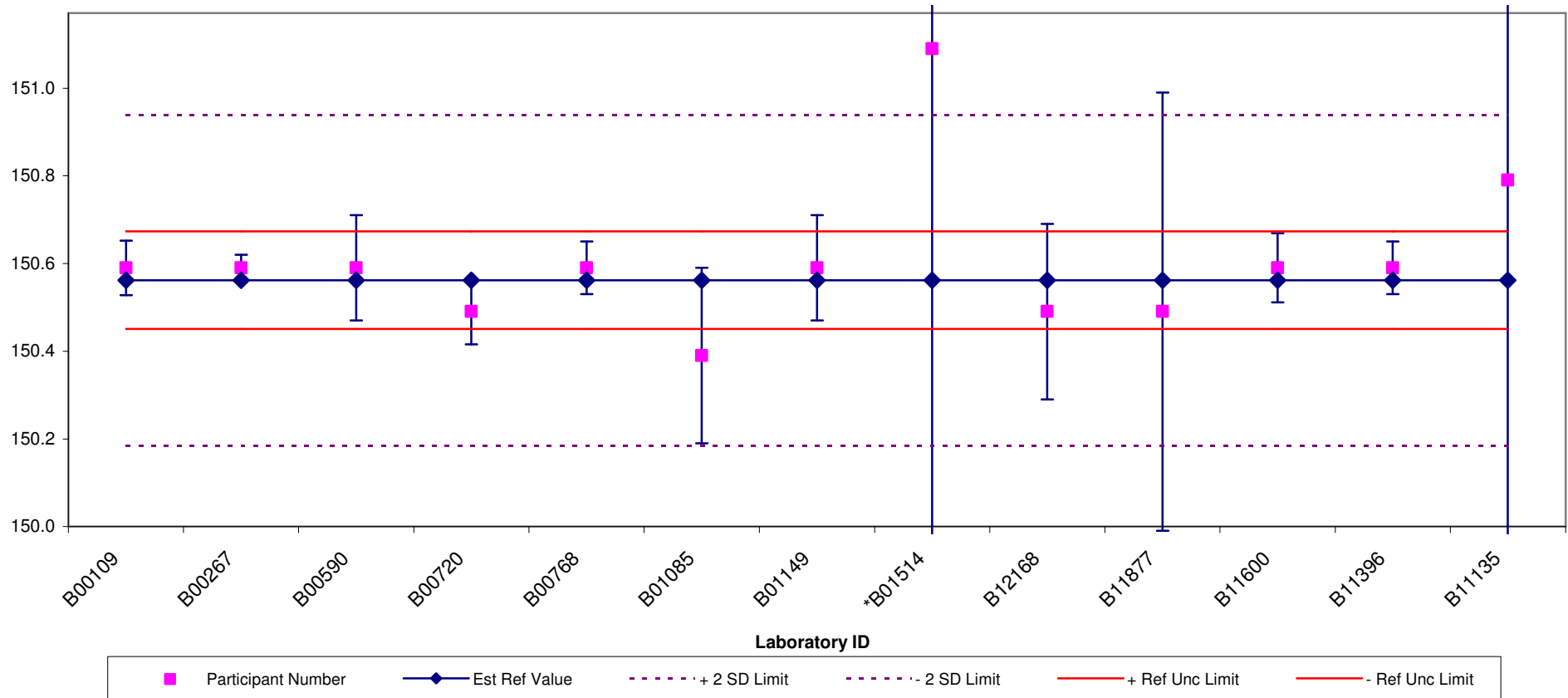
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Alpha Controls and Instrumentation

OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 2) AC Voltage 150V – 60Hz

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Report Date: 10/17/2011
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Measurement Description: 3) DC Current 100A

Discipline: Electrical - DC/LF Current - DC

Nominal Value: 100.0

Measurement Units: A

Established Reference Value: 100.3

Established Reference Uncertainty: 0.6

Mean Value (Satisfactory Results): 100.3

Mean Uncertainty (Satisfactory Results): 0.8

Mean Value (All Participants): 100.3

Mean Uncertainty (All Participants): 0.8

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	100.7	0.7	0.44	S	I	0.56
B00267	100.2	1.0	-0.08	S	I	-0.14
B00590	100.6	1.2	0.22	S	I	0.42
B00720	100.4	0.3	0.16	S	I	0.14
B00768	100.2	0.6	-0.12	S	I	-0.14
B01085	100.0	0.9	-0.28	S	I	-0.42
B01149	100.7	0.2	0.68	S	I	0.56
B11135	100.6	2.1	0.14	S	I	0.42
B11396	100.2	0.5	-0.13	S	I	-0.14
B11600	100.1	0.1	-0.35	S	I	-0.28
B11877	99.5	1.0	-0.69	S	W	-1.11
B12168	100.1	0.5	-0.26	S	I	-0.28



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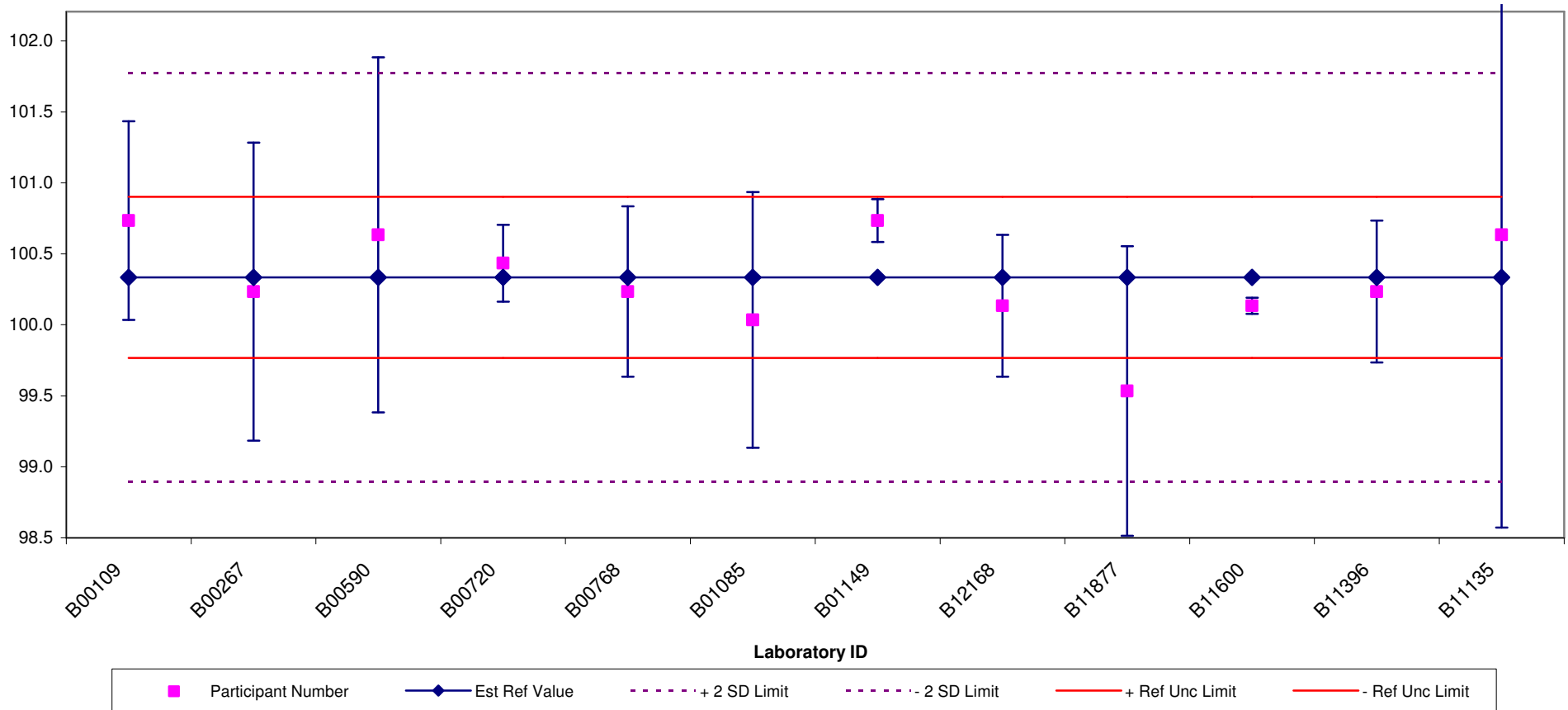
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Alpha Controls and Instrumentation

OUTLIERS EXCLUDED

Report Date: 10/17/2011
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Measurement Description: 3) DC Current 100A

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Report Date: 10/17/2011
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Measurement Description: 4) DC Current 200A

Discipline: Electrical - DC/LF Current - DC

Nominal Value: 200.0

Measurement Units: A

Established Reference Value: 200.4

Established Reference Uncertainty: 1.1

Mean Value (Satisfactory Results): 200.4

Mean Uncertainty (Satisfactory Results): 1.6

Mean Value (All Participants): 200.4

Mean Uncertainty (All Participants): 1.6

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	201.2	1.6	0.40	S	I	0.88
B00267	200.4	1.6	-0.02	S	I	-0.04
B00590	201.4	1.5	0.52	S	I	1.10
B00720	201.0	0.5	0.48	S	I	0.65
B00768	200.4	0.6	-0.03	S	I	-0.04
B01085	199.7	1.5	-0.39	S	I	-0.83
B01149	200.4	0.5	-0.03	S	I	-0.04
B11135	201.1	8.0	0.08	S	I	0.76
B11396	200.3	1.2	-0.08	S	I	-0.15
B11600	200.1	0.1	-0.30	S	I	-0.38
B11877	198.8	1.6	-0.84	S	W	-1.86
B12168	200.1	1.0	-0.22	S	I	-0.38



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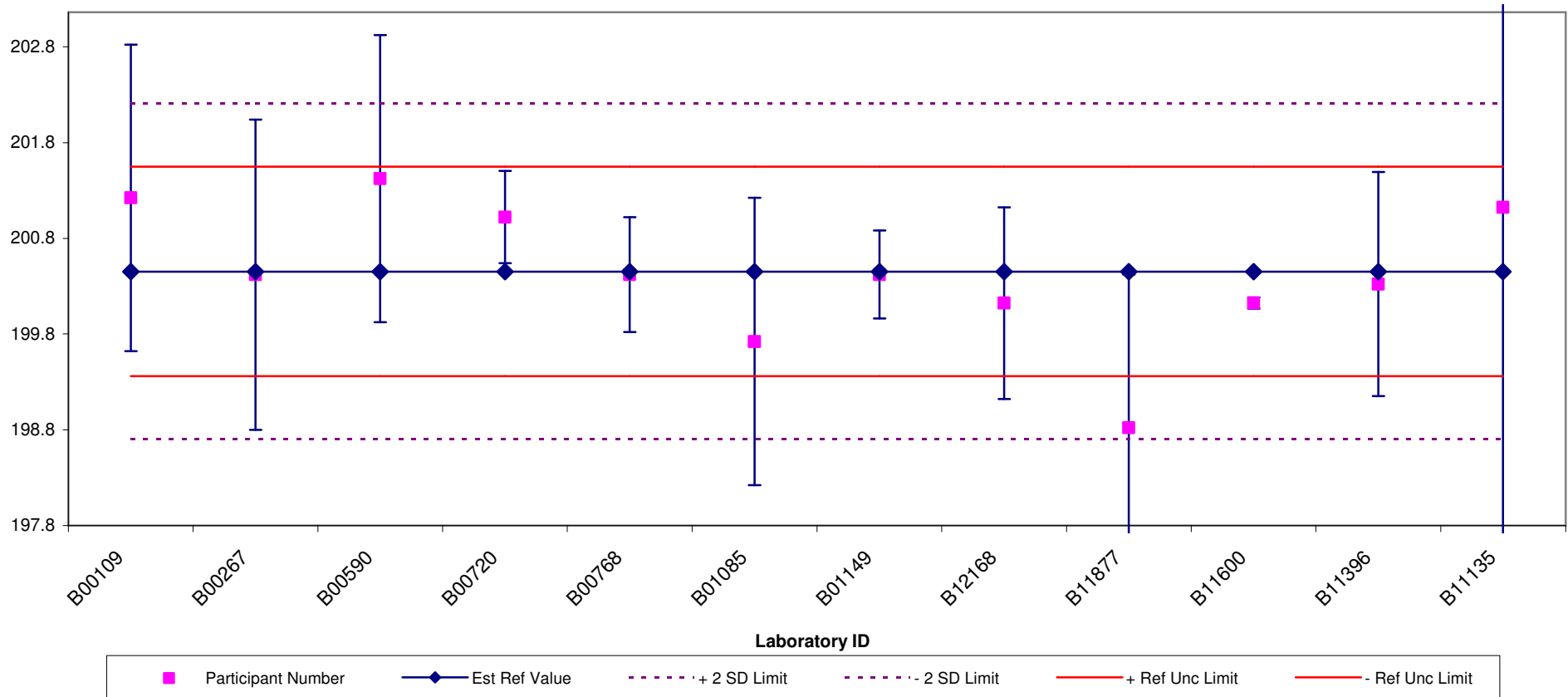
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Alpha Controls and Instrumentation

OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 4) DC Current 200A

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FINAL REPORT: BLOCK COMPARISON

RMS Clamp Meter/NAPT-CLAMP-309
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Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 5) DC Current 500A

Discipline: Electrical - DC/LF Current - DC

Nominal Value: 500.0

Measurement Units: A

Established Reference Value: 501.7

Established Reference Uncertainty: 1.5

Mean Value (Satisfactory Results): 501.6

Mean Uncertainty (Satisfactory Results): 2.8

Mean Value (All Participants): 501.6

Mean Uncertainty (All Participants): 2.8

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	503.1	3.3	0.39	S	I	1.02
B00267	501.5	3.3	-0.05	S	I	-0.14
B00590	503.1	3.0	0.42	S	I	1.02
B00720	501.8	1.1	0.06	S	I	0.08
B00768	501.7	0.6	0.01	S	I	0.01
B01085	499.6	3.1	-0.61	S	W	-1.51
B01149	502.9	1.2	0.64	S	I	0.88
B11135	503.1	10.0	0.14	S	I	1.02
B11396	501.3	2.3	-0.14	S	I	-0.28
B11877	499.1	2.1	-1.00	S	W	-1.87
B12168	500.8	1.0	-0.49	S	I	-0.64



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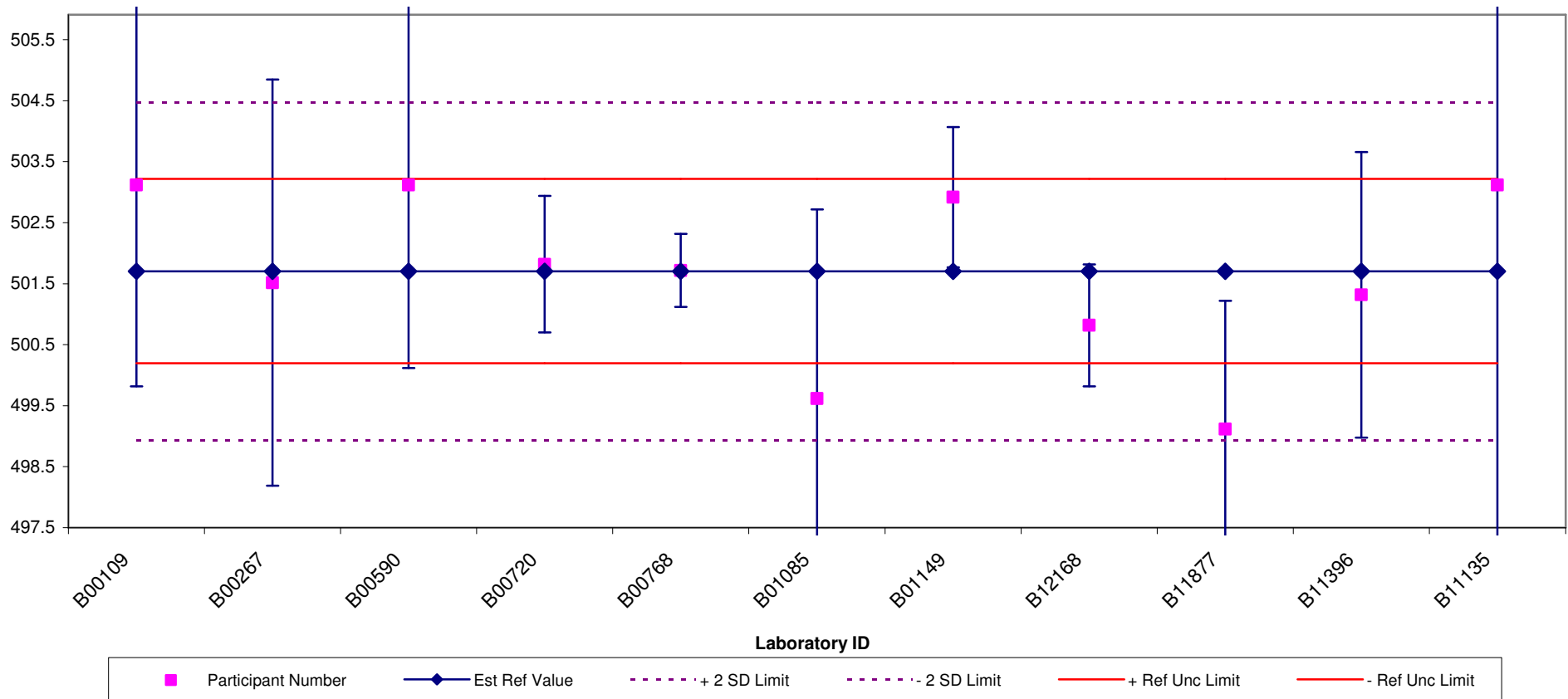
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OUTLIERS EXCLUDED

Report Date: 10/17/2011
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Measurement Description: 5) DC Current 500A

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FINAL REPORT: BLOCK COMPARISON

RMS Clamp Meter/NAPT-CLAMP-309
Alpha Controls and Instrumentation

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 6) AC Current 100A – 60Hz

Discipline: Electrical - DC/LF Current - AC

Nominal Value: 100.0

Measurement Units: A

Established Reference Value: 100.4

Established Reference Uncertainty: 0.5

Mean Value (Satisfactory Results): 100.5

Mean Uncertainty (Satisfactory Results): 1

Mean Value (All Participants): 100.5

Mean Uncertainty (All Participants): 1

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	100.3	0.8	-0.14	S	I	-1.09
B00267	100.4	1.3	-0.02	S	I	-0.26
B00590	100.5	1.0	0.06	S	I	0.58
B00720	100.5	0.3	0.12	S	I	0.58
B00768	100.4	0.6	-0.04	S	I	-0.26
B01085	100.2	1.0	-0.21	S	I	-1.93
B01149	100.5	0.2	0.12	S	I	0.58
B01514	100.6	3.6	0.05	S	I	1.41
*B11135	100.7	2.1	0.13	S	I	2.25
B11396	100.4	0.6	-0.04	S	I	-0.26
*B11600	100.7	0.1	0.52	S	I	2.25
B11877	100.3	1.1	-0.11	S	I	-1.09
B12168	100.4	0.5	-0.04	S	I	-0.26



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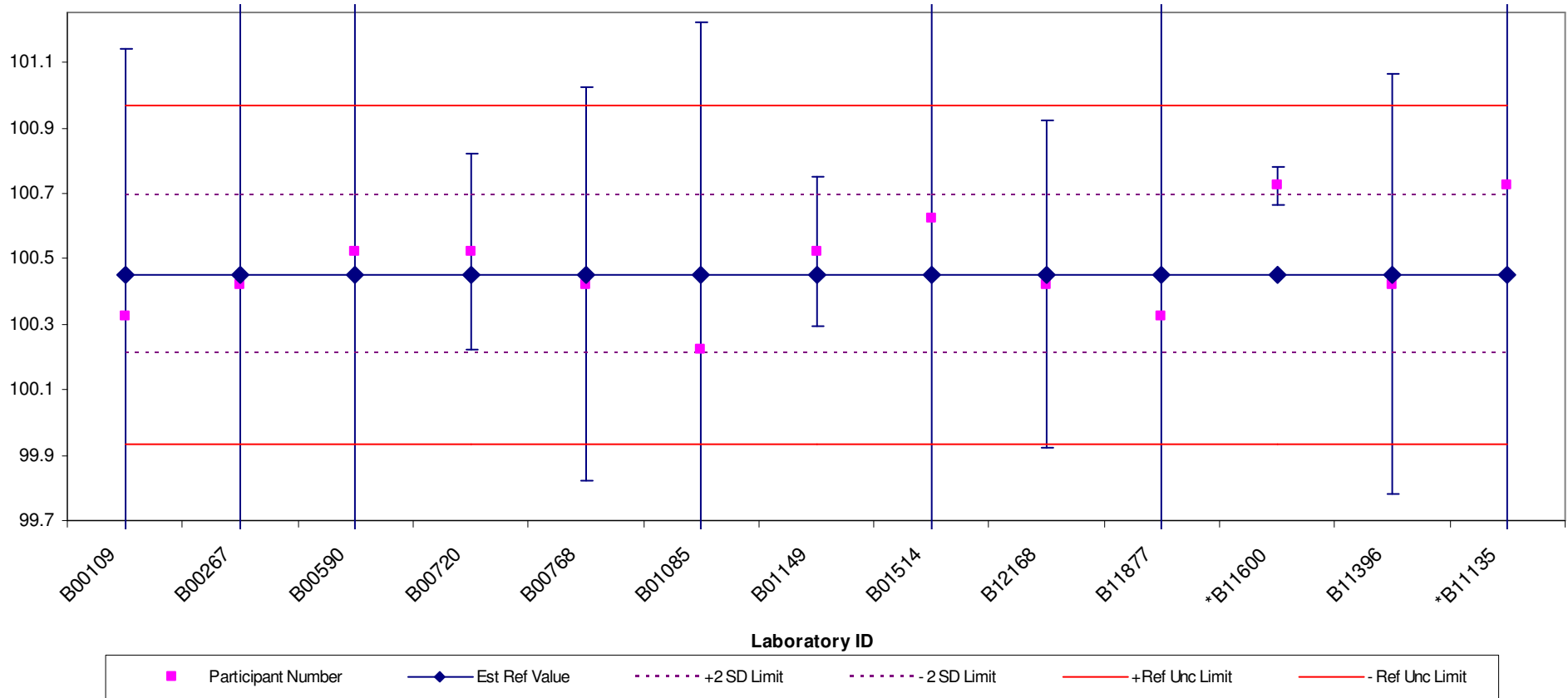
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OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 6) AC Current 100A – 60Hz

BLOCK COMPARISON:





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RMS Clamp Meter/NAPT-CLAMP-309
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Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 7) AC Current 190A – 400Hz

Discipline: Electrical - DC/LF Current - AC

Nominal Value: 190.0

Measurement Units: A

Established Reference Value: 188.1

Established Reference Uncertainty: 1.8

Mean Value (Satisfactory Results): 188.1

Mean Uncertainty (Satisfactory Results): 2.6

Mean Value (All Participants): 188.1

Mean Uncertainty (All Participants): 2.6

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	188.0	2.2	-0.04	S	I	-0.30
B00267	188.4	3.0	0.09	S	I	0.90
B00590	188.4	1.9	0.11	S	I	0.90
B00720	188.2	1.2	0.05	S	I	0.30
B00768	188.0	0.6	-0.05	S	I	-0.30
B01085	187.6	3.0	-0.14	S	I	-1.50
B01149	187.7	2.2	-0.14	S	I	-1.20
B11135	188.2	11.4	0.01	S	I	0.30
B11396	188.2	2.8	0.03	S	I	0.30
*B11600	189.0	0.1	0.50	S	I	2.70
B11877	187.7	1.4	-0.17	S	I	-1.20
B12168	188.1	2.0	0.00	S	I	0.00



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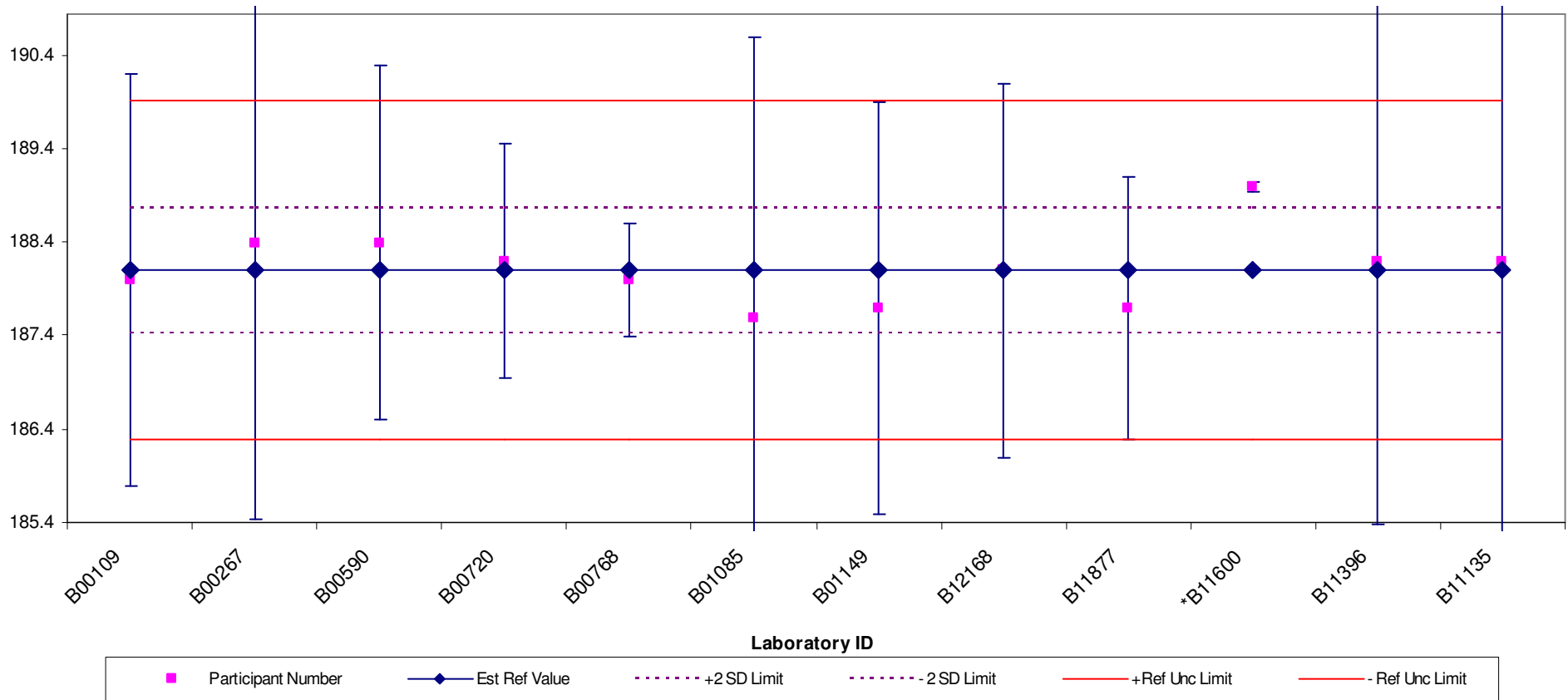
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OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 7) AC Current 190A – 400Hz

BLOCK COMPARISON:





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RMS Clamp Meter/NAPT-CLAMP-309
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Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 8) AC Current 300A – 400Hz

Discipline: Electrical - DC/LF Current - AC

Nominal Value: 300.0

Measurement Units: A

Established Reference Value: 297.0

Established Reference Uncertainty: 1.5

Mean Value (Satisfactory Results): 296.9

Mean Uncertainty (Satisfactory Results): 3

Mean Value (All Participants): 296.9

Mean Uncertainty (All Participants): 3

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
*B00109	297.3	3.3	0.09	S	I	2.62
*B00267	297.3	4.2	0.07	S	I	2.62
*B00590	297.3	3.0	0.09	S	I	2.62
B00768	296.9	0.6	-0.05	S	I	-0.72
*B01085	296.0	4.4	-0.21	S	I	-8.23
B01149	297.0	3.6	0.00	S	I	0.12
B11396	297.2	4.0	0.05	S	I	1.79
*B11877	296.1	1.6	-0.40	S	I	-7.40
B12168	296.9	1.9	-0.04	S	I	-0.72



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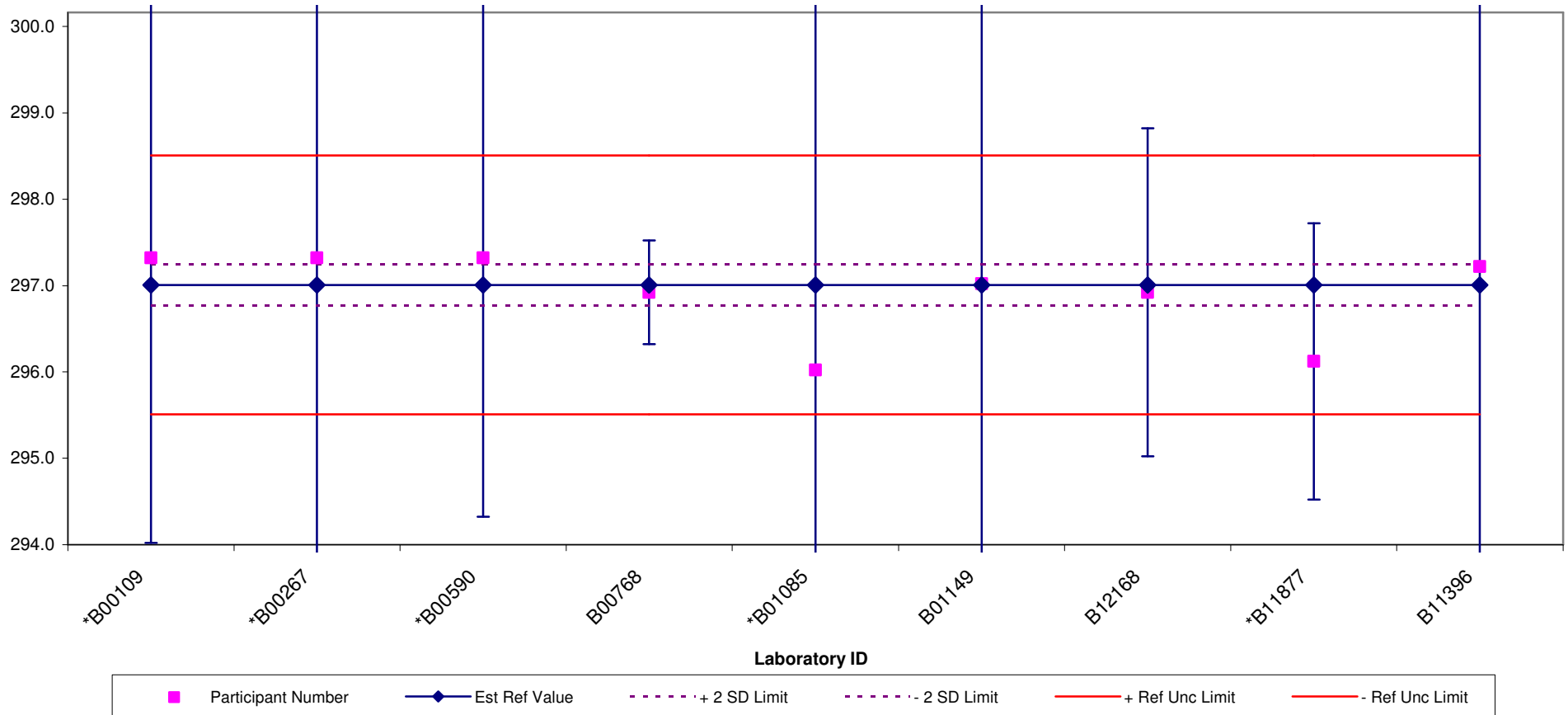
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Alpha Controls and Instrumentation

OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 8) AC Current 300A – 400Hz

BLOCK COMPARISON:





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Measurement Description: 9) AC Current 500A – 60Hz

Discipline: Electrical - DC/LF Current - AC

Nominal Value: 500.0

Measurement Units: A

Established Reference Value: 502.3

Established Reference Uncertainty: 2.2

Mean Value (Satisfactory Results): 502.3

Mean Uncertainty (Satisfactory Results): 3.7

Mean Value (All Participants): 502.3

Mean Uncertainty (All Participants): 3.7

Test ID #	Reported Value	Reported Uncertainty	E_n	S/U	IWO	Z Score
B00109	502.5	3.8	0.05	S	I	0.30
B00267	502.5	3.8	0.05	S	I	0.30
B00590	502.5	5.0	0.04	S	I	0.30
B00720	502.4	1.3	0.05	S	I	0.17
B00768	502.1	0.6	-0.08	S	I	-0.25
*B01085	500.6	6.0	-0.26	S	I	-2.32
B01149	503.1	2.6	0.24	S	I	1.13
B11135	503.7	10.0	0.14	S	I	1.96
B11396	502.5	2.9	0.06	S	I	0.30
B11877	501.1	2.1	-0.38	S	I	-1.63
B12168	501.9	2.3	-0.12	S	I	-0.52



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FINAL REPORT: BLOCK COMPARISON

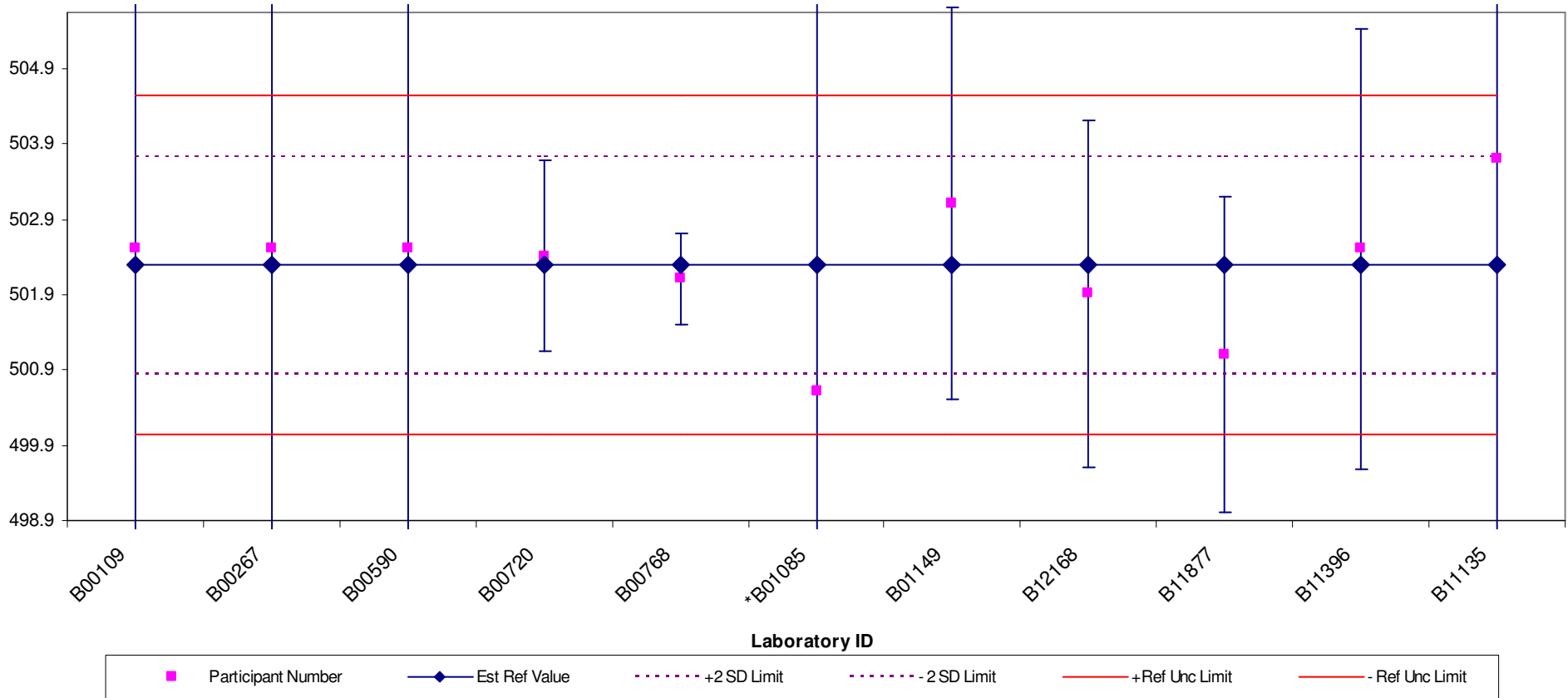
RMS Clamp Meter / NAPT-CLAMP-309
Alpha Controls and Instrumentation

OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 9) AC Current 500A – 60Hz

BLOCK COMPARISON:





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RMS Clamp Meter/NAPT-CLAMP-309
Alpha Controls and Instrumentation

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 10) Resistance 100Ω

Discipline: Electrical - DC/LF Resistance

Nominal Value: 100.0

Measurement Units: ohms

Established Reference Value: 100.6

Established Reference Uncertainty: 0.1

Mean Value (Satisfactory Results): 100.6

Mean Uncertainty (Satisfactory Results): 0.3

Mean Value (All Participants): 100.6

Mean Uncertainty (All Participants): 0.3

Test ID #	Reported Value	Reported Uncertainty	E _n	S/U	IWO	Z Score
B00109	100.6	0.1	-0.25	S	I	-0.27
B00267	100.7	0.0	0.46	S	I	0.45
B00590	100.5	0.1	-0.82	S	W	-0.99
B00720	100.6	0.1	-0.25	S	I	-0.27
B00768	100.6	0.1	-0.25	S	I	-0.27
B01085	100.9	0.2	1.09	U	W	1.88
B01149	100.6	0.1	-0.21	S	I	-0.27
B11135	100.6	1.6	-0.02	S	I	-0.27
B11396	100.7	0.1	0.43	S	I	0.45
B11600	100.7	0.1	0.43	S	I	0.45
B11877	100.7	0.3	0.19	S	I	0.45
B12168	100.4	0.2	-0.99	S	W	-1.70



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FINAL REPORT: BLOCK COMPARISON

RMS Clamp Meter / NAPT-CLAMP-309
Alpha Controls and Instrumentation

OUTLIERS EXCLUDED

Report Date: 10/17/2011
Date of Participation in ILC/PT: 10/03/2011

Measurement Description: 10) Resistance 100Ω

BLOCK COMPARISON:

