

MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

1. INTRODUCTION

This document states the Correlation and Qual result of **MPC5565/MPC5567** device in order to certify the Teradyne Ultraflex B ATE platform. All evaluations stated in this document have been discussed and agreed by both OHT and KLM, based on IFM Test Correlation and Qualification (**Spec#: 12MQS10009G**)

PRODUCT INFORMATION

MPC5565/MPC5567	
Product Line	: S9U5565,G9U5565, S9U5567,G9U5567
Target Device	: Various
Mask	: M49H
Package Code	: 5252 (416 PBGA 27 X 27) , 324 PBGA 23 X 23
Assembly Site	: KLM
PTI Code	: JBET

This document also states the results of all evaluations listed in the correlation plan and Class A Qual (to be provided by 20 Nov). Any requirements stated in the IFM Test Correlation and Qualification (**Spec#:12MQS10009G**) which cannot be fulfilled will require approval from OHT's & KLM's PE and RQA.

- Hardware Requirements:
System (Tester) Type : Ultraflex
Handler Type : Castle
Load board : ATX7764A
Software (Test Program) : MPC5565_M49H_UPPA05J

2. BIN TO BIN CORRELATION

Action:

A minimum of 1000 units from three different wafers lots to be tested at each temperature Room, Hot and Cold insertion on J750 and then Ultraflex.

Accept Criteria:

All units must achieve 100% bin to bin correlation. All good units from pilot site correlate 100% at transfer site. All reject units from pilot site correlate 100 % bin to bin.

Result

GOOD UNIT CORRELATION (R,H,C):

Lot 1	DD54710.1	1184 – fully correlated
Lot 2	DD54581.1	1023 – fully correlated
Lot 3	DD54580.1	1468 – fully correlated

FINAL TEST ROOM (25 C):

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		ULTRAFLEX TEST RESULT							
	Binning	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
J750 TEST RESULT	Bin1	0							
	Bin2		248						
	Bin3			0					
	Bin4				0				
	Bin5					0			
	Bin6						0		
	Bin7							0	
	Bin8								0

FINAL TEST HOT (155 C):

		ULTRAFLEX TEST RESULT							
	Binning	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
J750 TEST RESULT	Bin1	0							
	Bin2		0						
	Bin3			0					
	Bin4				0				
	Bin5					2			
	Bin6						0		
	Bin7							2	
	Bin8								0

FINAL TEST COLD (-45 C):

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		ULTRAFLEX TEST RESULT								
		Binning	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
J750 TEST RESULT	Bin1	0								
	Bin2		0							
	Bin3			2						
	Bin4				0					
	Bin5					0				
	Bin6						0			
	Bin7								1	
	Bin8									1

3. PARAMETRIC COMPARISON

Action:

- Sample of 30 units (10 units from 3 different wafer lots) was used to collect J750 to Ultraflex parametric comparisons.
- Units first tested to full J750 test flow at room. Units then retested on Ultraflex.
- Parametric results stored to Omniscience and data compared between the two platforms.
- Parameters having mean shifts > 10% were investigated.

Accept Criteria:

t-test and f-test should be no significant difference with p-value more than 0.05.

Result:

- Pass

PARAMETRIC COMPARISON FOR ROOM (25C)

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T-Test and F-Test of the selected parametric test is within the acceptance criteria, with a p-value of more than 0.05

Tests	F-test	T-test
oscSelfBiasVEXT	0.811	0.816
h7fa_idle_idd	0.163	0.715
osclbias	0.921	0.983

Paired T-Test and CI: oscSelfBiasVEXT

Paired T for oscSelfBias(UF) - oscSelfBias (j750)

	N	Mean	StDev	SE Mean
UF (oscSelfBias)	15	934.79	16.67	4.30
j750 (oscSelfBias)	15	934.36	17.79	4.59
Difference	15	0.43	6.95	1.79

95% CI for mean difference: (-3.42, 4.28)

T-Test of mean difference = 0 (vs not = 0): T-Value = 0.24 P-Value = 0.816

Paired T-Test and CI: h7fa_idle_idd

Paired T for h7fa_idle_idd(UF) - h7fa_idle_idd(j750)

	N	Mean	StDev	SE Mean
UF(h7fa_idle_idd)	15	3.304	0.465	0.120
j750 (h7fa_idle_idd)	15	3.345	0.683	0.176
Difference	15	-0.041	0.422	0.109

95% CI for mean difference: (-0.275, 0.193)

T-Test of mean difference = 0 (vs not = 0): T-Value = -0.37 P-Value = 0.715

Paired T-Test and CI: osclbias

Paired T for osclbias(UF) - osclbias (j750)

	N	Mean	StDev	SE Mean
UF (oscIbias)	30	-3.4110	0.3077	0.0562
j750 (oscIbias)	30	-3.4102	0.3135	0.0572
Difference	30	-0.0009	0.2199	0.0402

95% CI for mean difference: (-0.0830, 0.0812)

T-Test of mean difference = 0 (vs not = 0): T-Value = -0.02 P-Value = 0.983

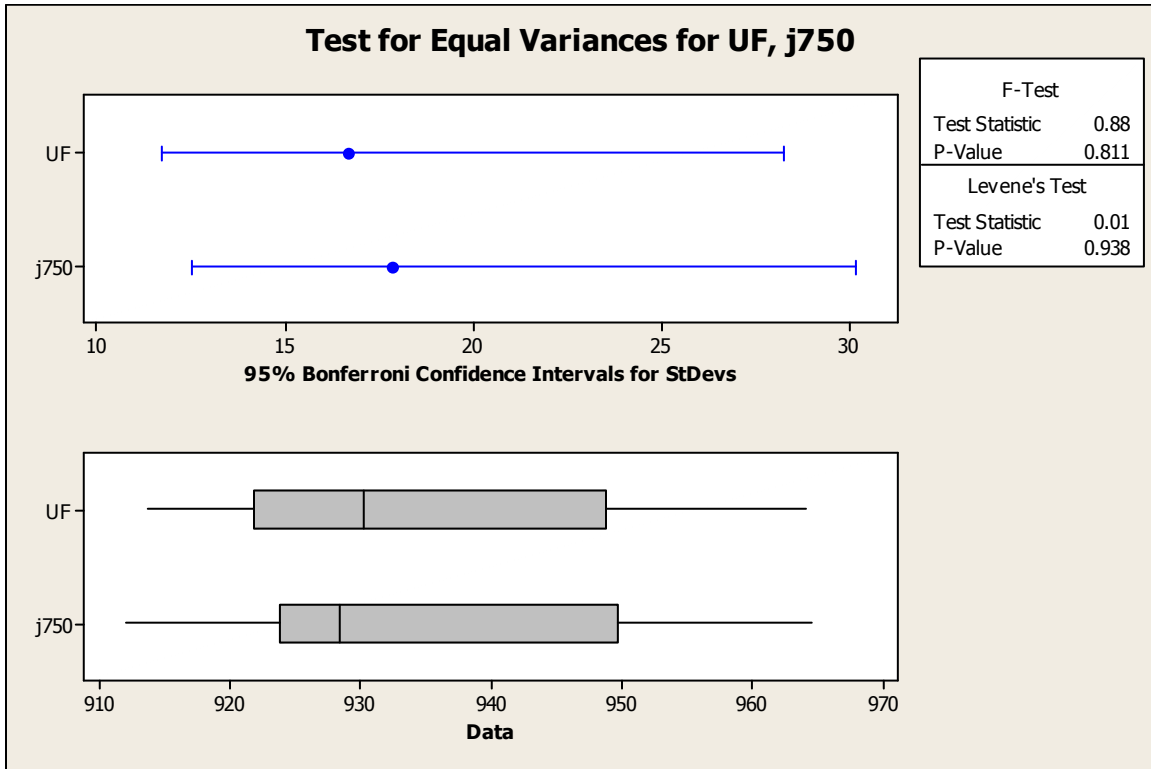
Test for Equal Variances: oscSelfBiasVEXT test

95% Bonferroni confidence intervals for standard deviations

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	N	Lower	StDev	Upper
UF(oscSelfBias)	15	11.6994	16.6696	28.2542
j750 (oscSelfBias)	15	12.4856	17.7899	30.1529

F-Test (Normal Distribution)
 Test statistic = 0.88, p-value = 0.811



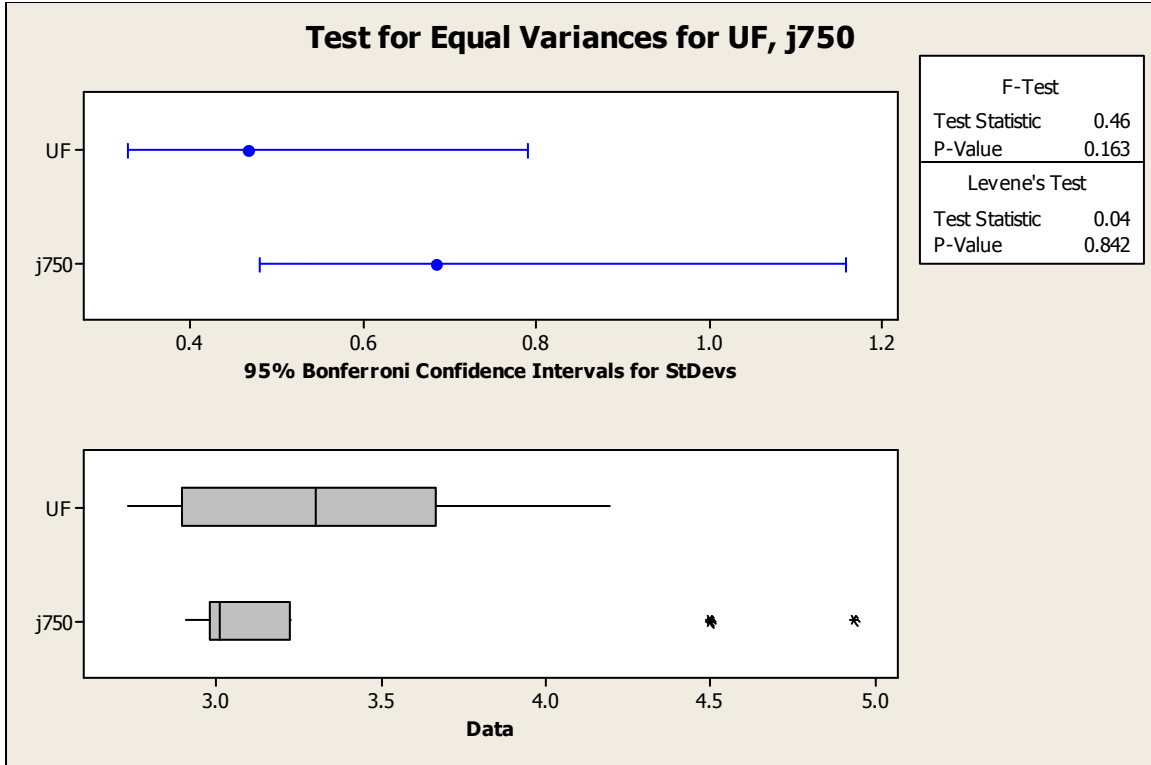
Test for Equal Variances: h7fa_idle_idd_i vdd test

95% Bonferroni confidence intervals for standard deviations

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	N	Lower	StDev	Upper
UF(h7fa_idle_idd)	15	0.326547	0.465274	0.78861
j750(h7fa_idle_idd)	15	0.479362	0.683009	1.15766

F-Test (Normal Distribution)
 Test statistic = 0.46, p-value = 0.163



Test for Equal Variances: osclbias test

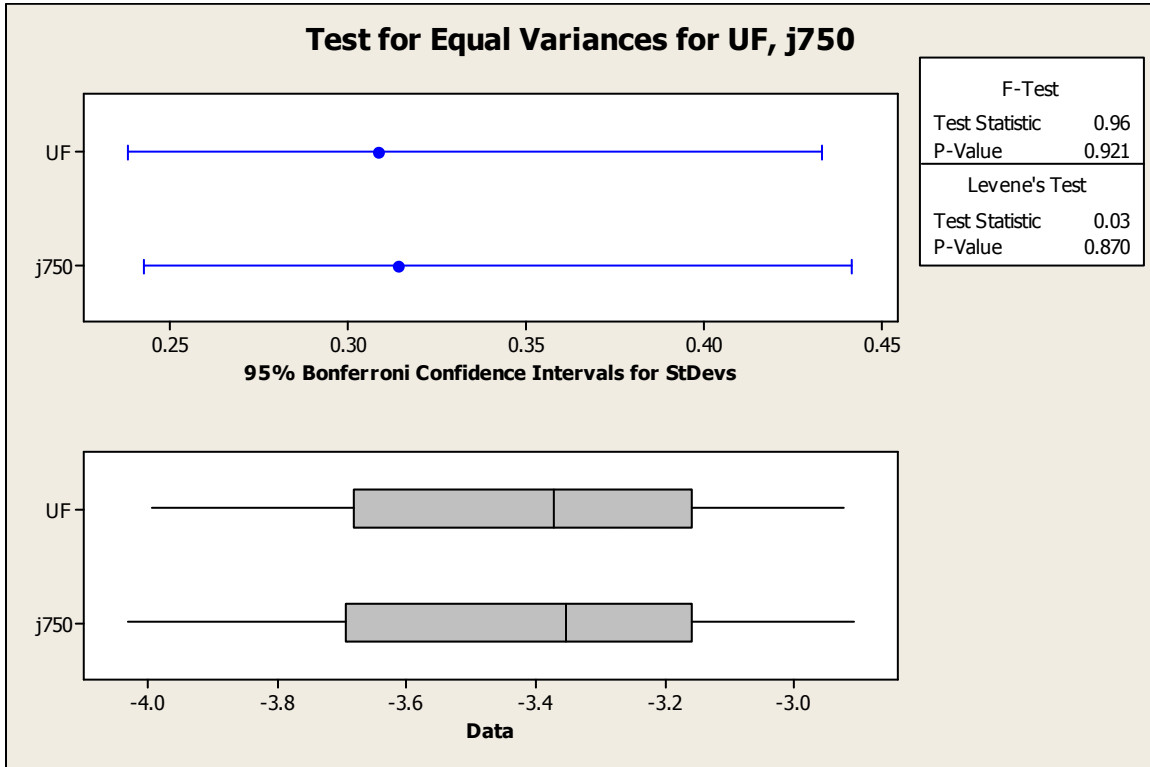
95% Bonferroni confidence intervals for standard deviations

N	Lower	StDev	Upper
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UF(oscIbias)	30	0.237534	0.307733	0.432842
j750(oscIbias)	30	0.241964	0.313472	0.440915

F-Test (Normal Distribution)
Test statistic = 1.04, p-value = 0.921



PARAMETRIC COMPARISON FOR HOT (145C)

T-Test and F-Test of the selected parametric test is within the acceptance criteria, with a p-value of more than 0.05

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Tests	F-test	T-test
oscSelfBiasVEXT	0.980	0.816
h7fa_idle_idd_i vdd	0.762	0.518
osclbias	0.905	0.183

Paired T-Test and CI: oscSelfBiasVEXT

Paired T for oscSelfBias(Uflex) - oscSelfBias (j750)

	N	Mean	StDev	SE Mean
UF (oscSelfBias)	23	981.03	9.66	2.01
j750 (oscSelfBias)	23	980.90	9.71	2.03
Difference	23	0.129	2.630	0.548

95% CI for mean difference: (-1.008, 1.267)

T-Test of mean difference = 0 (vs not = 0): T-Value = 0.24 P-Value = 0.816

Paired T-Test and CI: h7fa_idle_idd

Paired T for h7fa_idle_idd (Uflex) - h7fa_idle_idd (J750)

	N	Mean	StDev	SE Mean
UF (h7fa_idle_idd)	35	11.874	2.076	0.351
j750 (h7fa_idle_idd)	35	11.839	1.970	0.333
Difference	35	0.0349	0.3163	0.0535

95% CI for mean difference: (-0.0737, 0.1436)

T-Test of mean difference = 0 (vs not = 0): T-Value = 0.65 P-Value = 0.518

Paired T-Test and CI: osclbias

Paired T for osclbias (Uflex) - osclbias(J750)

	N	Mean	StDev	SE Mean
UF (osclbias)	31	-4.5247	0.2438	0.0438
J750 (Osclbias)	31	-4.5131	0.2492	0.0448
Difference	31	-0.01168	0.04767	0.00856

95% CI for mean difference: (-0.02916, 0.00581)

T-Test of mean difference = 0 (vs not = 0): T-Value = -1.36 P-Value = 0.183

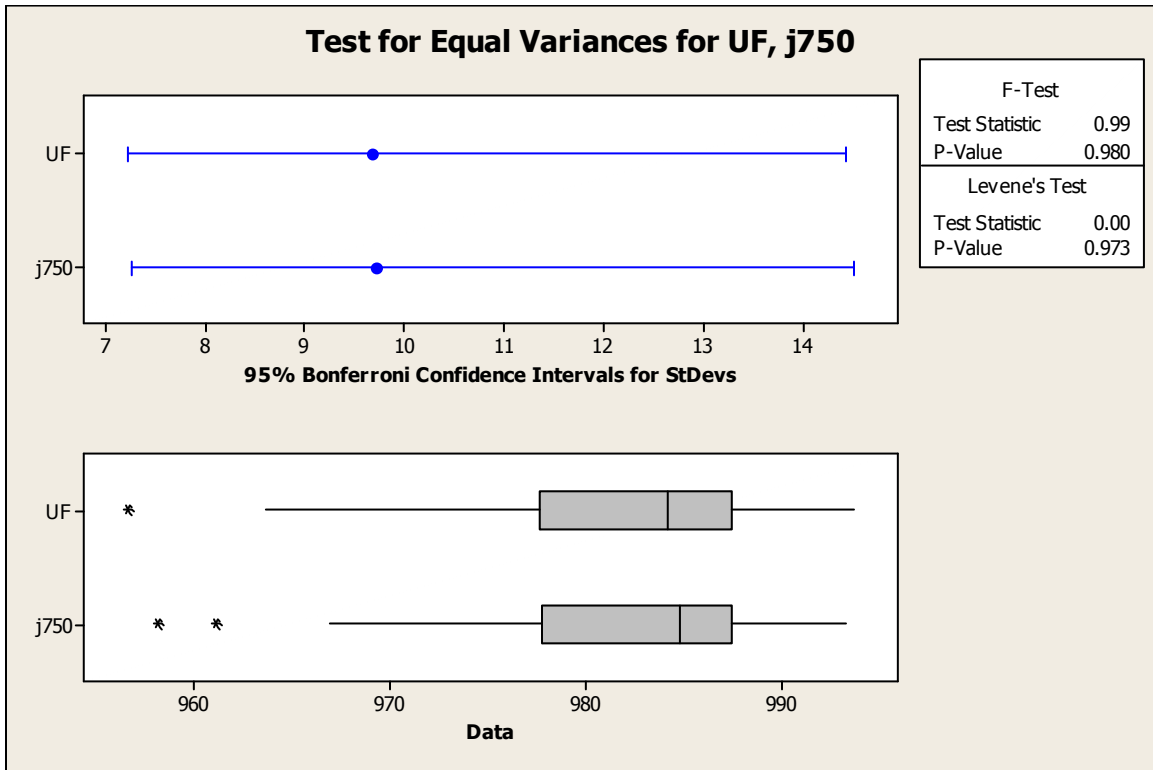
Test for Equal Variances: oscSelfBiasVEXT test

95% Bonferroni confidence intervals for standard deviations

	N	Lower	StDev	Upper
UF(oscSelfBias)	23	7.21344	9.66044	14.4275
j750(oscSelfBias)	23	7.25184	9.71187	14.5043

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F-Test (Normal Distribution)
 Test statistic = 0.99, p-value = 0.980



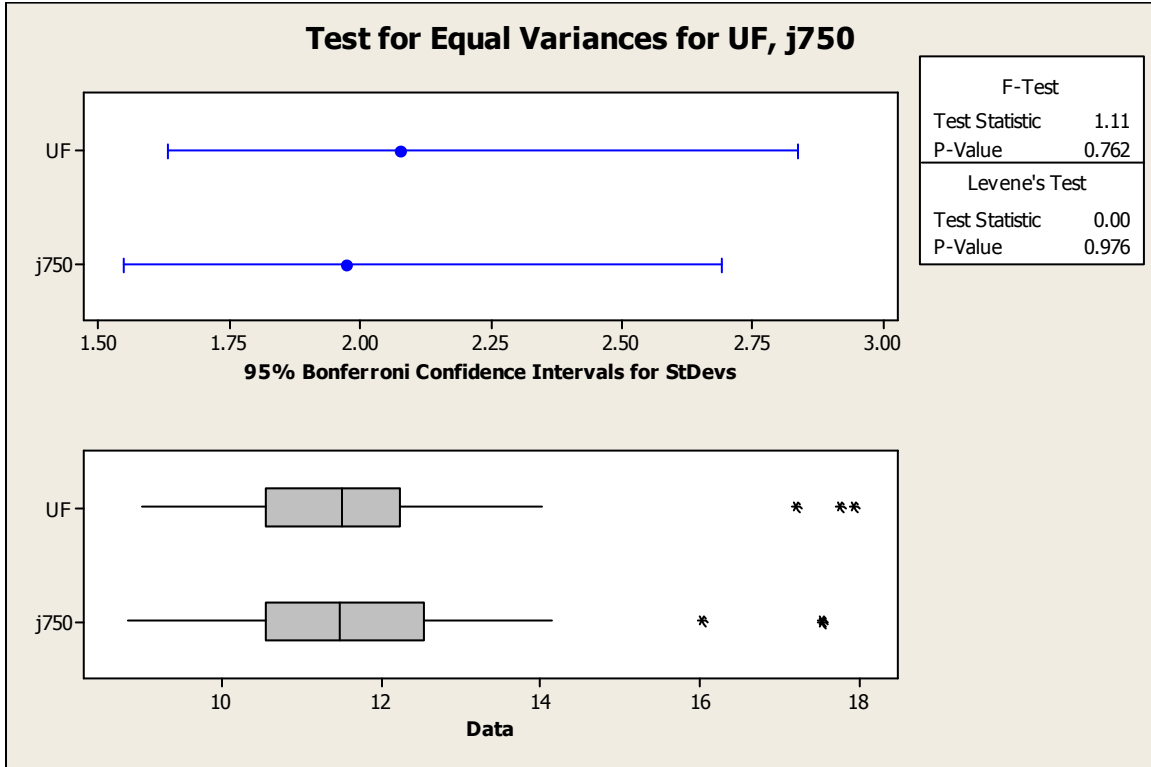
Test for Equal Variances for h7fa_idle_idd_i vdd test

95% Bonferroni confidence intervals for standard deviations

	N	Lower	StDev	Upper
UF(h7fa_idle_idd)	35	1.63080	2.07593	2.83401
j750(h7fa_idle_idd)	35	1.54748	1.96987	2.68921

F-Test (Normal Distribution)
 Test statistic = 1.11, p-value = 0.762

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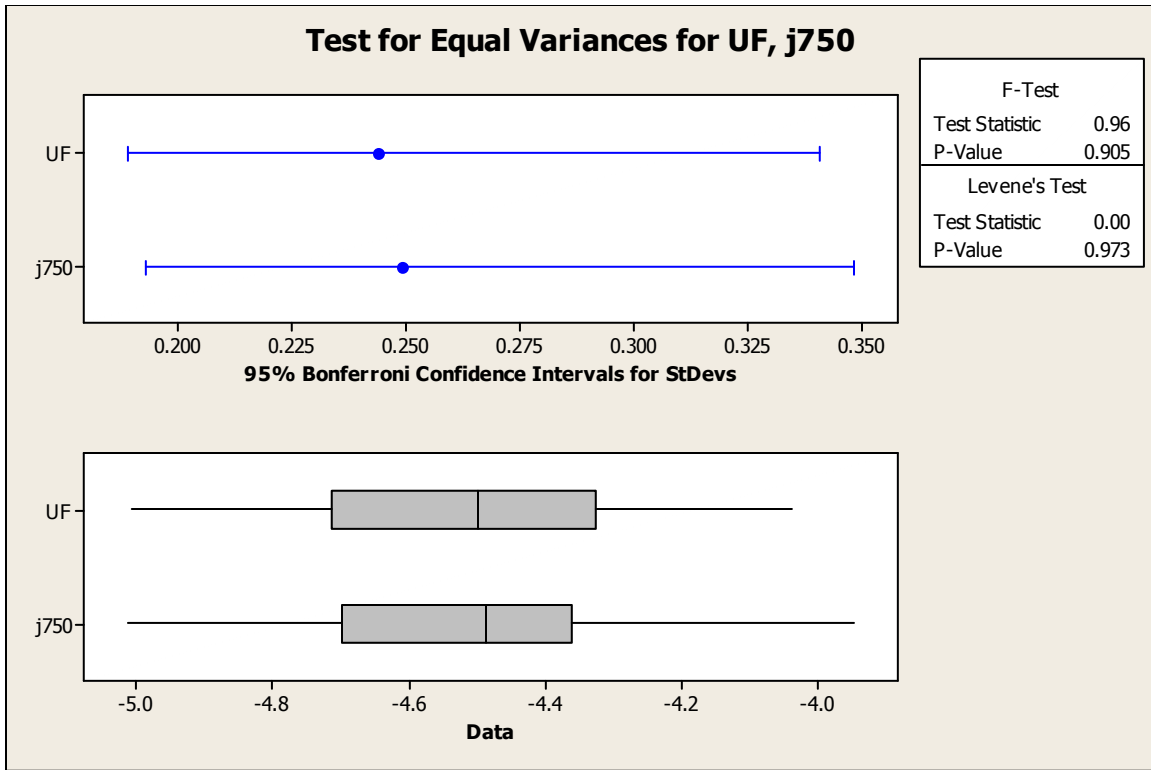
Test for Equal Variances: oscIbias test

95% Bonferroni confidence intervals for standard deviations

	N	Lower	StDev	Upper
UF(oscIbias)	31	0.188924	0.243819	0.340680
j750(oscIbias)	31	0.193121	0.249237	0.348249

F-Test (Normal Distribution)
 Test statistic = 0.96, p-value = 0.905

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PARAMETRIC COMPARISON FOR COLD (-45C)

T-Test and F-Test of the selected parametric test is within the acceptance criteria, with a p-value of more than 0.05

Tests	F-test	T-test
oscSelfBiasVEXT	0.247	0.333
h7fa_idle_idd_i_vdd	0.098	0.121
osclbias	0.809	0.084

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Paired T-Test and CI: oscSelfBiasVEXT

Paired T for oscSelfBiasVEXT (Uflex) - oscSelfBiasVEXT (J750)

	N	Mean	StDev	SE Mean
UF (oscSelfBias)	28	932.6	23.0	4.3
J750 (oscSelfBias)	28	898.4	177.4	33.5
Difference	28	34.2	183.4	34.7

95% CI for mean difference: (-36.9, 105.3)

T-Test of mean difference = 0 (vs not = 0): T-Value = 0.99 P-Value = 0.333

Paired T-Test and CI: h7fa_idle_idd

Paired T for h7fa_idle_idd (Uflex) - h7fa_idle_idd (J750)

	N	Mean	StDev	SE Mean
UF (h7fa_idle_idd)	25	3.9648	0.2819	0.0564
J750 (h7fa_idle_idd)	25	4.0118	0.1998	0.0400
Difference	25	-0.0469	0.1458	0.0292

95% CI for mean difference: (-0.1071, 0.0133)

T-Test of mean difference = 0 (vs not = 0): T-Value = -1.61 P-Value = 0.121

Paired T-Test and CI: osclbias

Paired T for osclbias (Uflex) - osclbias (J750)

	N	Mean	StDev	SE Mean
UF (Osclbias)	35	-2.9105	0.3642	0.0616
J750 (Osclbias)	35	-2.9300	0.3493	0.0590
Difference	35	0.0195	0.0646	0.0109

95% CI for mean difference: (-0.0027, 0.0416)

T-Test of mean difference = 0 (vs not = 0): T-Value = 1.78 P-Value = 0.084

Test for Equal Variances: (oscSelfBiasVEXT test)

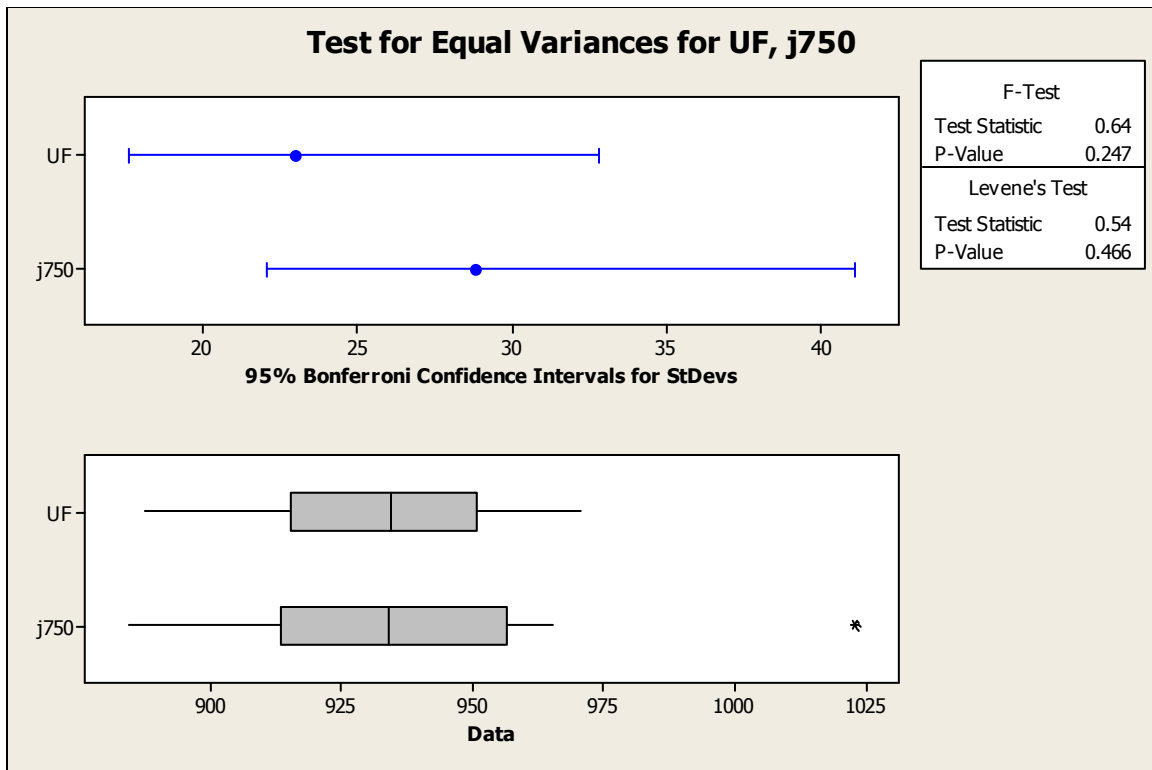
95% Bonferroni confidence intervals for standard deviations

	N	Lower	StDev	Upper
UF (oscSelfBias)	28	17.5729	22.9550	32.7577
j750 (oscSelfBias)	28	22.0277	28.7742	41.0620

F-Test (Normal Distribution)

Test statistic = 0.64, p-value = 0.247

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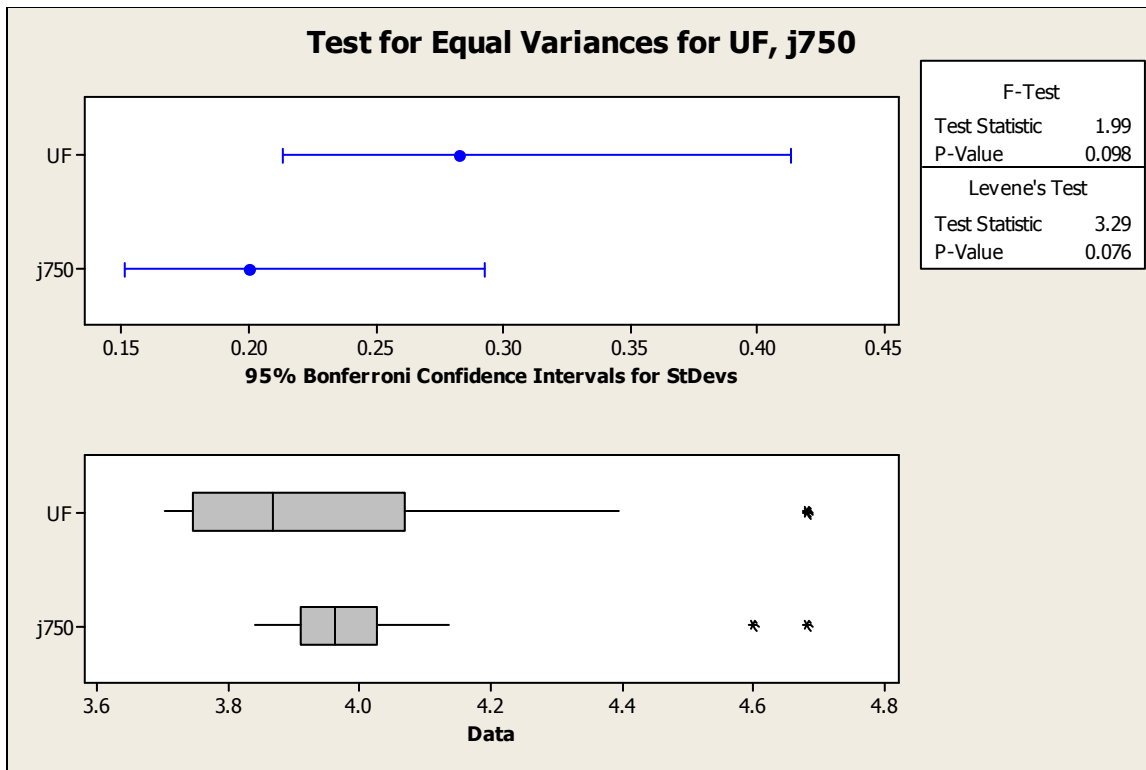
Test for Equal Variances: h7fa_idle_idd_i vdd test

95% Bonferroni confidence intervals for standard deviations

	N	Lower	StDev	Upper
UF(h7fa_idle_idd)	25	0.212806	0.281929	0.412672
j750(h7fa_idle_idd)	25	0.150834	0.199828	0.292497

F-Test (Normal Distribution)
 Test statistic = 1.99, p-value = 0.098

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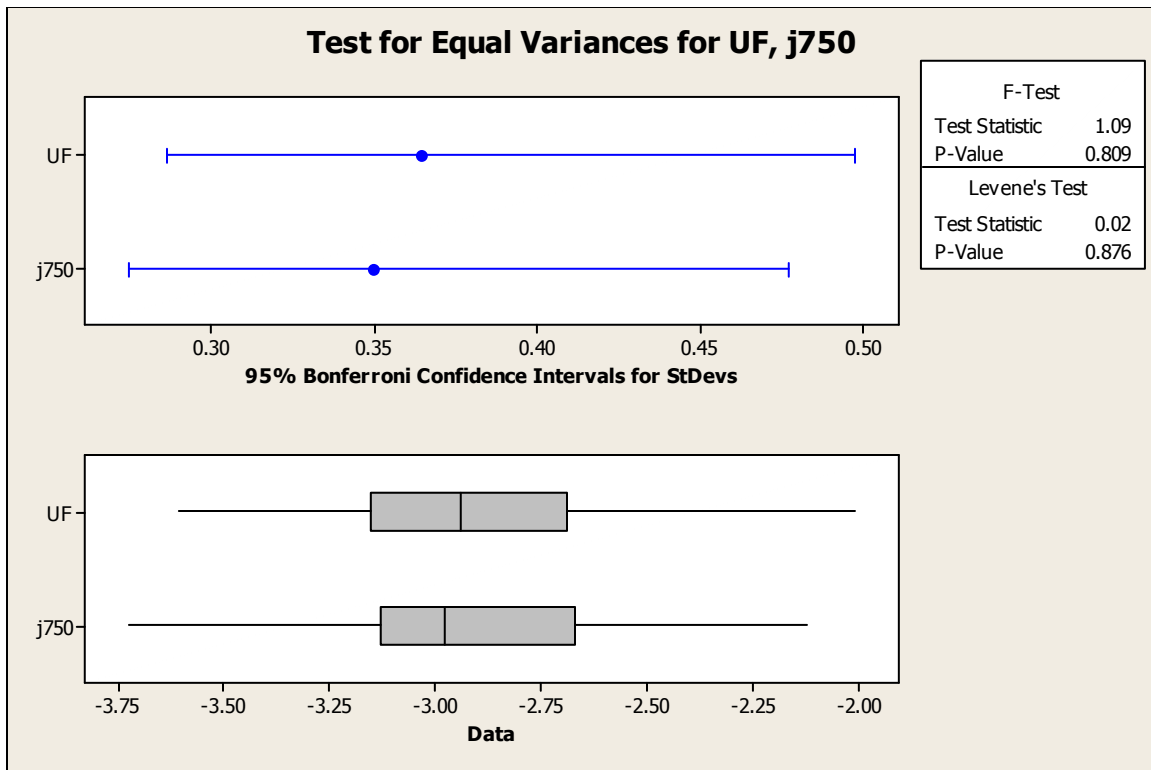
Test for Equal Variances: oscIbias

95% Bonferroni confidence intervals for standard deviations

	N	Lower	StDev	Upper
UF(oscIbias)	35	0.286135	0.364236	0.497245
J750(oscIbias)	35	0.274430	0.349336	0.476904

F-Test (Normal Distribution)
 Test statistic = 1.09, p-value = 0.809

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4. WAVEFORM CHECK

Action:

Perform signal waveform scoping on power supply pins to check for over voltage (+30% from test VDD). Waveform scoping study performed using the first insertion's test program, Post Room.

Accept Criteria:

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Zero over voltage spike and zero under voltage spike.

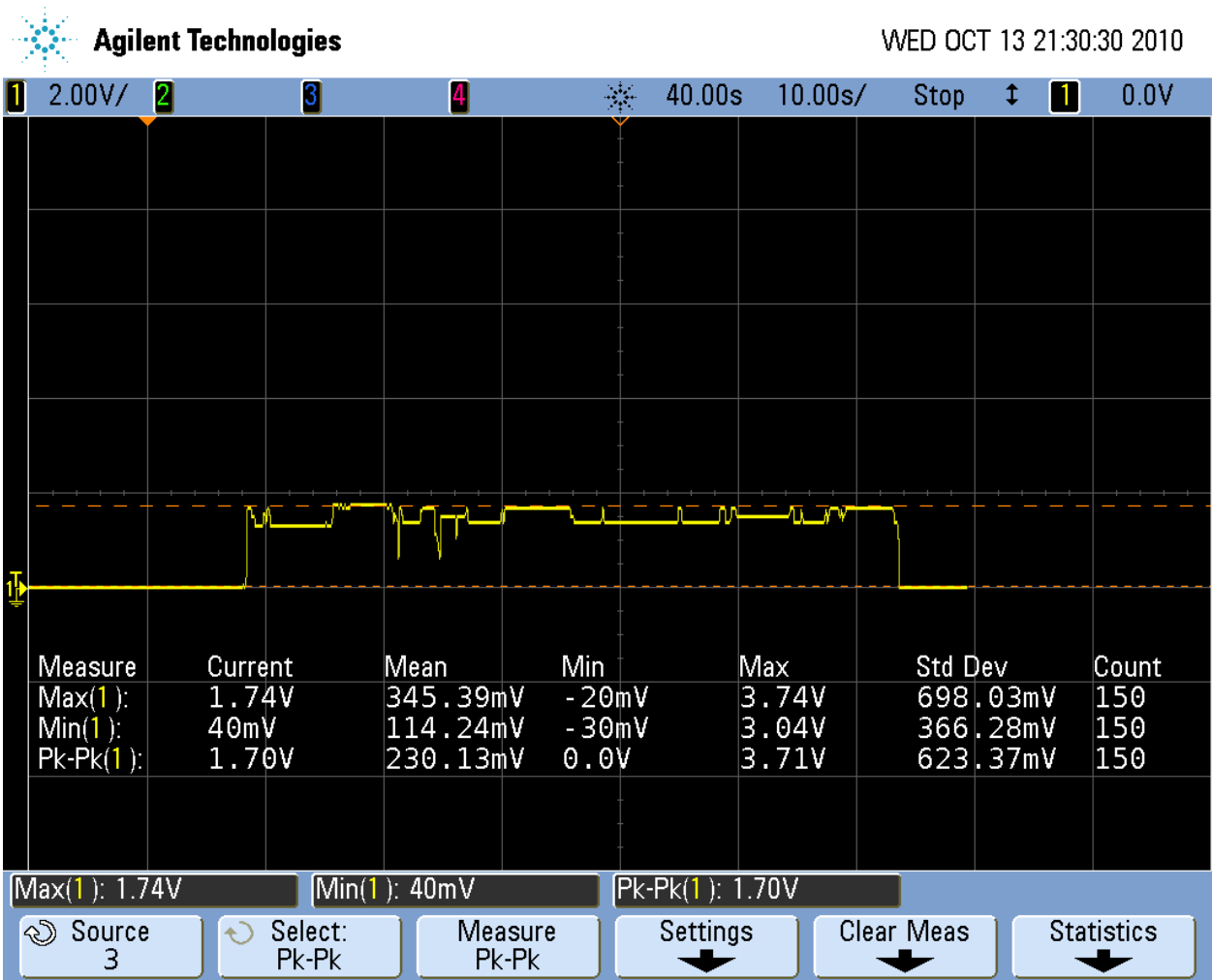
- Detailed oscilloscope work done using a Tektronix 3034 scope.
- All power supplies checked for any excessive positive or negative voltages.
 - Vdd (internal 1.5V supply) checked at 1.90V / -0.5V
 - Vdde (pad 3.3V supply) checked at 3.9V / -0.5V
 - Vddeh (pad 5.0V supply) checked at 5.75V / -0.5V
 - Vpp (flash 5.0V supply) checked at 5.75V / -0.5V
 - Vdda (QADC 5.0V supply) checked at 5.75V / -0.5V
 - Vdd33 checked at 3.75V / -0.5V
 - Vddsyn checked at 4.0V / -0.5V
 - Vstby (SRAM 1.5V supply) checked at 1.9V / -0.5V
- Results passed

Voltage Tracing Results				
Pin Name	Vmax (V)	Vmin (V)	Vprog (V)	Auto Comments
VDD	1.74	40m	1.7	No Threat to Units
VDD33	3.73	40m	4.6	No Threat to Units
VDDA	5.28	40m	5.5	No Threat to Units
VDDE	3.73	40m	4.6	No Threat to Units
VDDEH	5.37	40m	6.5	No Threat to Units
VDDSYN	3.73	40m	4.6	No Threat to Units
VPP	5.28	40m	6.5	No Threat to Units
VSTBY	1.24	40m	1.7	No Threat to Units

Results:

VDD

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Summary:

30% of the maximum Vdd Voltage Level = $1.70 + (1.70 \times 30\%) = 2.21V$.

None of the Vdd pin exceeds 1.74V, no over-voltage observed

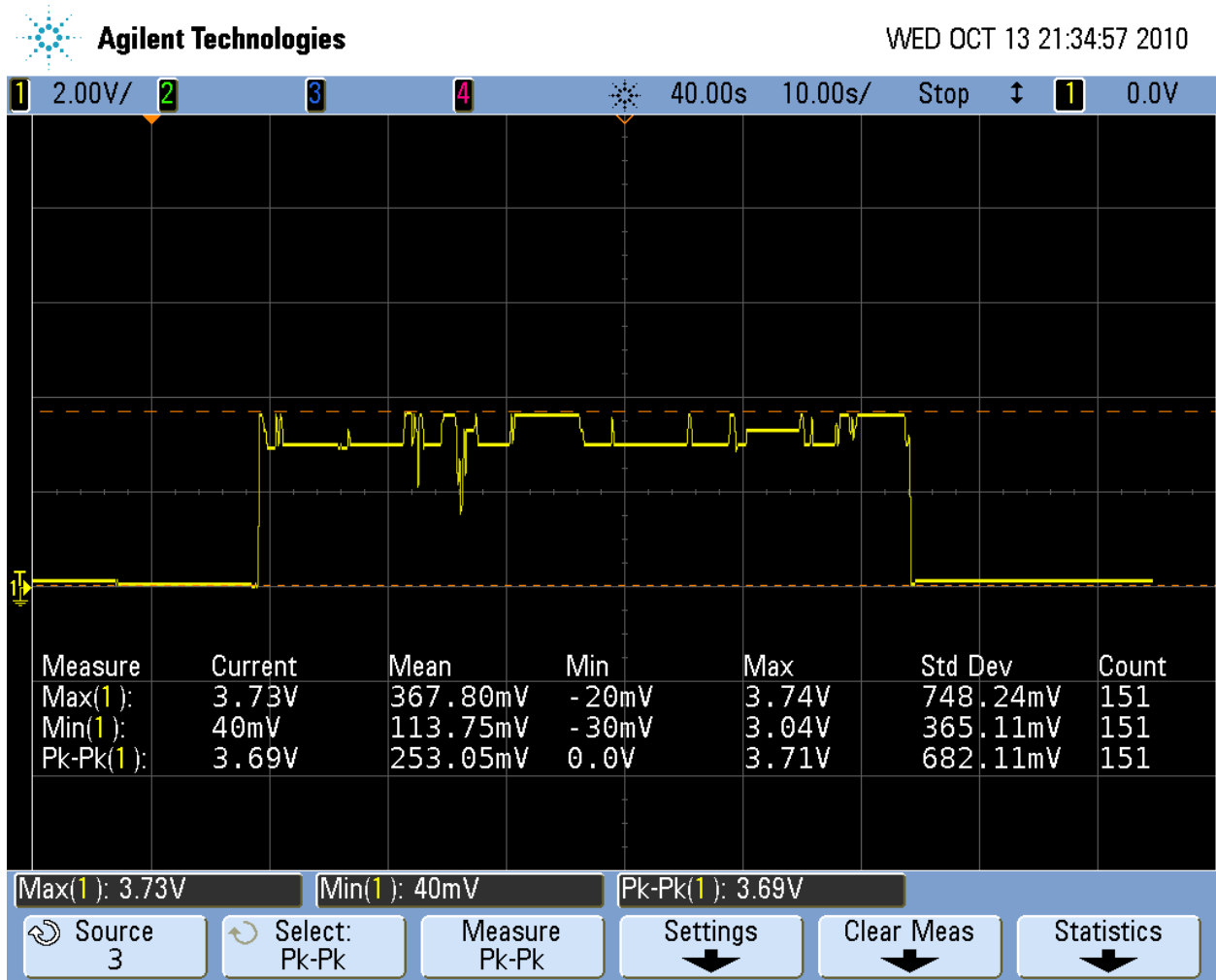
30% of the minimum Vdd Voltage Level = $0 - (1.70 \times 30\%) = -0.51V$.

None of the Vdd pin has voltage lower than 40mV, no over-voltage observed

Results :

VDD33

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Summary:

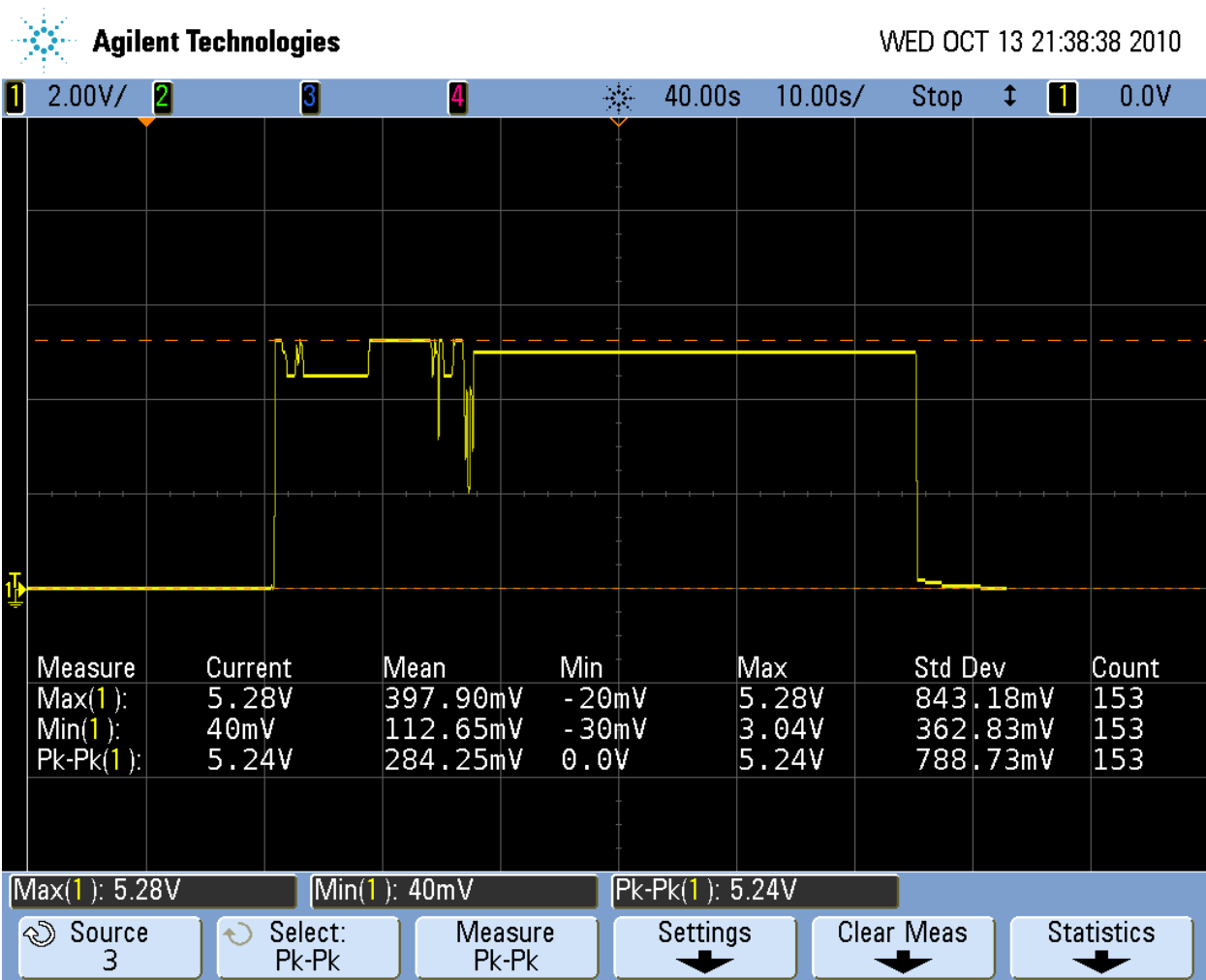
30% of the maximum VDD33 Voltage Level = $4.60 + (4.60 \times 30\%) = 5.98V$.
 None of the VDD33 pin exceeds 3.73V, no over-voltage observed

30% of the minimum VDD33 Voltage Level = $0 - (4.60 \times 30\%) = -1.38V$.
 None of the VDD33 pin has voltage lower than 40mV, no over-voltage observed

Results :

VDDA

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Summary:

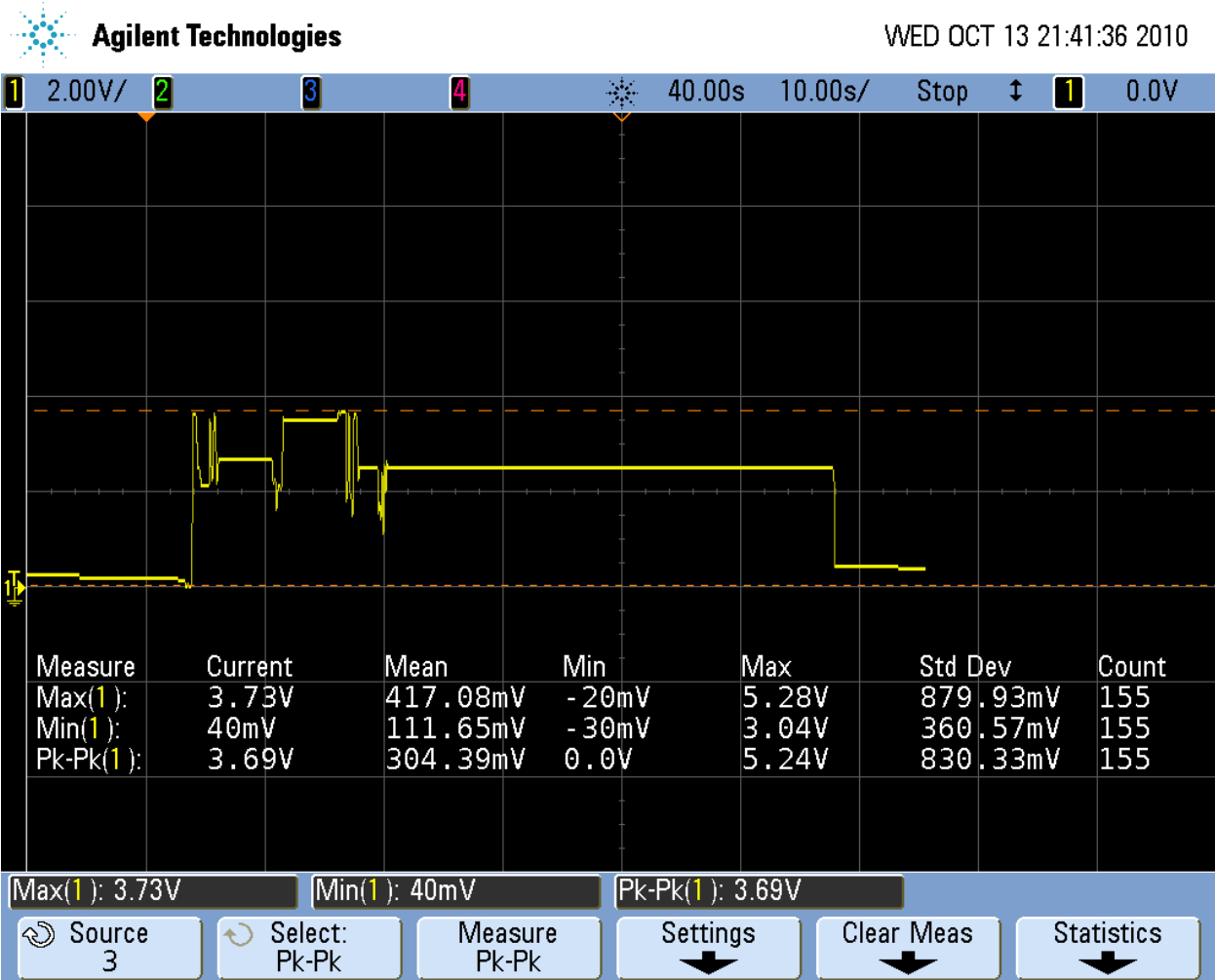
30% of the maximum VDDA Voltage Level = $5.50 + (5.50 \times 30\%) = 7.15V$.
None of the VDDA pin exceeds 5.28V, no over-voltage observed

30% of the minimum VDDA Voltage Level = $0 - (5.50 \times 30\%) = -1.65V$.
None of the VDDA pin has voltage lower than 40mV, no over-voltage observed

Results :

VDDE

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Summary:

30% of the maximum VDDE Voltage Level = $4.60 + (4.60 \times 30\%) = 5.98V$.

None of the VDDE pin exceeds 3.73V, no over-voltage observed

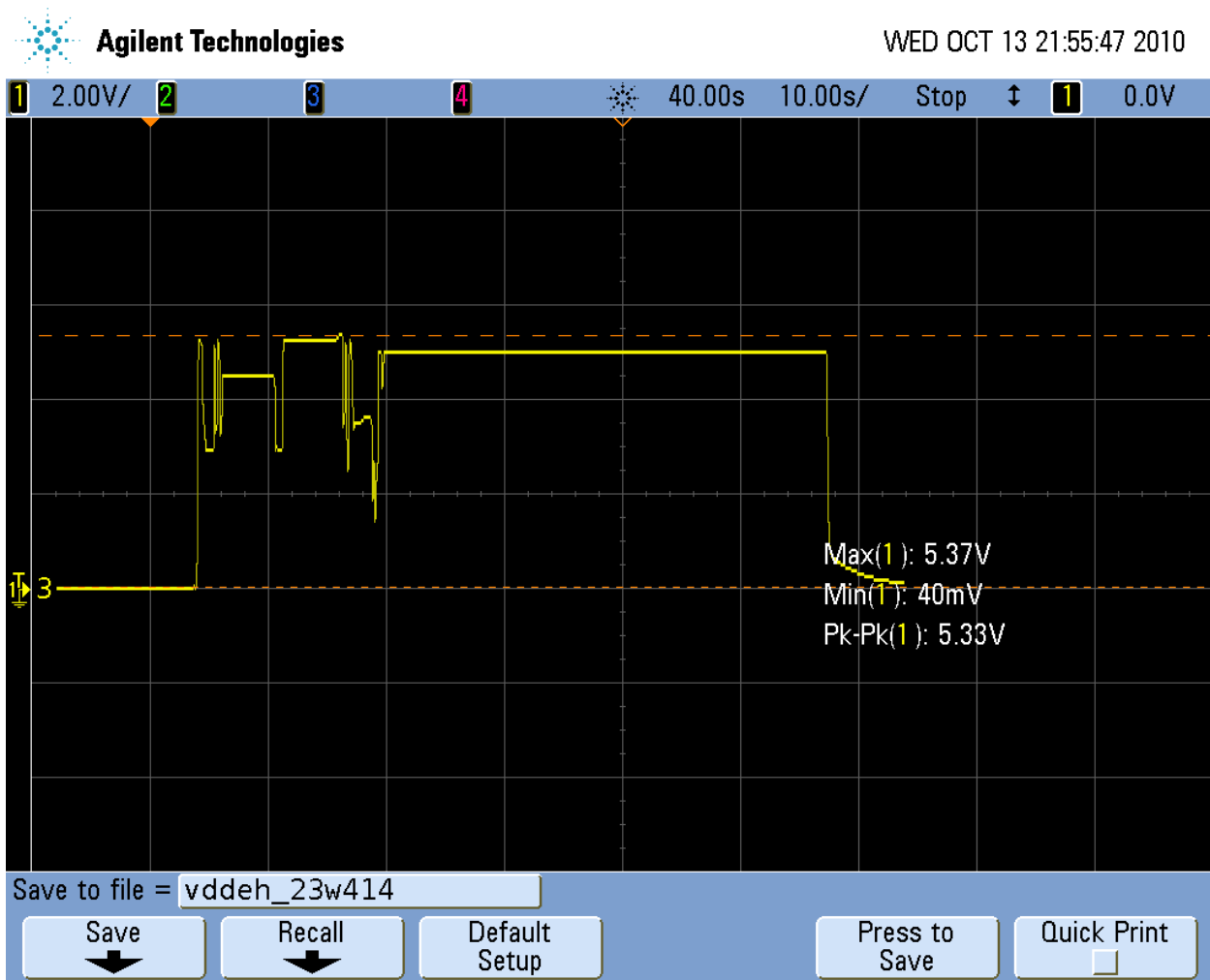
30% of the minimum VDDE Voltage Level = $0 - (4.60 \times 30\%) = -1.38V$.

None of the VDDE pin has voltage lower than 40mV, no over-voltage observed

Results :

VDDEH

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Summary:

30% of the maximum VDDEH Voltage Level = $6.50 + (6.50 \times 30\%) = 8.45V$.

None of the VDDEH pin exceeds 5.37V, no over-voltage observed

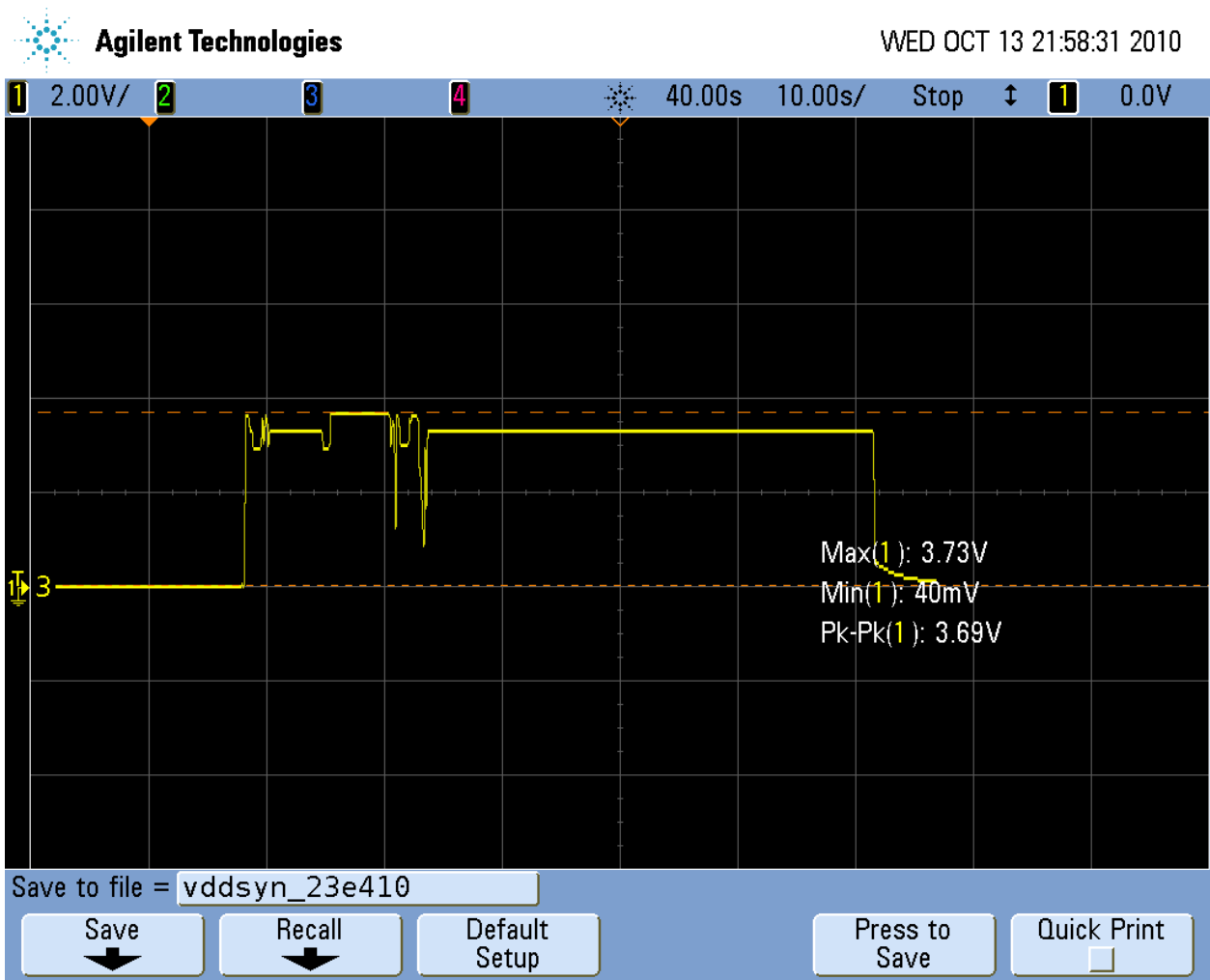
30% of the minimum VDDEH Voltage Level = $0 - (6.50 \times 30\%) = -1.95V$.

None of the VDDEH pin has voltage lower than 40mV, no over-voltage observed

Results :

VDDSYN

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Summary:

30% of the maximum VDDSYN Voltage Level = $4.6 + (4.6 \times 30\%) = 5.98\text{V}$.

None of the VDDSYN pin exceeds 3.73V, no over-voltage observed

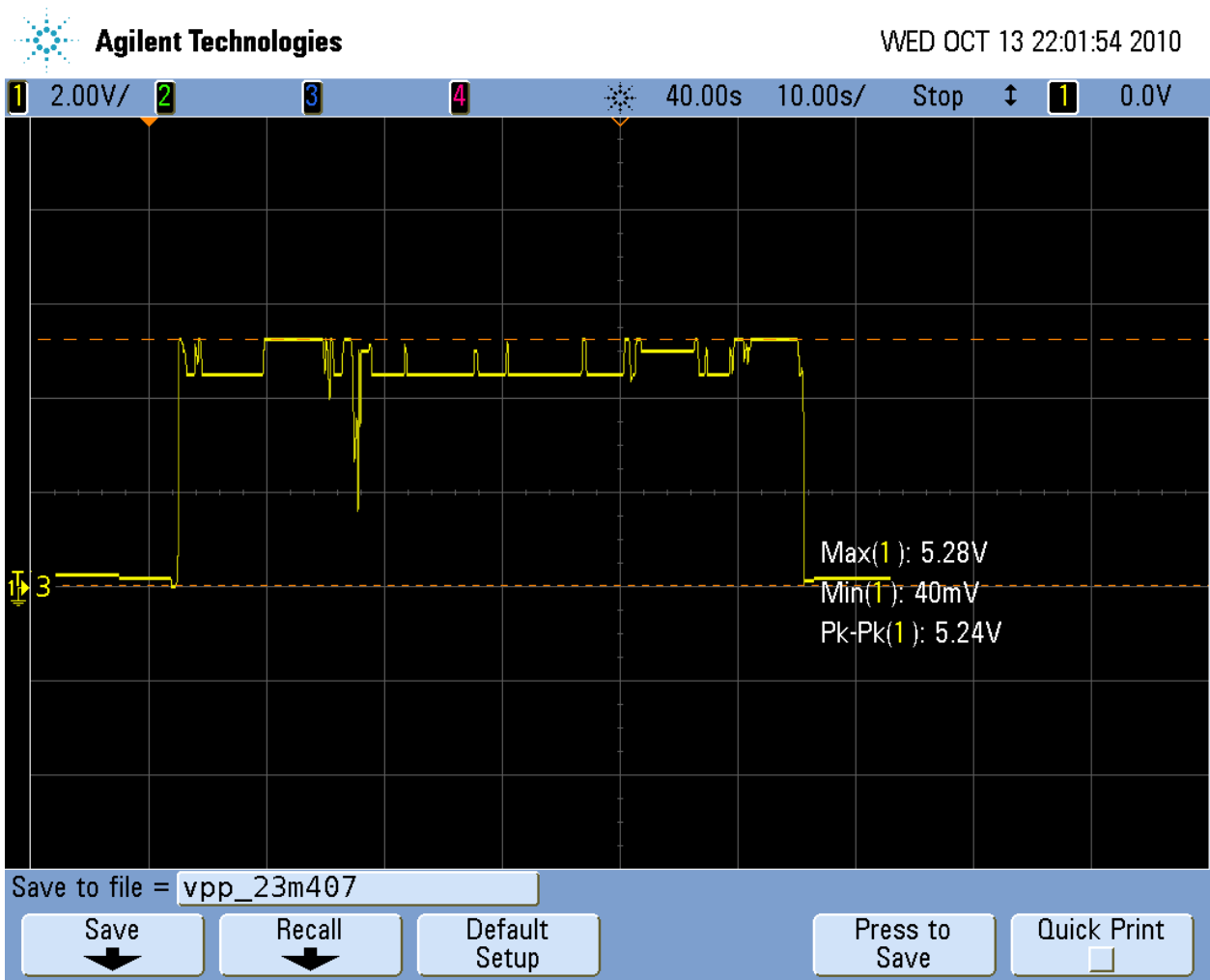
30% of the minimum VDDSYN Voltage Level = $0 - (4.6 \times 30\%) = -1.38\text{V}$.

None of the VDDSYN pin has voltage lower than 0.40mV, no over-voltage observed

Results :

VPP

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Summary:

30% of the maximum VPP Voltage Level = $6.50 + (6.50 \times 30\%) = 8.45\text{V}$.

None of the VPP pin exceeds 5.28V, no over-voltage observed

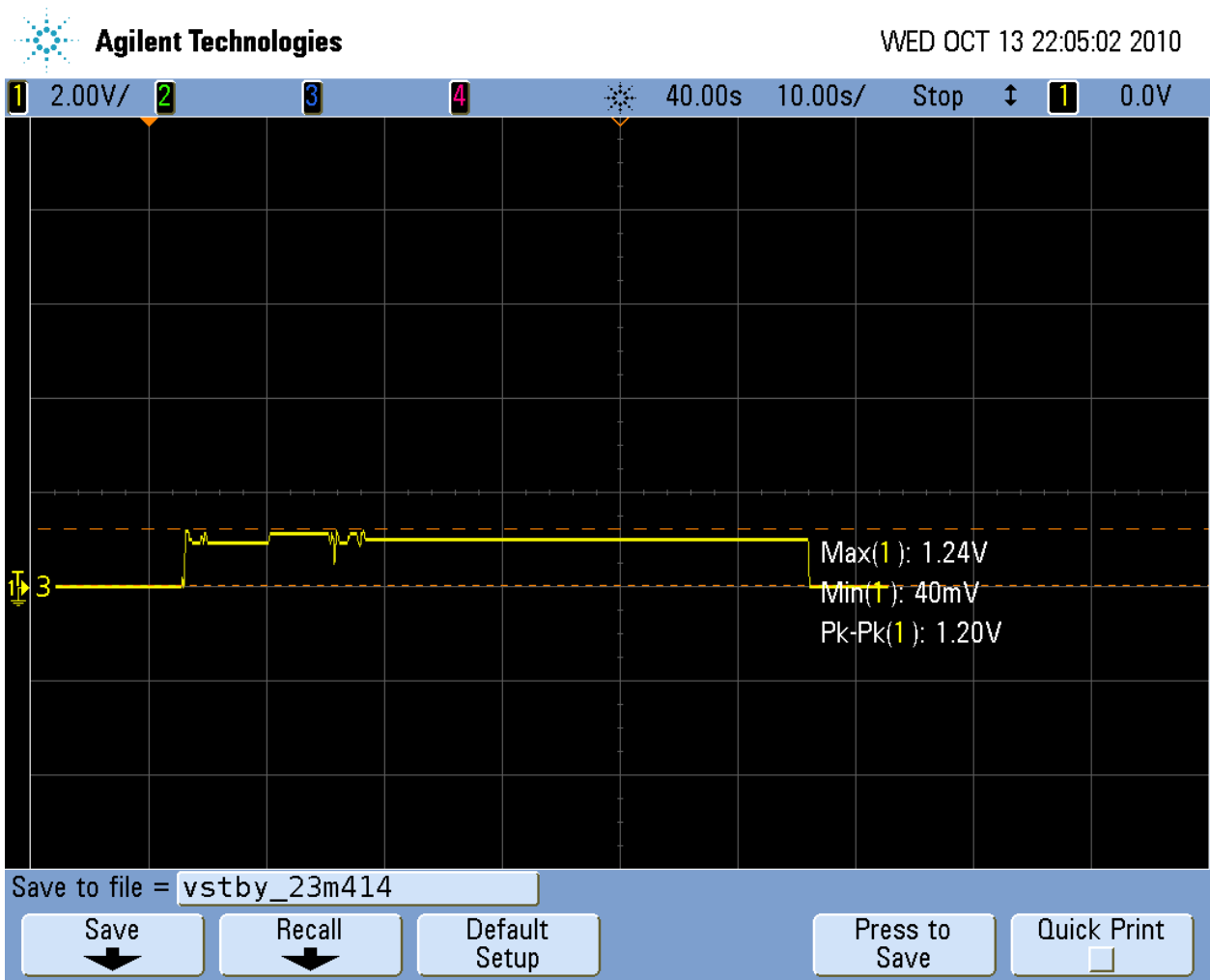
30% of the minimum VPP Voltage Level = $0 - (6.50 \times 30\%) = -1.95\text{V}$.

None of the VPP pin has voltage lower than 40mV, no over-voltage observed

Results :

VSTBY

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Summary:

30% of the maximum VPP Voltage Level = $1.70 + (1.70 \times 30\%) = 2.21\text{V}$.

None of the VPP pin exceeds 1.24V, no over-voltage observed

30% of the minimum VPP Voltage Level = $0 - (1.70 \times 30\%) = -0.51\text{V}$.

None of the VPP pin has voltage lower than 40mV, no over-voltage observed

Results :

Vrc33

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Summary:

30% of the maximum VPP Voltage Level = $4.60 + (4.60 \times 30\%) = 5.98V$.

None of the VPP pin exceeds 630mV, no over-voltage observed

30% of the minimum VPP Voltage Level = $0 - (4.60 \times 30\%) = -1.38V$.

None of the VPP pin has voltage lower than 590mV, no over-voltage observed

5. GAGE REPEATABILITY AND REPRODUCIBILITY STUDY (GRR)

Action:

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Tolerance of all GR&R study must not exceed 10%

- Performed gage R&R following the recommended procedure from the Breakaway Test Group and utilizing the Omniscience QuickUpdate Gage Study Wizard to process and analyze the results.
- Only have a single Ultraflex tester available. Therefore appraisers used in this experiment were:
 - 30 units (each from a different 3 wafer lot)
 - 2 load boards (time permitting)
 - 3 test sites (all sites – limited performance on 2nd loadboard)
 - 5 runs per above condition
 - Total of 300 executions run
- Results passed

**Details analysis for selected test for GR&R as below:
DUT site performance**

GAGE on SITE 0

Gage R&R for TRIPIDDP_VDD

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	0.0070204	15.86
Repeatability	0.0068980	15.59
Reproducibility	0.0001224	0.28
LOOP	0.0001224	0.28
Part-To-Part	0.0372326	84.14
Total Variation	0.0442531	100.00

Process tolerance = 20

Source	StdDev (SD)	Study Var (6 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	0.083788	0.50273	39.83	2.51
Repeatability	0.083054	0.49833	39.48	2.49
Reproducibility	0.011063	0.06638	5.26	0.33
LOOP	0.011063	0.06638	5.26	0.33
Part-To-Part	0.192958	1.15775	91.73	5.79
Total Variation	0.210364	1.26218	100.00	6.31

Gage R&R for OSCSELFBIAS

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	1.062	0.36

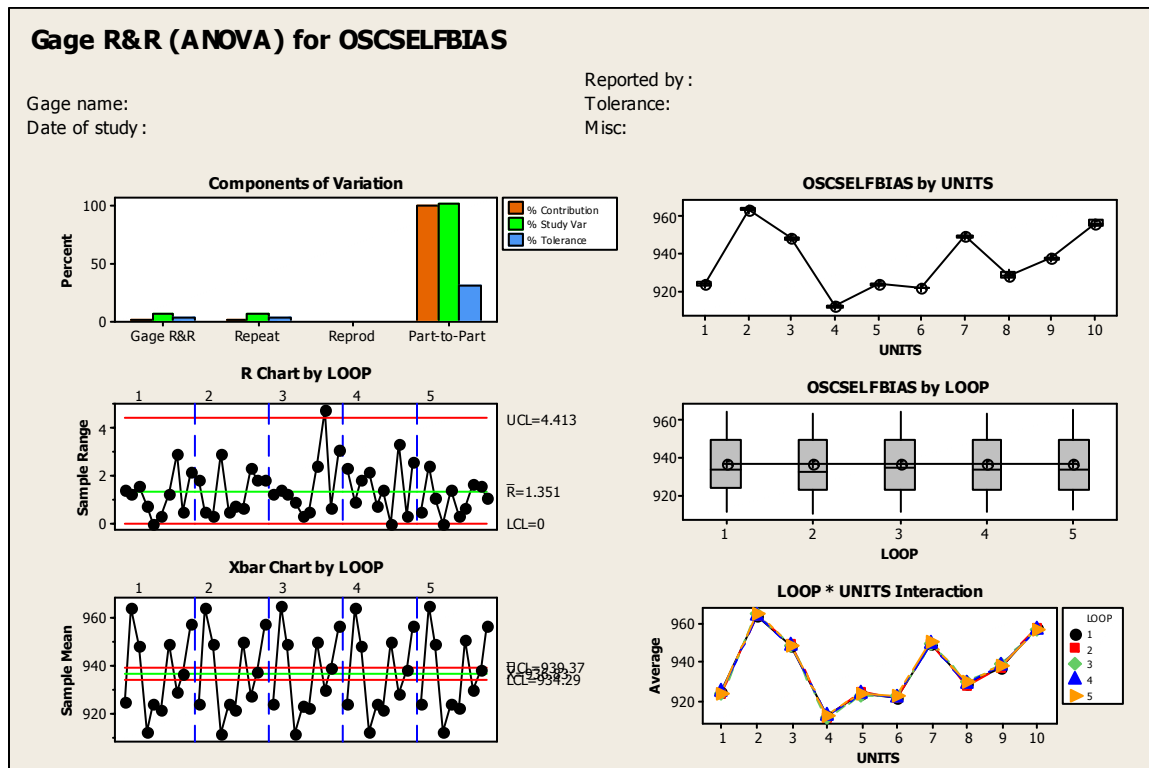
MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Repeatability	1.062	0.36
Reproducibility	0.000	0.00
LOOP	0.000	0.00
Part-To-Part	297.395	99.64
Total Variation	298.457	100.00

Process tolerance = 350

Source	StdDev (SD)	Study Var (6 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	1.0303	6.182	5.96	1.77
Repeatability	1.0303	6.182	5.96	1.77
Reproducibility	0.0000	0.000	0.00	0.00
LOOP	0.0000	0.000	0.00	0.00
Part-To-Part	17.2451	103.471	99.82	29.56
Total Variation	17.2759	103.655	100.00	29.62

Number of Distinct Categories = 23



Gage R&R for runidd_vdd

%Contribution

MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Source	VarComp	(of VarComp)
Total Gage R&R	6.8632	56.42
Repeatability	6.8632	56.42
Reproducibility	0.0000	0.00
LOOP	0.0000	0.00
Part-To-Part	5.3007	43.58
Total Variation	12.1638	100.00

Process tolerance = 500

Source	StdDev (SD)	Study Var (6 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	2.61977	15.7186	75.12	3.14
Repeatability	2.61977	15.7186	75.12	3.14
Reproducibility	0.00000	0.0000	0.00	0.00
LOOP	0.00000	0.0000	0.00	0.00
Part-To-Part	2.30232	13.8139	66.01	2.76
Total Variation	3.48767	20.9260	100.00	4.19

Number of Distinct Categories = 1

GAGE on SITE 2

Gage R&R for tripiddp_vdd

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	0.0051607	15.97
Repeatability	0.0000000	0.00
Reproducibility	0.0051607	15.97
LOOP	0.0000706	0.22
LOOP*UNITS	0.0050901	15.75
Part-To-Part	0.0271551	84.03
Total Variation	0.0323158	100.00

Process tolerance = 20

Source	StdDev (SD)	Study Var (6 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	0.071838	0.43103	39.96	2.16
Repeatability	0.000000	0.00000	0.00	0.00
Reproducibility	0.071838	0.43103	39.96	2.16
LOOP	0.008400	0.05040	4.67	0.25
LOOP*UNITS	0.071345	0.42807	39.69	2.14
Part-To-Part	0.164788	0.98873	91.67	4.94
Total Variation	0.179766	1.07860	100.00	5.39

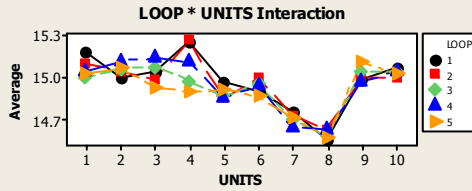
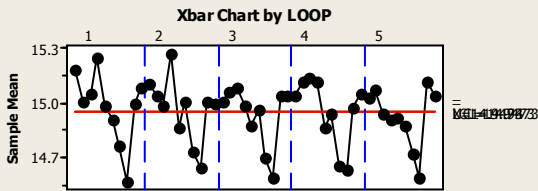
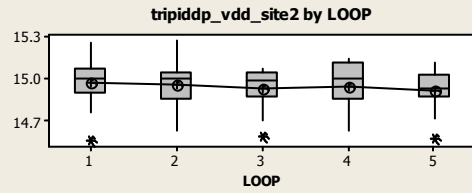
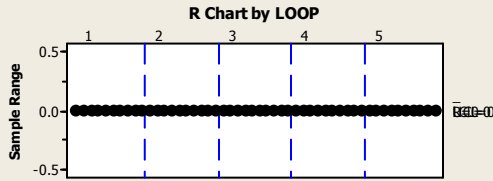
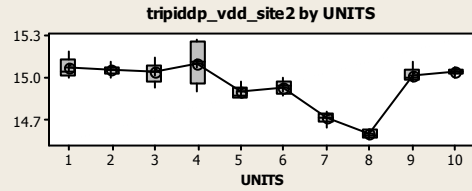
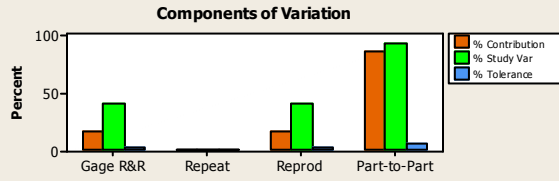
Number of Distinct Categories = 3

MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Gage R&R (ANOVA) for tripiddp_vdd_site2

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:



MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

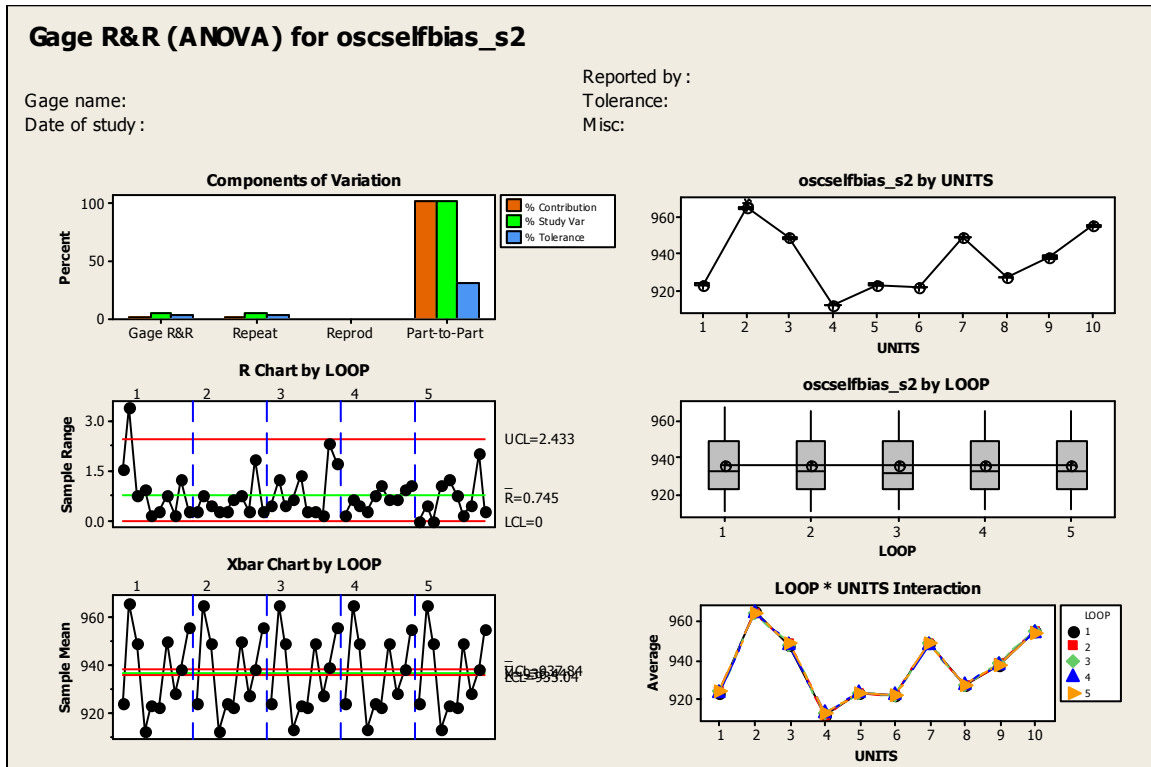
Gage R&R for osscelfbias

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	0.349	0.12
Repeatability	0.349	0.12
Reproducibility	0.000	0.00
LOOP	0.000	0.00
Part-To-Part	296.790	99.88
Total Variation	297.139	100.00

Process tolerance = 350

Source	StdDev	Study Var (SD)	%Study Var (6 * SD)	%Tolerance (%SV) (SV/Toler)
Total Gage R&R	0.5912	3.547	3.43	1.01
Repeatability	0.5912	3.547	3.43	1.01
Reproducibility	0.0000	0.000	0.00	0.00
LOOP	0.0000	0.000	0.00	0.00
Part-To-Part	17.2276	103.366	99.94	29.53
Total Variation	17.2377	103.426	100.00	29.55

Number of Distinct Categories = 41



MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Gage R&R for runidd_vdd

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	4.61089	55.47
Repeatability	4.61089	55.47
Reproducibility	0.00000	0.00
LOOP	0.00000	0.00
Part-To-Part	3.70168	44.53
Total Variation	8.31257	100.00

Process tolerance = 500

Source	StdDev (SD)	Study Var (6 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	2.14730	12.8838	74.48	2.58
Repeatability	2.14730	12.8838	74.48	2.58
Reproducibility	0.00000	0.0000	0.00	0.00
LOOP	0.00000	0.0000	0.00	0.00
Part-To-Part	1.92397	11.5438	66.73	2.31
Total Variation	2.88315	17.2989	100.00	3.46

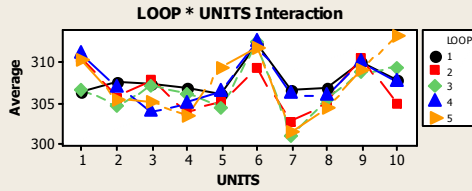
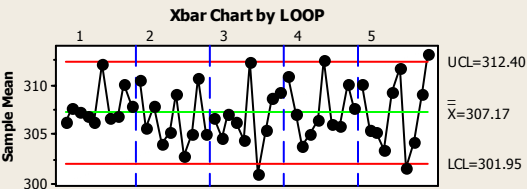
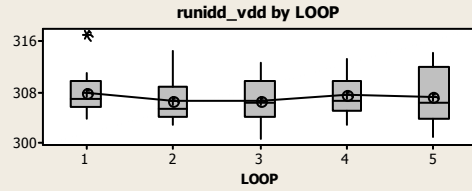
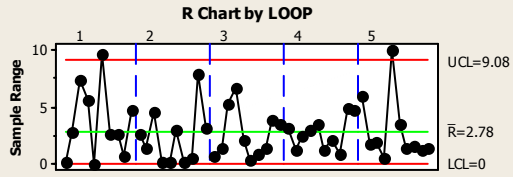
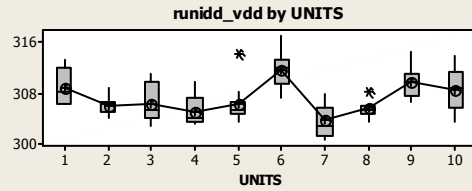
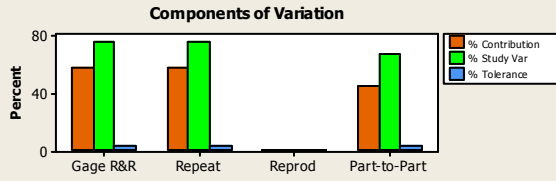
Number of Distinct Categories = 1

MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Gage R&R (ANOVA) for runidd_vdd

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:

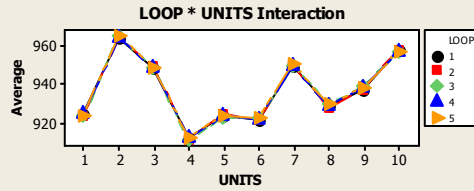
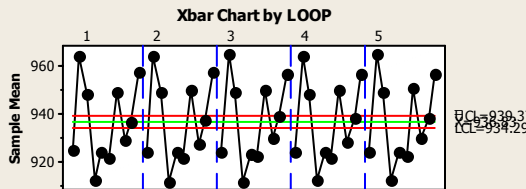
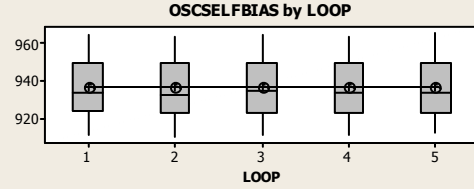
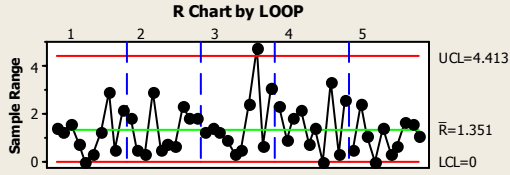
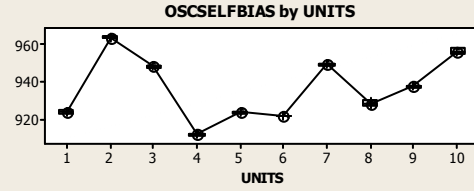
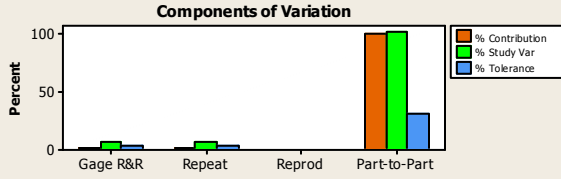


MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Gage R&R (ANOVA) for OSCSELFBIAS

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:



MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Results on site to site performance

Load board A – ATX 7764A

(load board A – on site 0,2 and 6)

Gage R&R for tripiddp_vdd

Gage R&R

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	0.0615650	96.23
Repeatability	0.0346843	54.21
Reproducibility	0.0268807	42.02
units	0.0268807	42.02
Part-To-Part	0.0024133	3.77
Total Variation	0.0639783	100.00

Process tolerance = 20

Source	StdDev (SD)	Study Var (6 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	0.248123	1.48874	98.10	7.44
Repeatability	0.186237	1.11742	73.63	5.59
Reproducibility	0.163953	0.98372	64.82	4.92
units	0.163953	0.98372	64.82	4.92
Part-To-Part	0.049125	0.29475	19.42	1.47
Total Variation	0.252939	1.51764	100.00	7.59

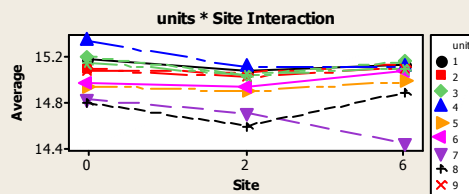
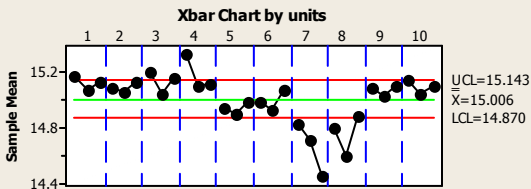
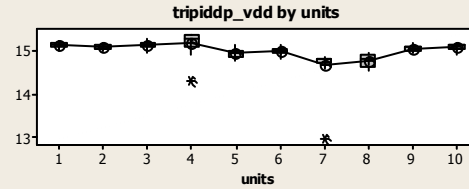
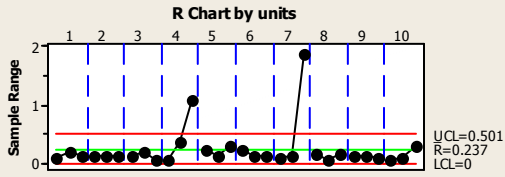
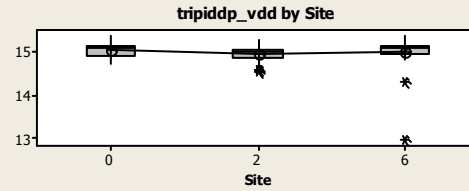
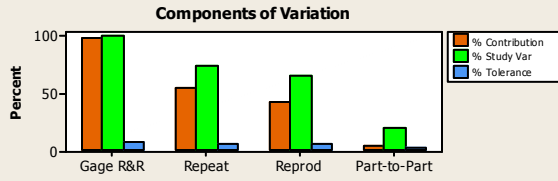
Number of Distinct Categories = 1

MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Gage R&R (ANOVA) for tripiddp_vdd

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:



MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

Load Board B – ATX 7764 B

(site issue on site 6, gage is on site 0 and site 2)

Gage R&R for tripiddp_vdd IbB

Gage R&R

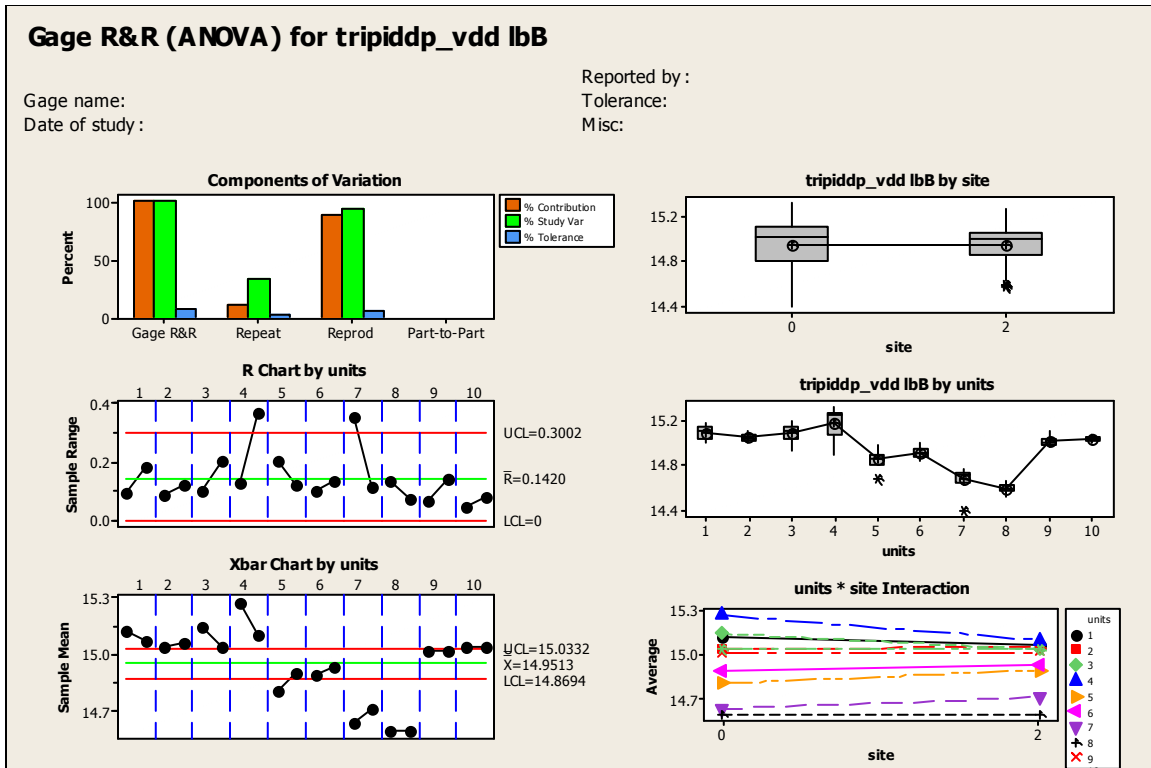
Source	%Contribution	
	VarComp	(of VarComp)
Total Gage R&R	0.0420038	100.00
Repeatability	0.0044841	10.68
Reproducibility	0.0375196	89.32
units	0.0352532	83.93
units*site	0.0022664	5.40
Part-To-Part	0.0000000	0.00
Total Variation	0.0420038	100.00

Process tolerance = 20

Source	Study Var		%Study Var	%Tolerance
	StdDev (SD)	(6 * SD)		
Total Gage R&R	0.204948	1.22969	100.00	6.15
Repeatability	0.066964	0.40178	32.67	2.01
Reproducibility	0.193700	1.16220	94.51	5.81
units	0.187758	1.12655	91.61	5.63
units*site	0.047607	0.28564	23.23	1.43
Part-To-Part	0.000000	0.00000	0.00	0.00
Total Variation	0.204948	1.22969	100.00	6.15

Number of Distinct Categories = 1

MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION



Summary:

These gauges are suitable for maintaining product within the spec limits as the % tolerance is less than 10%.

6. CLASS A QUAL

Action:

Lot as per list below will be tested at Room, Hot and Cold before going through 100% QC Gate at Hot and Cold.

Accept Criteria:

All lots must pass 100% QC Gate

Result :

To be provided by 20 Nov

Summary:

To be provided by 20 Nov

7. CONCLUSION

Based on above data and data from CAB 081441187FM (Copperhead lead vehicle), ULTRAFLEX platform is now a qualified production site.

MPC5565/MPC5567 ULTRAFLEX PLATFORM QUALIFICATION

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