

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

1. INTRODUCTION

This document states the Correlation and Qual result of * **VIPER (MPC5566)** device in order to qualify Ultra Flex-B Tester as qualified platform for direct shipment to customer. All evaluations stated in this document have been discussed and agreed by both OHT and KLM, based on KLM Class A Qualification and Correlation Procedure (*Spec#: 12MRQ85104A)

PRODUCT INFORMATION

VIPER (MPC5566)	
Product Line	: S9U55660,G9U55660
Target Device	: SPC5566MVR132, SPC5566MVR132R, PPC5566MZP132R, SPC5566MZP132R SPC5566MZP144, SPC5566MZP144R, SPC5566MZP132, SC5566MZP132, PPC5566MVR132 MPC5566MZP144, SPC5566MVR112R, SPC5566MVR112, PPC5566MVR144, MPC5566MVRX2 MPC5566MVRX4, MPC5566MZPX3, MPC5566MVRX3, MPC5566MVRX1, SGMPPC6230F7MZP MPC5566MZP132, SGMPPC6230F7MVR, SPC5566MZP112, SPC5566MZP112R, SC667014MVR132 SPC5566MZP80R, MPC5566MZPX4, SC667014MVR132R, SPC667017MZP132 SPC667017MZP132R, SPC5566MVR80, SPC5566MVR80R, SC5566MVR132, PPC5566MZP144 SC5566MZP144R, SPC5566MZP80, MPC5566MZPX1, SC5566MZP144, SC667014MVRX1 SC667014MVRX2, SC5566MZP132R, SPC5566MVR144, SPC5566MVR144R, MPC5566MVR132 MPC5566MZPX2, SC5566MVR132R, PPC5566MZP144R, PPC5566MVR132R, PPC5566MZP132
Mask	: M60E
Package Code	: 5252 (416 PBGA 27 X 27)
Assembly Site	: KLM
PTI Code	: JBEV

This document also states the results of all evaluations listed in the correlation plan and Class A Qual. Any requirements stated in the KLM Site Qualification Procedure (**Spec#: 12MRQ85104A**) which cannot be fulfilled will require approval from OHT's & KLM's PE and RQA.

- Hardware Requirements:

System (Tester) Type	:	J750 – 1024
Handler Type	:	Delta Flex X4
Load board	:	ATX-7343

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Software (Test Program) : MPC5566_M60E_A03D
System (Tester) Type : Ultra Flex-B
Handler Type : Delta Castle X4
Load board : ATX-7799_X4
Software (Test Program) : MPC5566_UPA03D_DEV5

2. ATX J750 and UFLEX BIN TO BIN CORRELATION

Action:

A minimum of 3000 units from four different wafers lots tested at each temperature Room, Hot and Cold insertion in J750-1K, and then Ultra Flex-B tester.

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.

Lot Number	KLMHA0X15L00
Target Device	MPC5566MZP
Trace Code	DQQCW0903
Wafer Lot Number	DD574321

FINAL TEST ROOM (25 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST	Bin1	373						
	Bin3		18					
	Bin4			0				

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

RESULT	Bin5				46			
	Bin6					0		
	Bin7						0	
	Bin8							20

FINAL TEST HOT (145 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	365						
	Bin3		0					
	Bin4			4				
	Bin5				0			
	Bin6					0		
	Bin7						4	
	Bin8							0

FINAL TEST COLD (-45 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	356						
	Bin3		0					
	Bin4			0				
	Bin5				4			
	Bin6					0		
	Bin7						5	

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

	Bin8							0
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Summary:

All units from **KLMHA0X15L00** tested on ATX J750 and UFLEX are 100% correlated.

Lot Number	KLMHA0XD4R00
Target Device	MPC5566MZP
Trace Code	DQQDE0907
Wafer Lot Number	DD571311

FINAL TEST ROOM (25 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	689						
	Bin3		27					
	Bin4			0				
	Bin5				59			
	Bin6					0		
	Bin7						12	
	Bin8							0

FINAL TEST HOT (145 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750	Bin1	667						
	Bin3		0					

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

TEST RESULT	Bin4			0				
	Bin5				13			
	Bin6					0		
	Bin7						8	
	Bin8							1

FINAL TEST COLD (-45 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	651						
	Bin3		0					
	Bin4			0				
	Bin5				8			
	Bin6					0		
	Bin7						8	
	Bin8							0

Summary:

All units from **KLMHA0XD4R0** tested on ATX J750 and UFLEX are 100% correlated.

Lot Number	KLMHA0XNND00
Target Device	MPC5566MZP
Trace Code	DQQDJ0910
Wafer Lot Number	DD580011

FINAL TEST ROOM (25 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX	Bin1	707						

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

J750 TEST RESULT	Bin3		15					
	Bin4			0				
	Bin5				50			
	Bin6					0		
	Bin7						1	
	Bin8							0

FINAL TEST HOT (145 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	701						
	Bin3		0					
	Bin4			0				
	Bin5				4			
	Bin6					0		
	Bin7						2	
	Bin8							0

FINAL TEST COLD (-45 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	561						
	Bin3		0					
	Bin4			0				
	Bin5				136			

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

	Bin6					0		
	Bin7						4	
	Bin8							0

Summary:

All units from **KLMHA0XNND00** tested on ATX J750 and UFLEX are 100% correlated.

Lot Number	KLMHA0WYFZ00
Target Device	MPC5566MZP
Trace Code	DQQCW0903
Wafer Lot Number	DD574321

FINAL TEST ROOM (25 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	904						
	Bin3		10					
	Bin4			0				
	Bin5				121			
	Bin6					0		
	Bin7						39	
	Bin8							0

FINAL TEST HOT (145 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX	Bin1	850						

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

J750 TEST RESULT	Bin3		0					
	Bin4			0				
	Bin5				16			
	Bin6					0		
	Bin7						38	
	Bin8							0

FINAL TEST COLD (-45 C):

		ATX UFLEX TEST RESULT						
	Binning	Bin1	Bin3	Bin4	Bin5	Bin6	Bin7	Bin8
ATX J750 TEST RESULT	Bin1	843						
	Bin3		0					
	Bin4			0				
	Bin5				3			
	Bin6					0		
	Bin7						4	
	Bin8							0

Summary:

All units from **KLMHA0WYFZ00** tested on ATX J750 and UFLEX are 100% correlated.

3. PARAMETRIC COMPARISON

Action:

A sample of 40 units for 5 parametric tests between J750-1K and Ultra Flex B used for parametric comparison.

Accept Criteria:

T-test and F-test should be no significant difference with p-value more than 0.05.

Result:

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

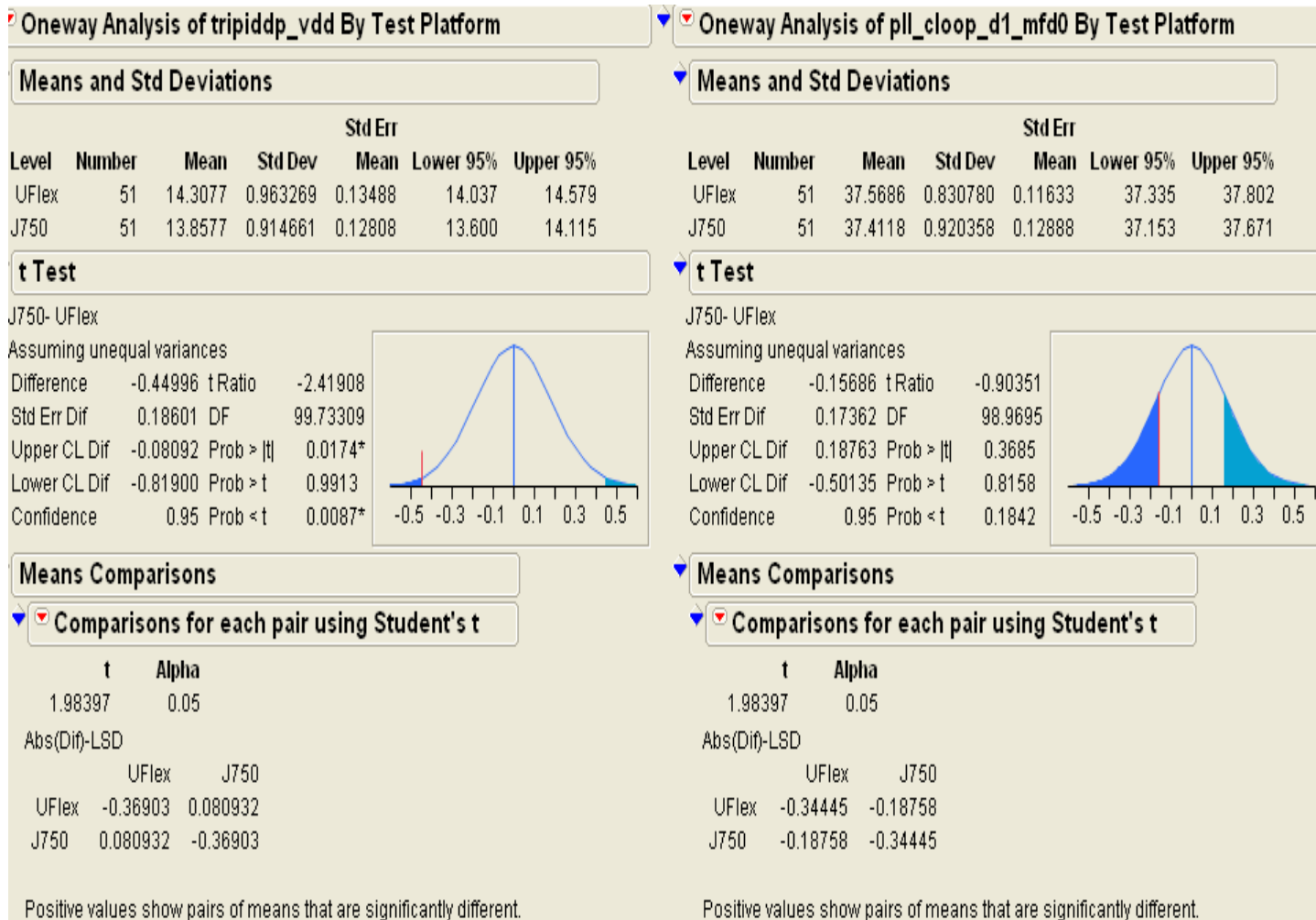
FINAL TEST ROOM PARAMENTRIC COMPARISON (25'C)

	T-Test : P Value	F-Test : P-Value
TRIPIDDP_VDD	2.4191	0.7157
PULLUPS_VDDE	2.1738	0.8195
PLL_CLOOP_D1_MFD0	0.9035	0.4716
PLL_TME	1.6704	0.6388
OSCSELFBIASVEXTAL	5.6638	0.1101

FRA: T-test and F- test p values

Tripiddp_vdd and pll_cloop_d1_mfd0 for UFlex and J750

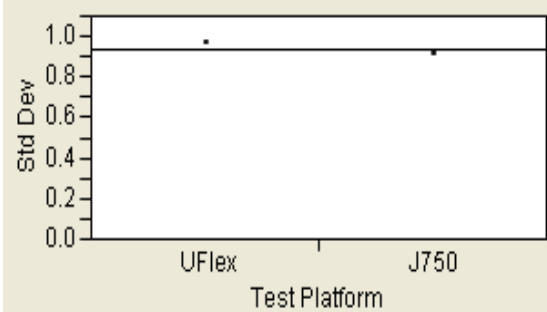
VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION



FRA: T-test and F- test p values
Tripiddp_vdd and pll_cloop_d1_mfd0 for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Tests that the Variances are Equal



Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
UFlex	51	0.9632691	0.7762307	0.7380000
J750	51	0.9146615	0.7160331	0.6855294

Test	F Ratio	DFNum	DFDen	p-Value
O'Brien[.5]	0.1272	1	100	0.7221
Brown-Forsythe	0.1600	1	100	0.6900
Levene	0.2948	1	100	0.5884
Bartlett	0.1327	1	.	0.7157
F Test 2-sided	1.1091	50	50	0.7157

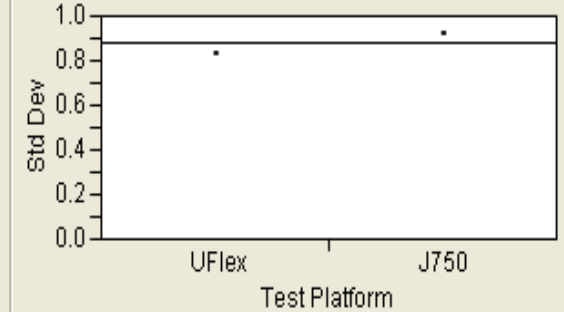
Welch's Test

Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob > F
5.8519	1	99.733	0.0174*

t Test
2.4191

Tests that the Variances are Equal



Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
UFlex	51	0.8307804	0.7089581	0.6666667
J750	51	0.9203580	0.7589389	0.6862745

Test	F Ratio	DFNum	DFDen	p-Value
O'Brien[.5]	0.5547	1	100	0.4581
Brown-Forsythe	0.0203	1	100	0.8870
Levene	0.2915	1	100	0.5905
Bartlett	0.5182	1	.	0.4716
F Test 2-sided	1.2273	50	50	0.4716

Welch's Test

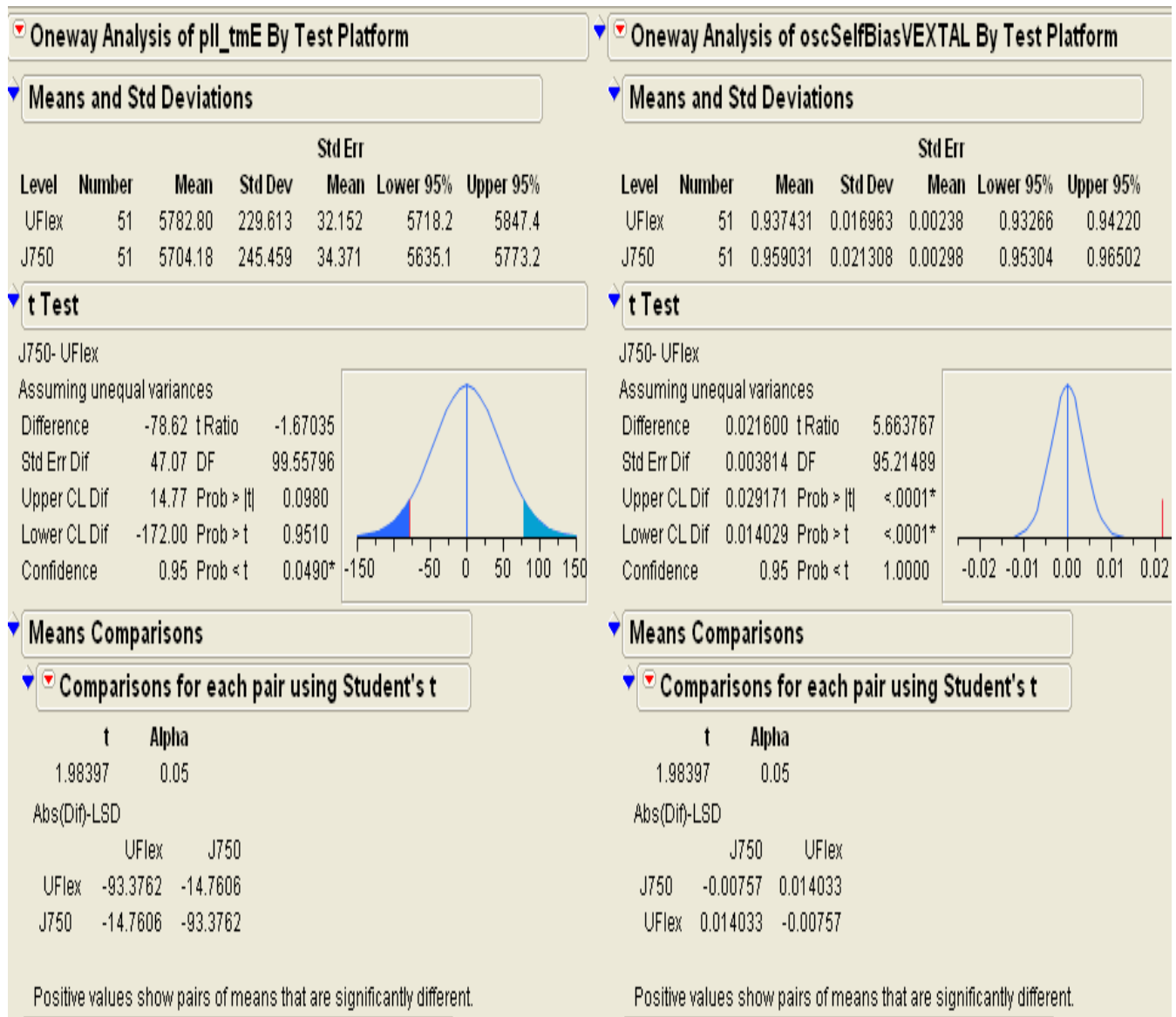
Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob > F
0.8163	1	98.969	0.3685

t Test
0.9035

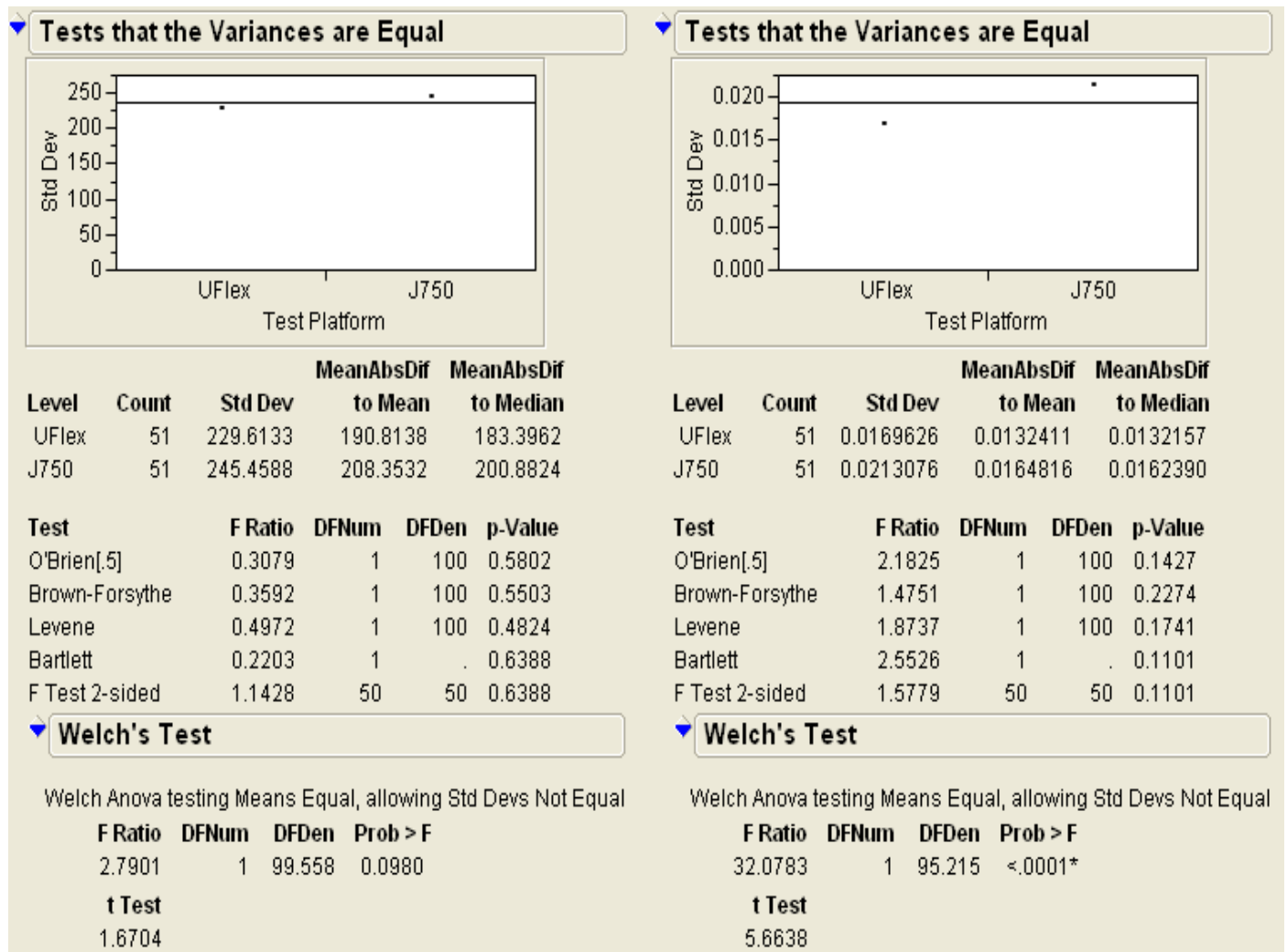
FRA: t – Test and F- Test p values
Pll_tmE and OscSelfBiasVEXTAL for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION



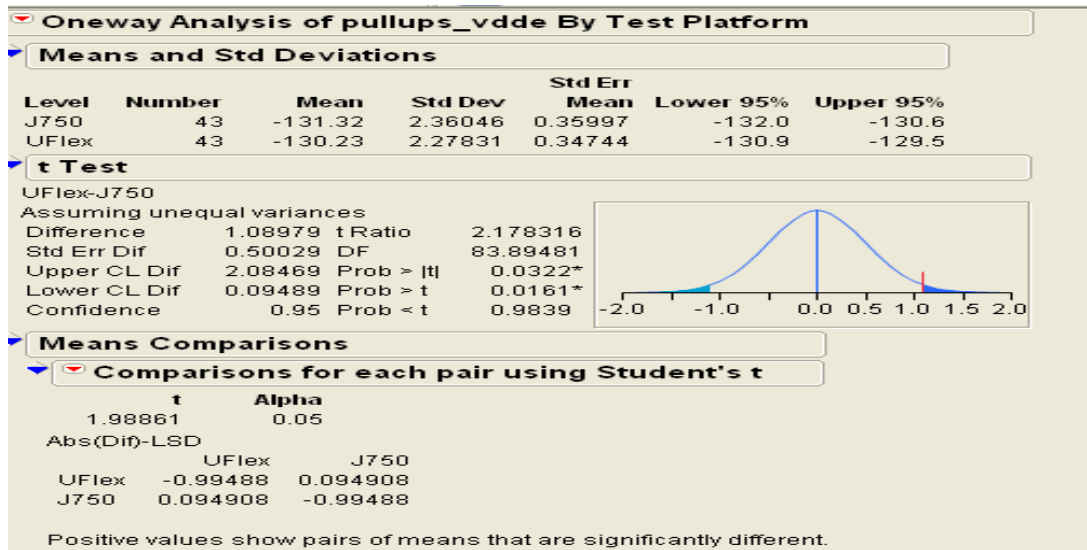
FRA: t – Test and F- Test p values
Pll_tmE and OscSelfBiasVEXTAL for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

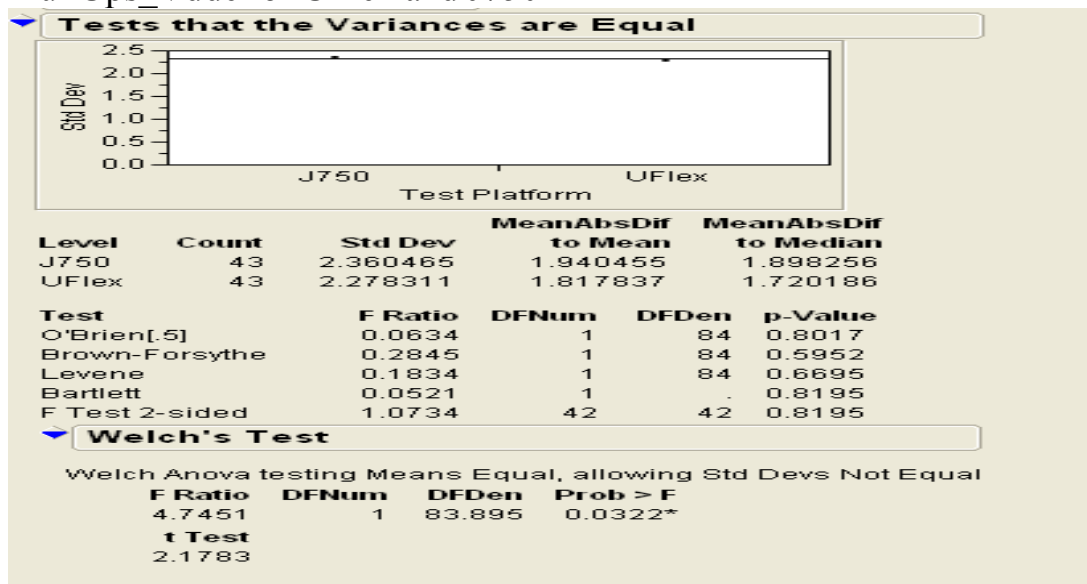


FRA: t –Test and F –test p values
PullUps_Vdde for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION



FRA: t –Test and F –test p values
PullUps_Vdde for UFlex and J750



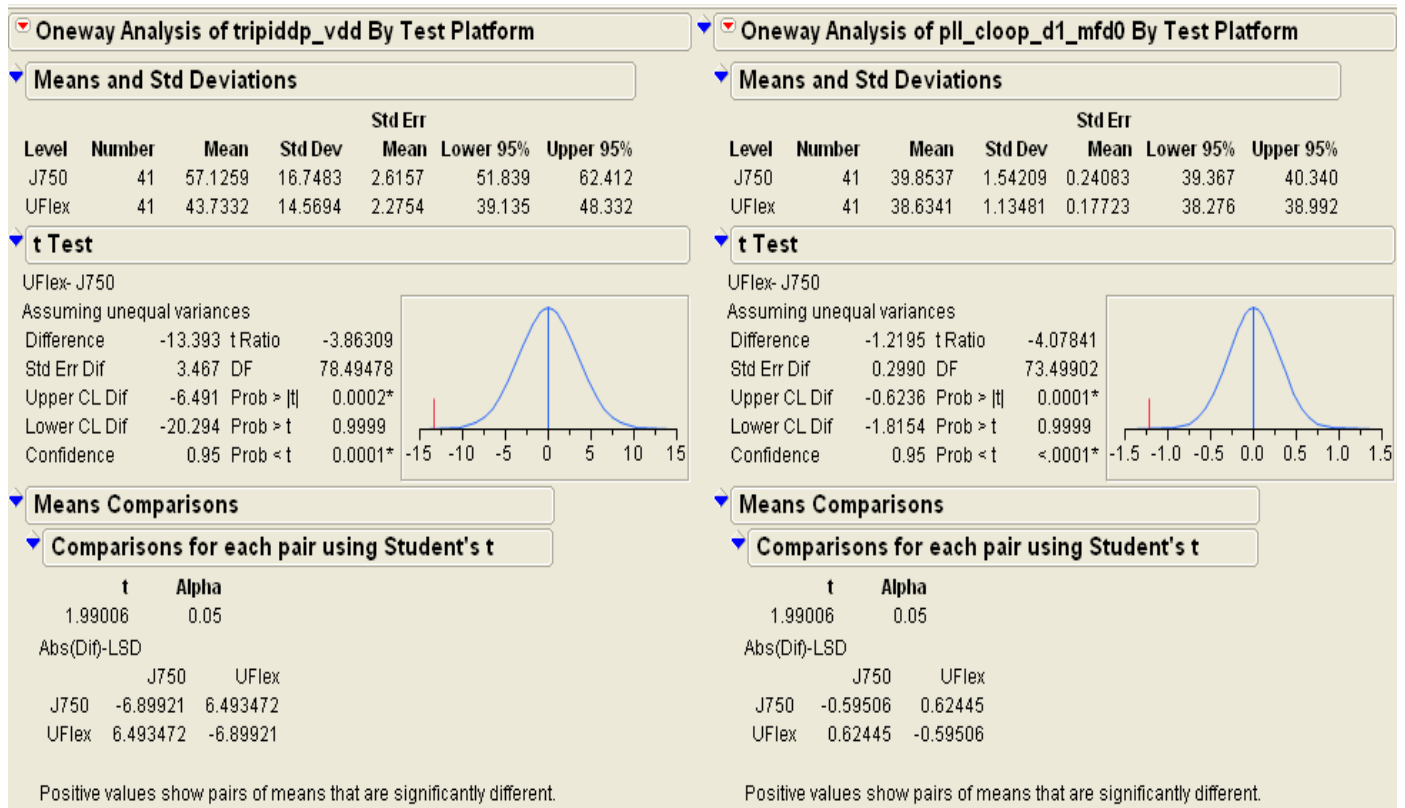
FINAL TEST HOT PARAMENTRIC COMPARISON (145'C)

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

	T-Test : P Value	F-Test : P-Value
TRIPIDDP_VDD	3.8631	0.3818
PLL_CLOOP_D1_MFD0	4.0784	0.0558
PULLUPS_VDDE	6.1645	0.4439
PLL_TME	0.0925	0.8331
OSCSELFBIASVEXTAL	0.4720	0.5235

FHA: T-test and F- test p values

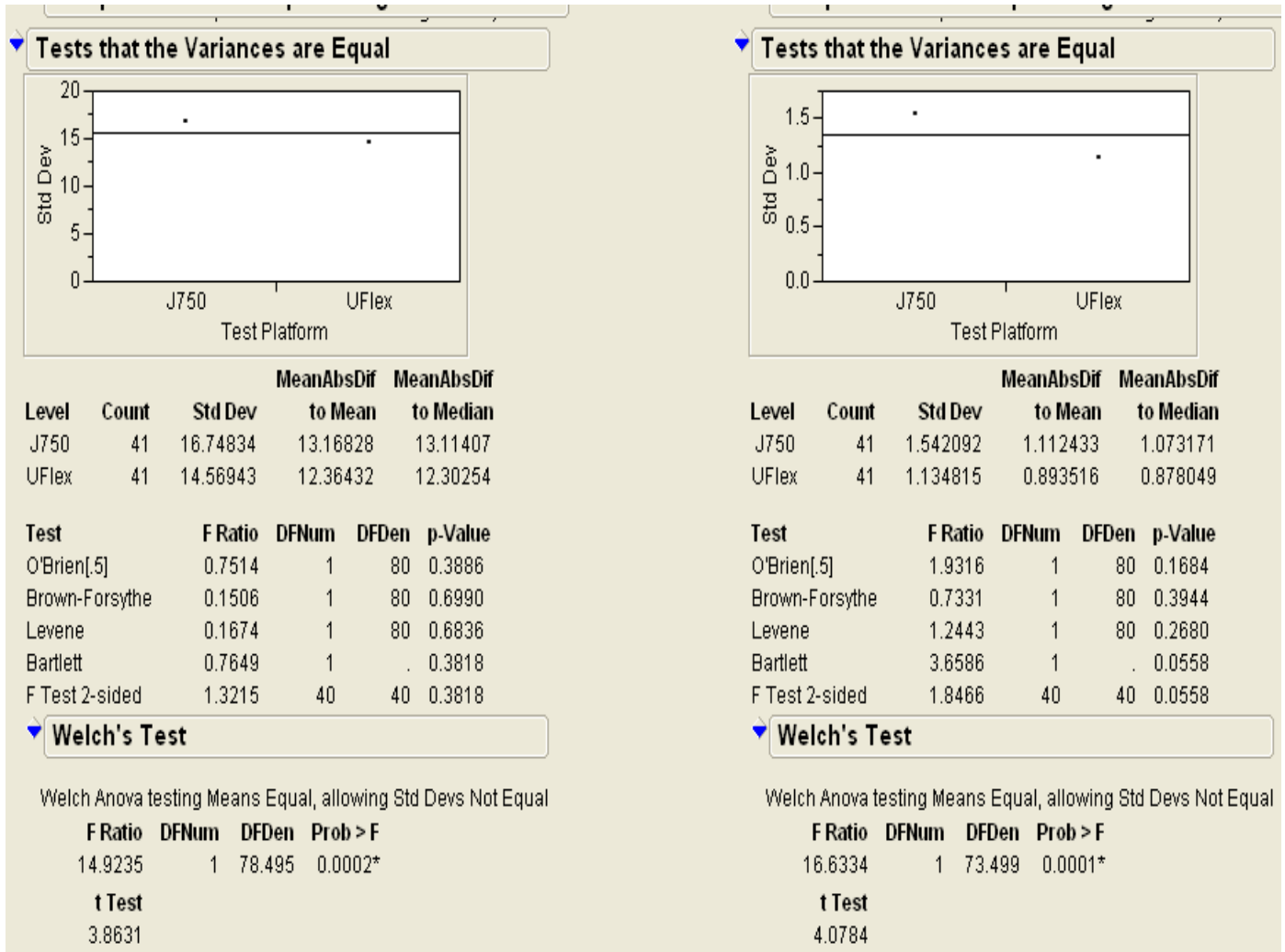
Tripiddp_vdd and pll_cloop_d1_mfd0 for UFlex and J750



FHA: T-test and F- test p values

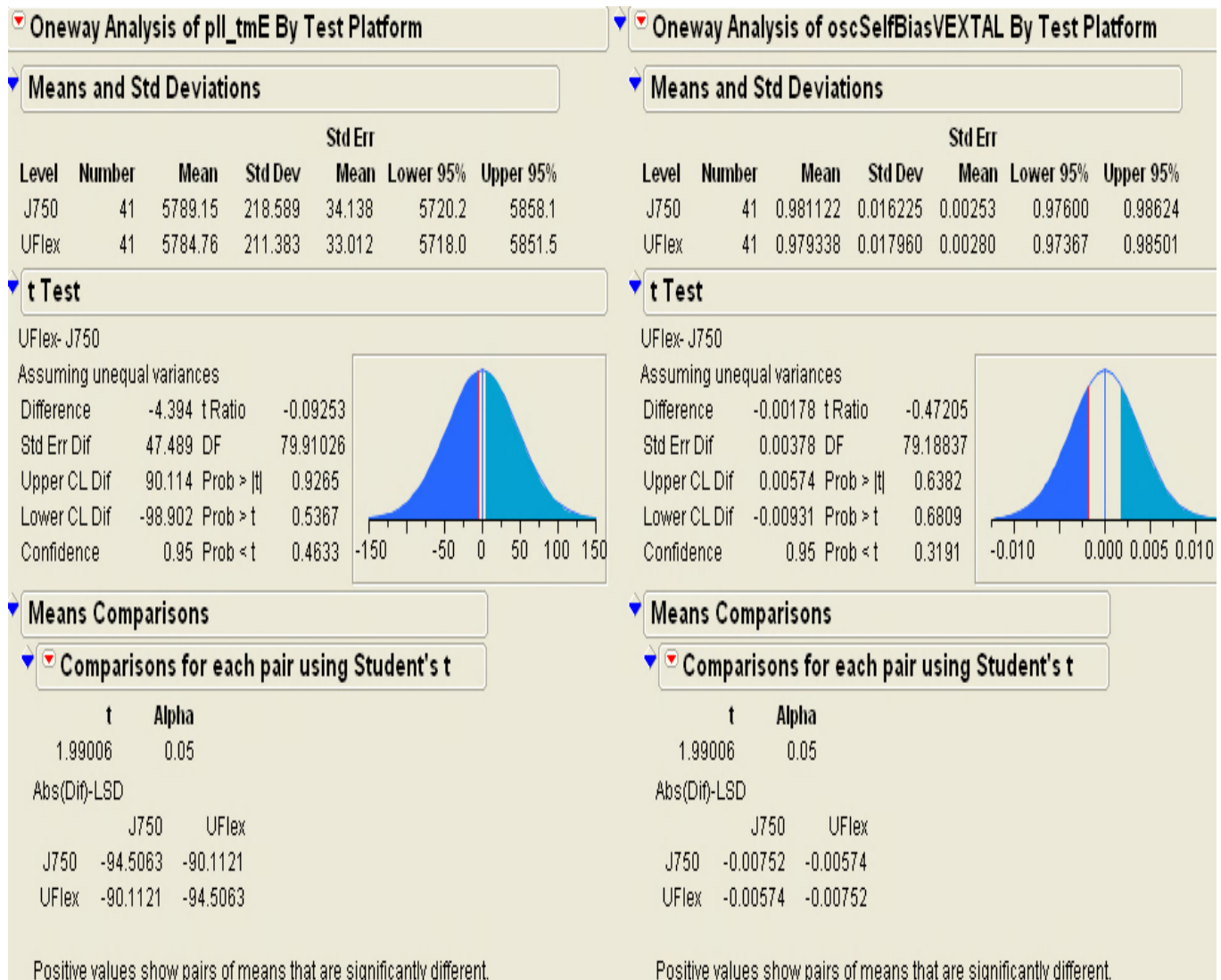
Tripiddp_vdd and pll_cloop_d1_mfd0 for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION



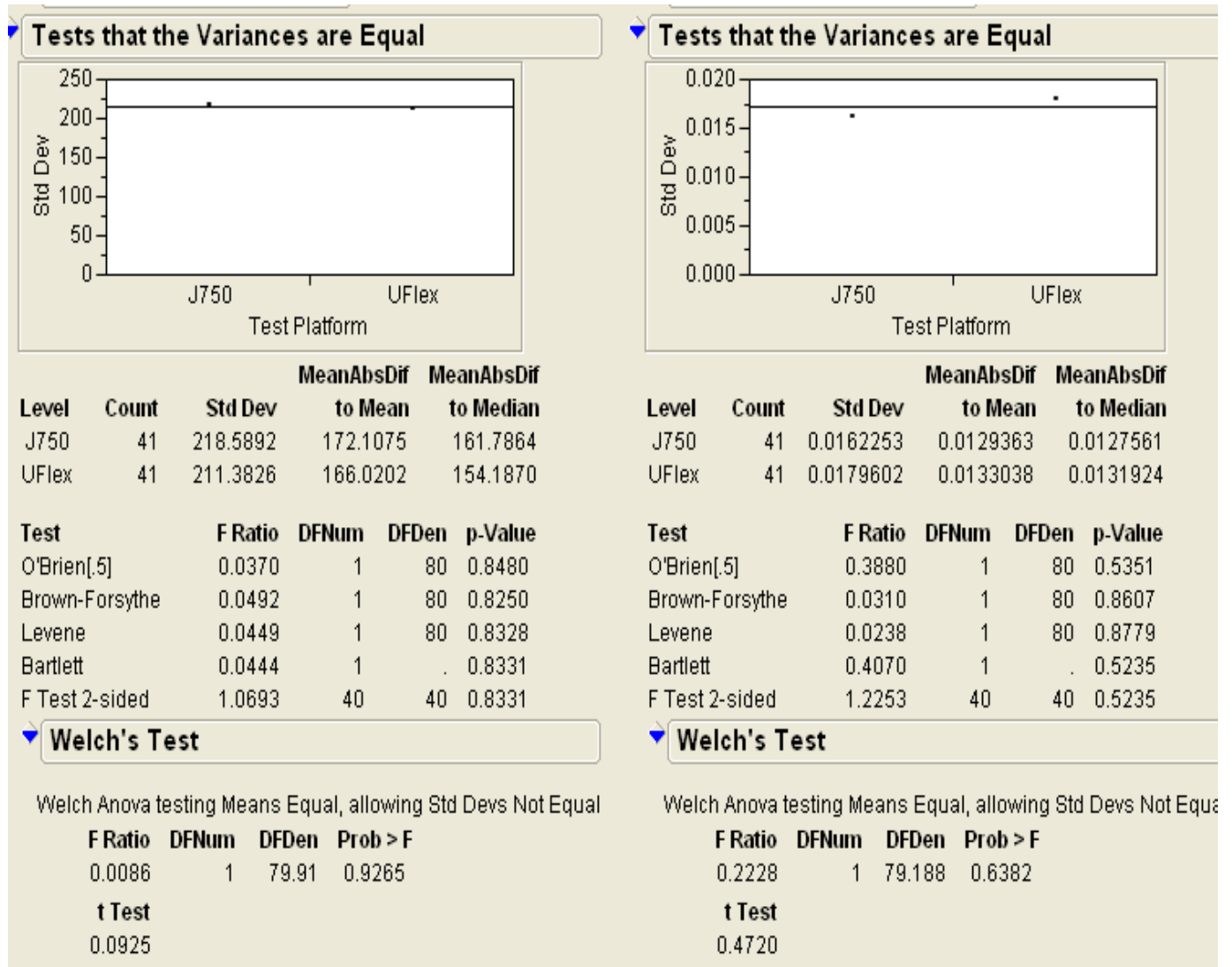
FHA: t- Test and F- Test p values
 pll_tmE and oscSelfBiasVEXTAL for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION



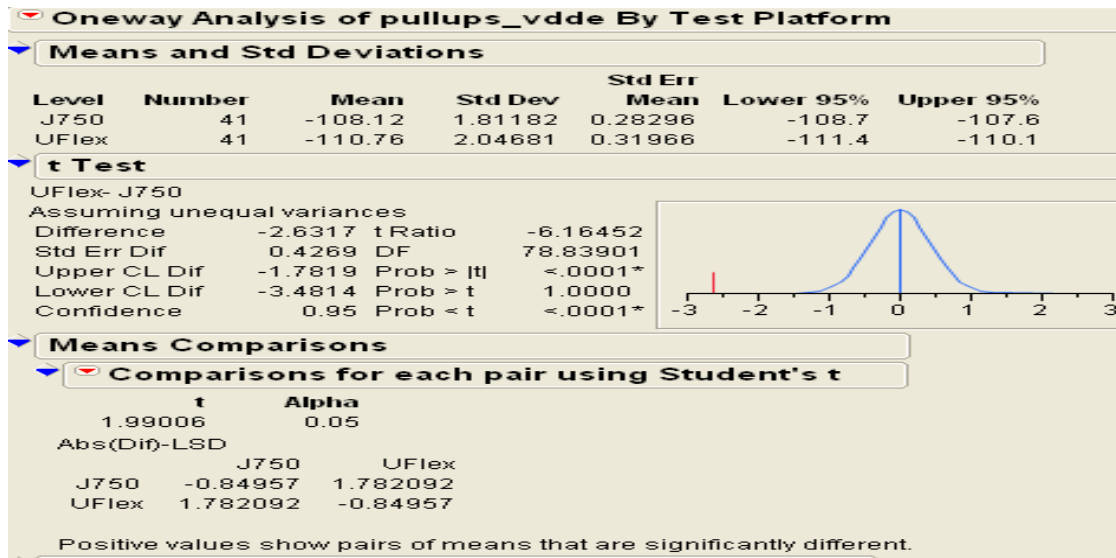
FHA: t- Test and F- Test p values
pll_tmE and oscSelfBiasVEXTAL for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

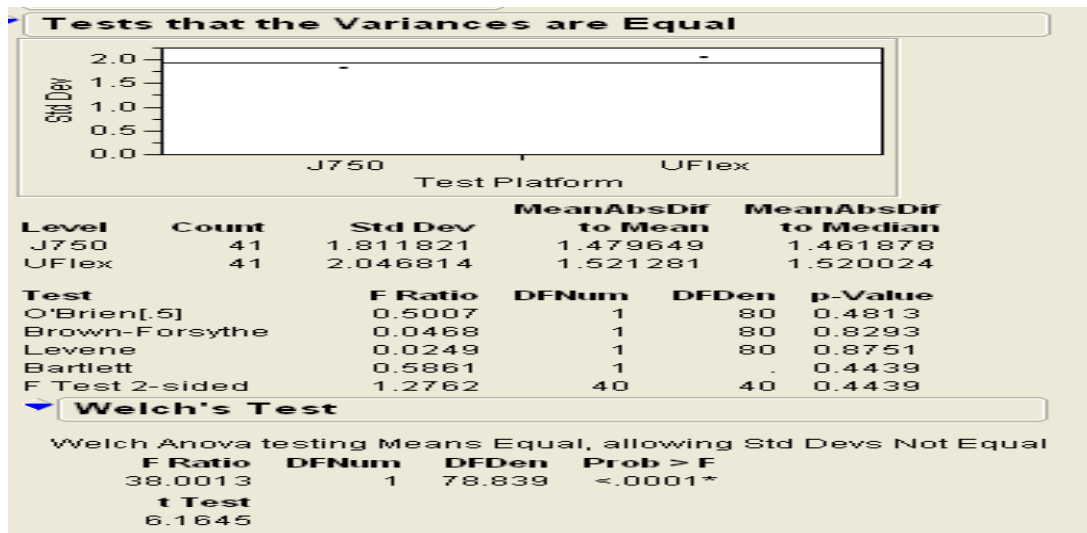


FHA: t- Test and F- Test p values
PullUps_Vdde for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION



FHA: t- Test and F- Test p values
PullUps_Vdde for UFlex and J750

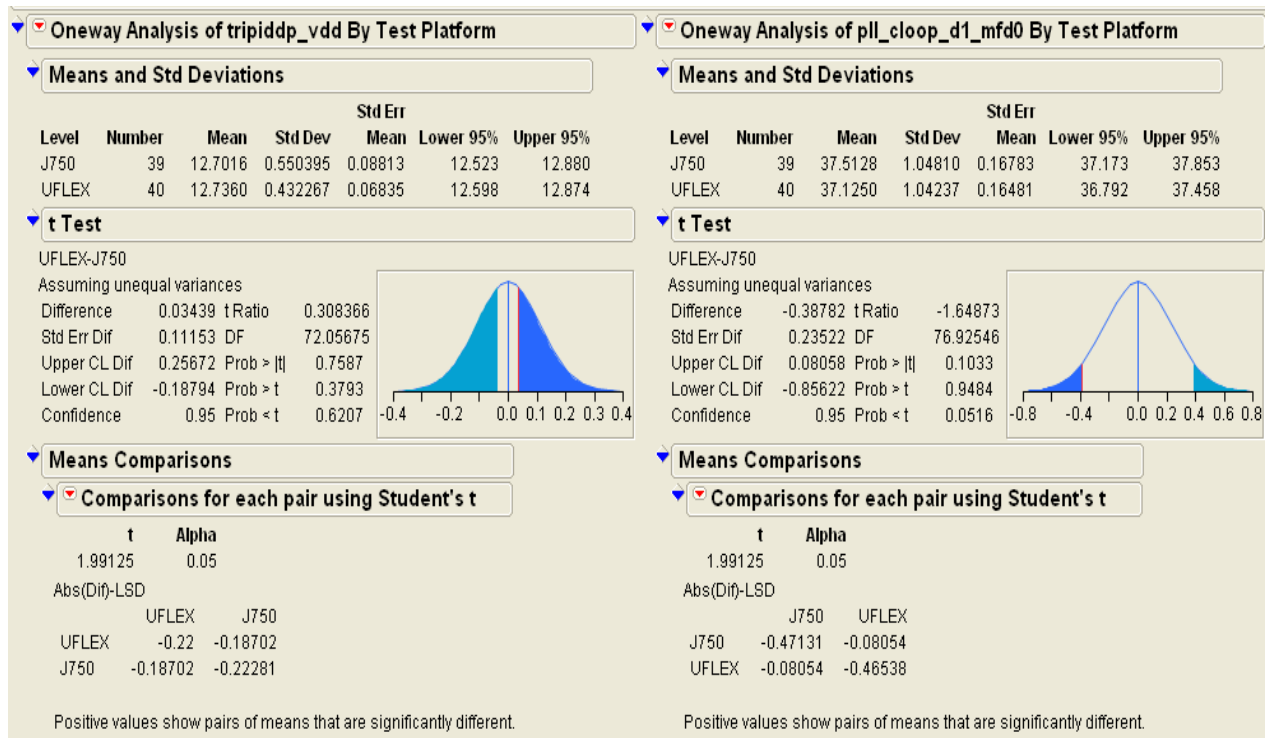


FINAL TEST COLD PARAMENTRIC COMPARISON (- 45°C)

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

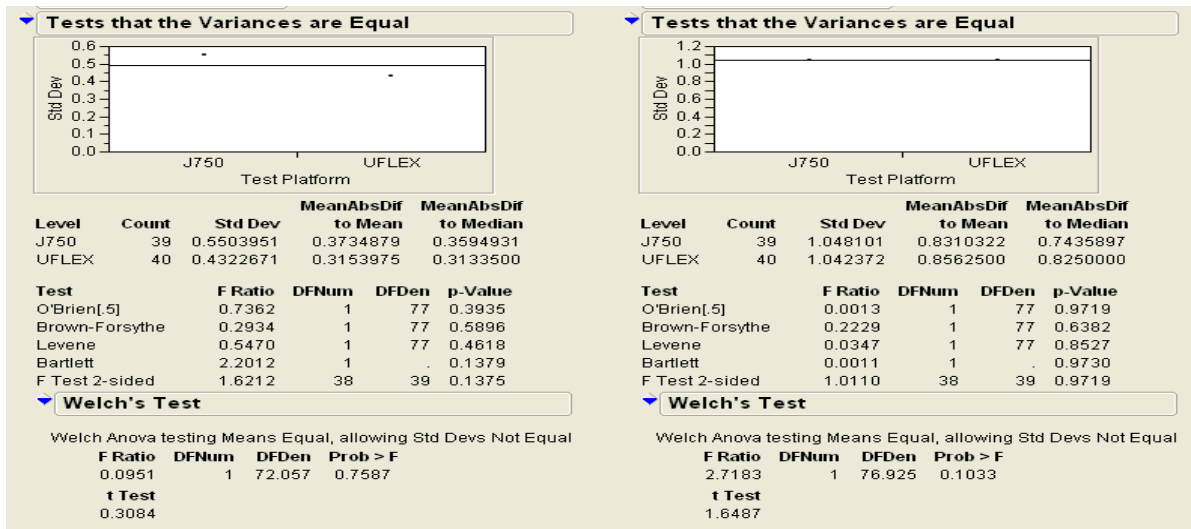
	T-Test : P Value	F-Test : P-Value
TRIPIDDP_VDD	0.3084	0.1375
PLL_CLOOP_D1_MFD0	1.6487	0.9719
PLL_TME	0.8713	0.4692
OSCSELFBIASVEXTAL	2.2335	0.4450
PULLUPS_VDDE	2.8458	0.1128

FCA: T-test and F- test p values
Tripiddp_vdd and pll_cloop_d1_mfd0 for UFlex and J750

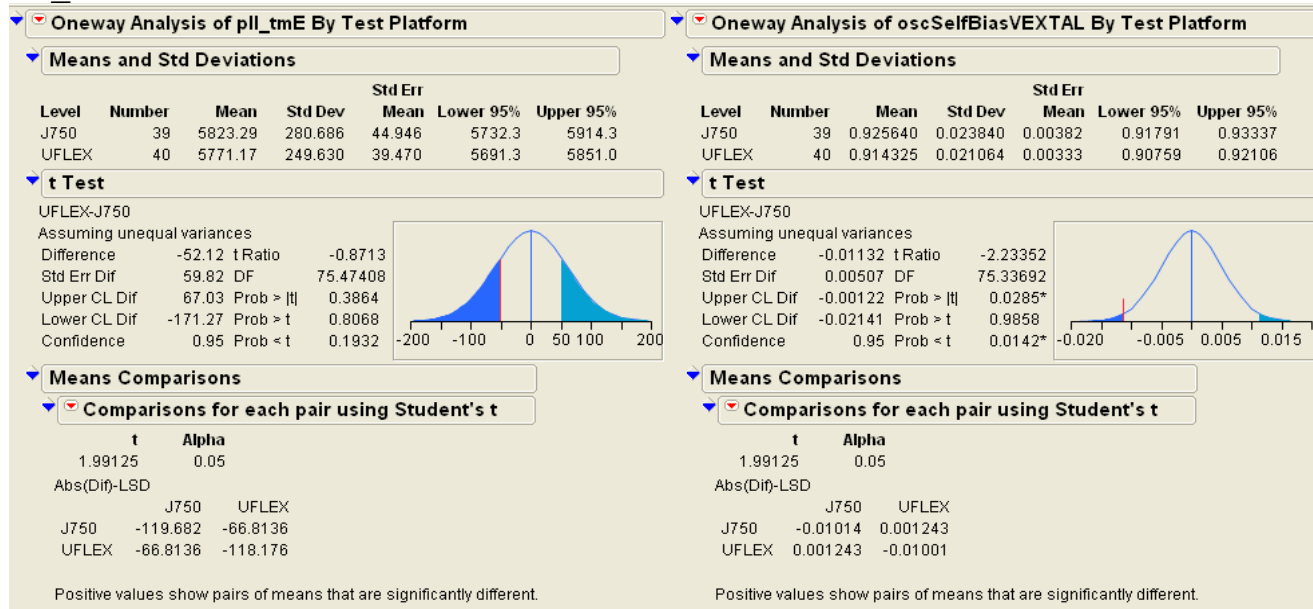


FCA: T-test and F- test p values
Tripiddp_vdd and pll_cloop_d1_mfd0 for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

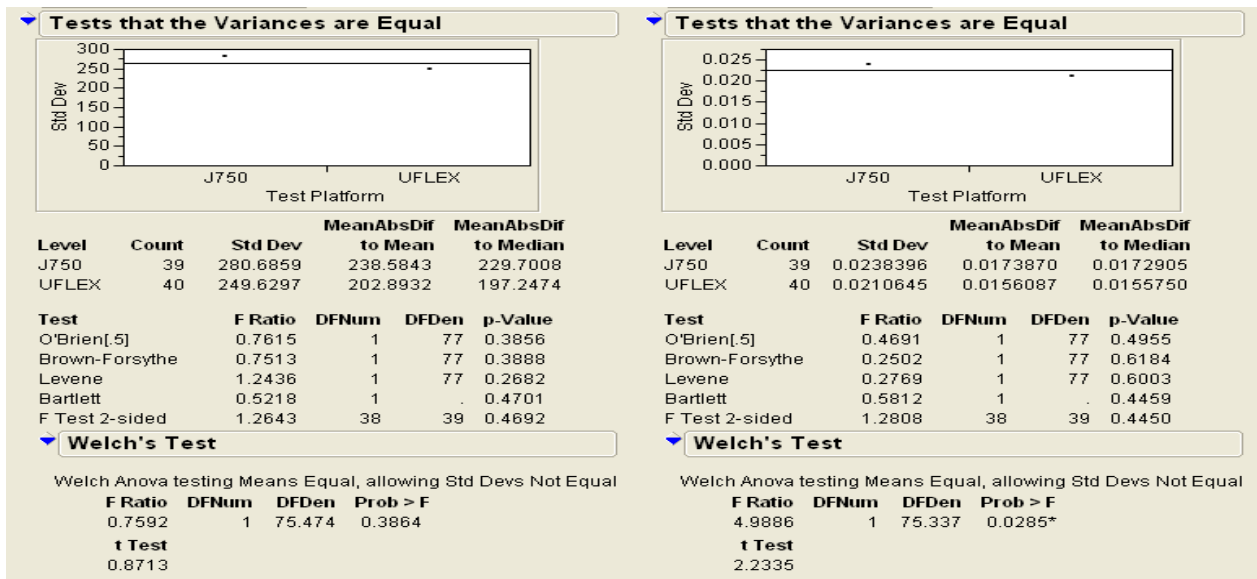


FCA: T-test and F- test p values
 pll_tmE and oscSelfBiasVEXTAL for UFLEX and J750

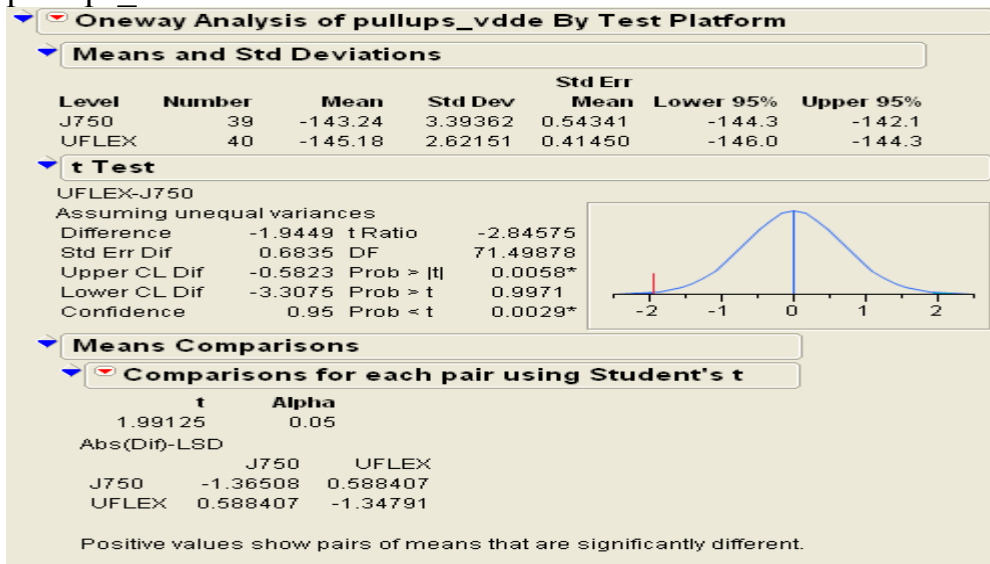


FCA: T-test and F- test p values
 pll_tmE and oscSelfBiasVEXTAL for UFLEX and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

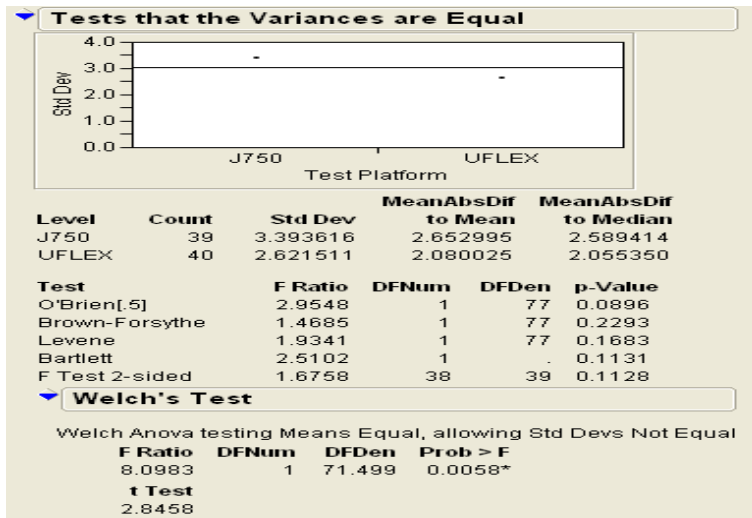


FCA: T-test and F- test p values
pullups_vdde for UFlex and J750



FCA: T-test and F- test p values
pullups_vdde for UFlex and J750

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION



4. GAGE REPEATABILITY AND REPRODUCIBILITY STUDY (GRR)

Action:

3 parameters will be taken for this study. The collection of data will be captured and arranged as follow:

Factor	Levels	Comment
Unit	10	Process
Site (Dut)	4 (x6)	Reproducibility
Repeat	5	Repeatability

Accept Criteria:

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

Result:

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Omni GR&R result can be obtained from the link below:

<http://globalomni/QU/ZeroDefect/GageDetail.aspx?u=r63668&g=4967bbfe-4601-4b7b-818c-124311daa0be&n=1833>

Omni GR&R summary result as below:

Gage Performance Summary

Rating	Count	As %	Graphic
Excellent	23	1 %	
Good	8	0 %	
Acceptable	0	0 %	
Questionable	2065	92 %	
Needs Improvement	139	6 %	

Details analysis for selected test for GR&R as below:

Gage R&R for oscSelfBiasVEXTAL

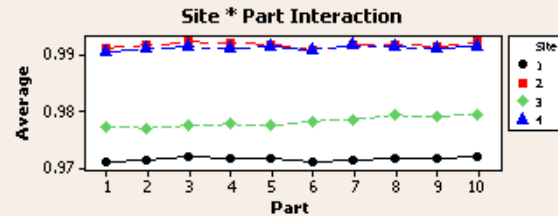
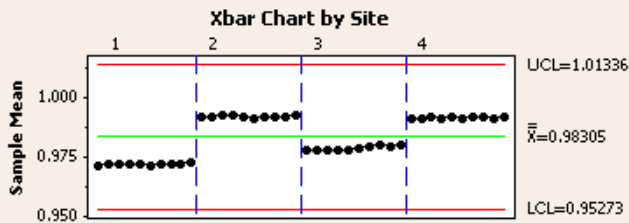
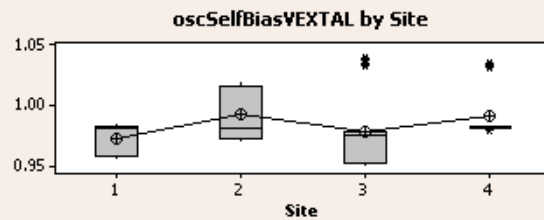
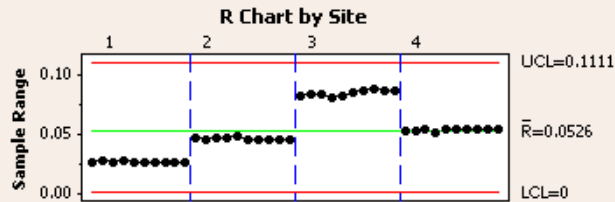
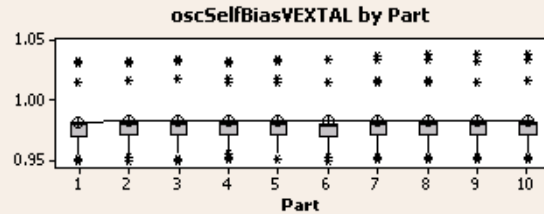
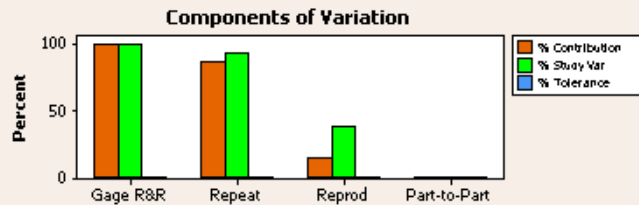
Source	StdDev (SD)	Study Var (5.15 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	0.0247661	0.127545	100.00	0.64
Repeatability	0.0229479	0.118182	92.66	0.59
Reproducibility	0.0093140	0.047967	37.61	0.24
Site	0.0093140	0.047967	37.61	0.24
Part-To-Part	0.0000000	0.000000	0.00	0.00
Total Variation	0.0247661	0.127545	100.00	0.64

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Gage R&R (ANOVA) for oscSelfBiasVEXTAL

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:



Gage R&R for lvrctl_startup

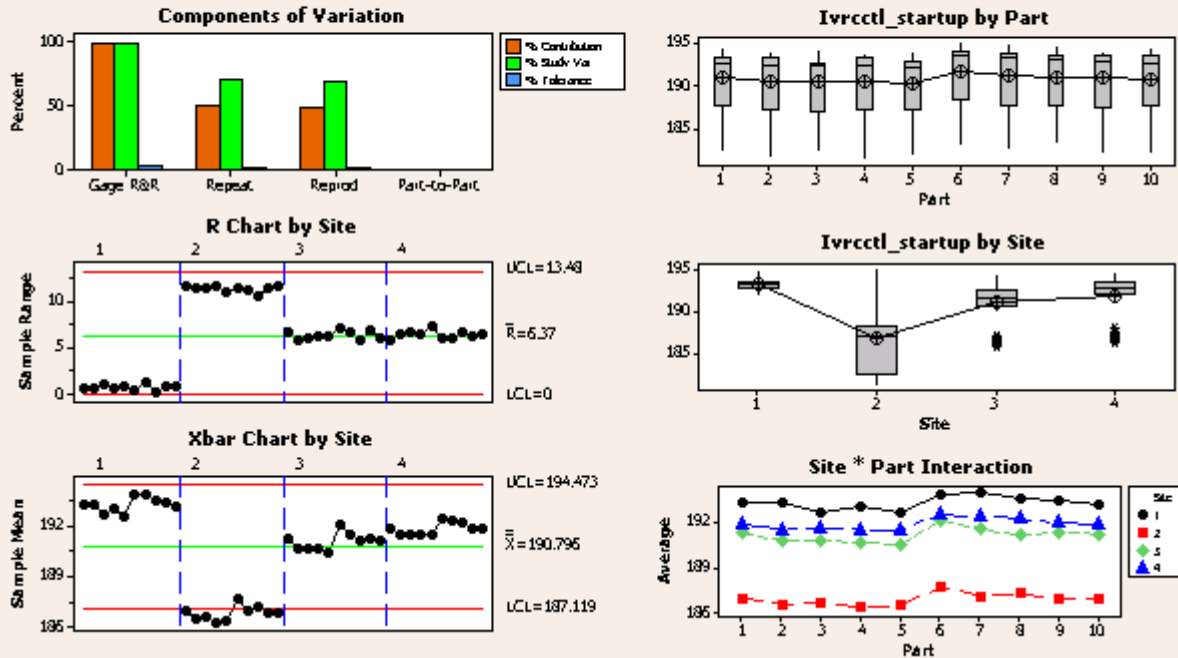
Source	StdDev (SD)	Study Var (5.15 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	3.90739	20.1231	100.00	2.87
Repeatability	2.79173	14.3774	71.45	2.05
Reproducibility	2.73385	14.0793	69.97	2.01
Site	2.73385	14.0793	69.97	2.01
Part-To-Part	0.00000	0.0000	0.00	0.00
Total Variation	3.90739	20.1231	100.00	2.87

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Gage R&R (ANOVA) for Ivrcctl_startup

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:



Gage R&R for pullups_vdde

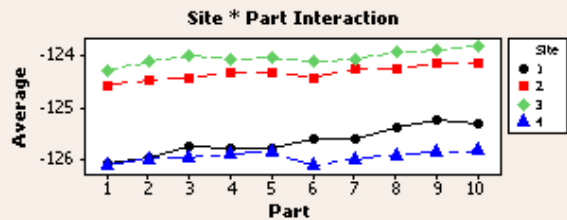
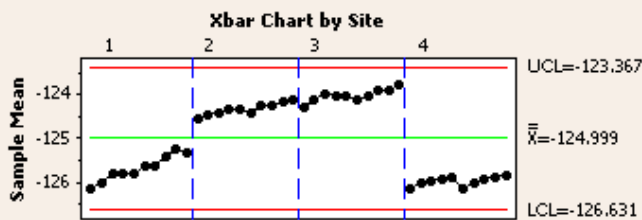
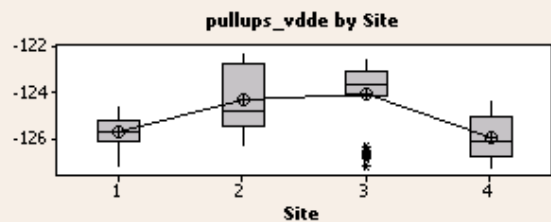
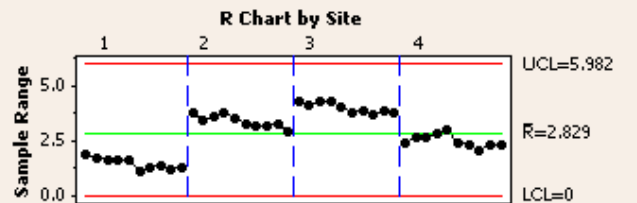
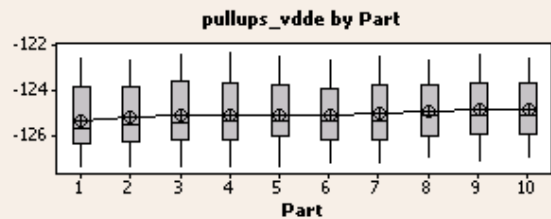
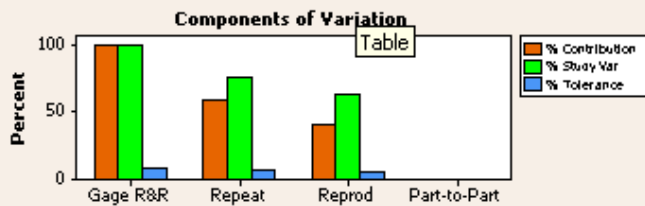
Source	StdDev (SD)	Study Var (5.15 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	1.49606	7.70469	100.00	9.06
Repeatability	1.15153	5.93039	76.97	6.98
Reproducibility	0.95507	4.91860	63.84	5.79
Site	0.95507	4.91860	63.84	5.79
Part-To-Part	0.00000	0.00000	0.00	0.00
Total Variation	1.49606	7.70469	100.00	9.06

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Gage R&R (ANOVA) for pullups_vdde

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:



Gage R&R for tripiddp_vdde

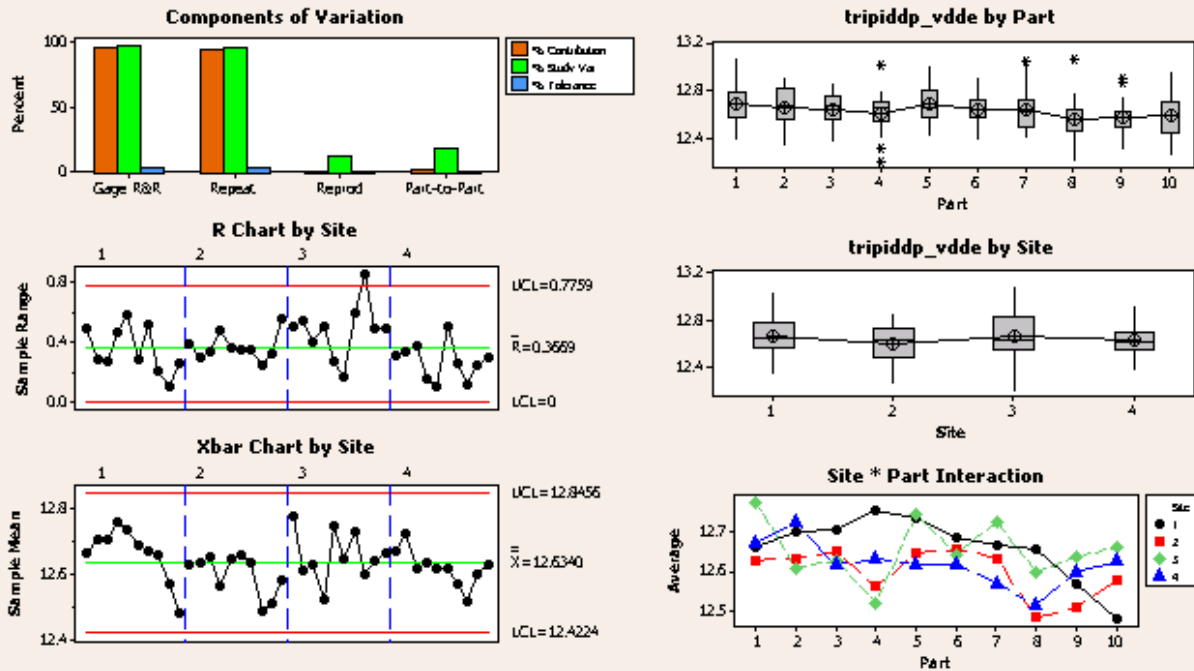
Source	StdDev (SD)	Study Var (5.15 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	0.163196	0.840457	98.16	4.94
Repeatability	0.161641	0.832449	97.22	4.90
Reproducibility	0.022476	0.115749	13.52	0.68
Site	0.022476	0.115749	13.52	0.68
Site*Part	0.000000	0.000000	0.00	0.00
Part-To-Part	0.031771	0.163620	19.11	0.96
Total Variation	0.166259	0.856236	100.00	5.04

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Gage R&R (ANOVA) for tripiddp_vdde

Gage name:
Date of study:

Reported by:
Tolerance:
Misc:



5. 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.

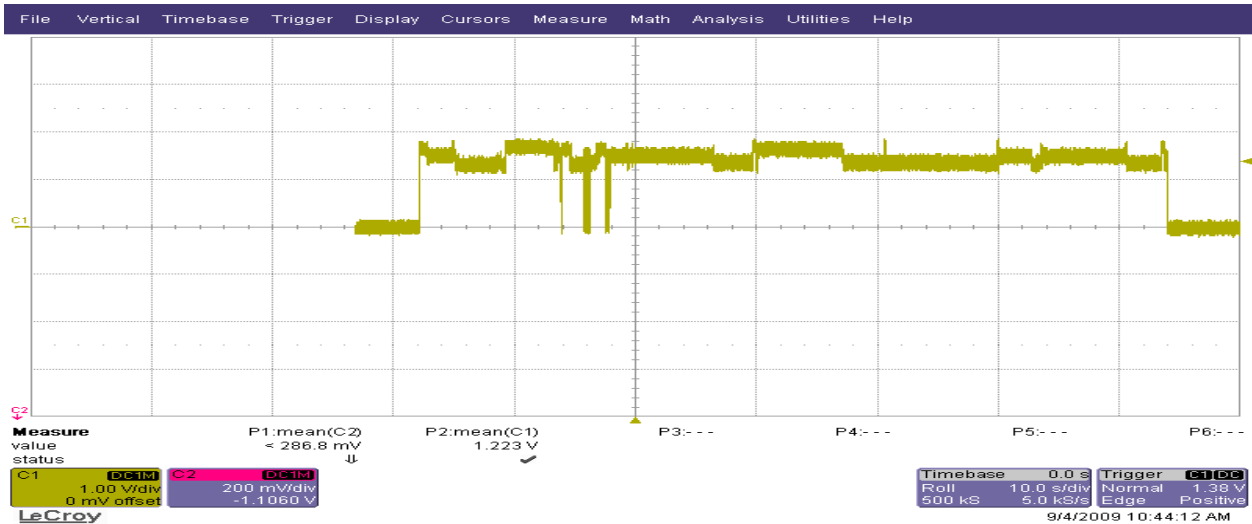
Accept Criteria:

Zero over voltage spike and zero under voltage spike.

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Results:

HDVS (VDD)



Summary:

30% of the maximum Vdd Voltage Level = $1.5 + (1.5 \times 30\%) = 1.95\text{V}$.

None of the Vdd pin exceeds 1.78V, no over-voltage observed

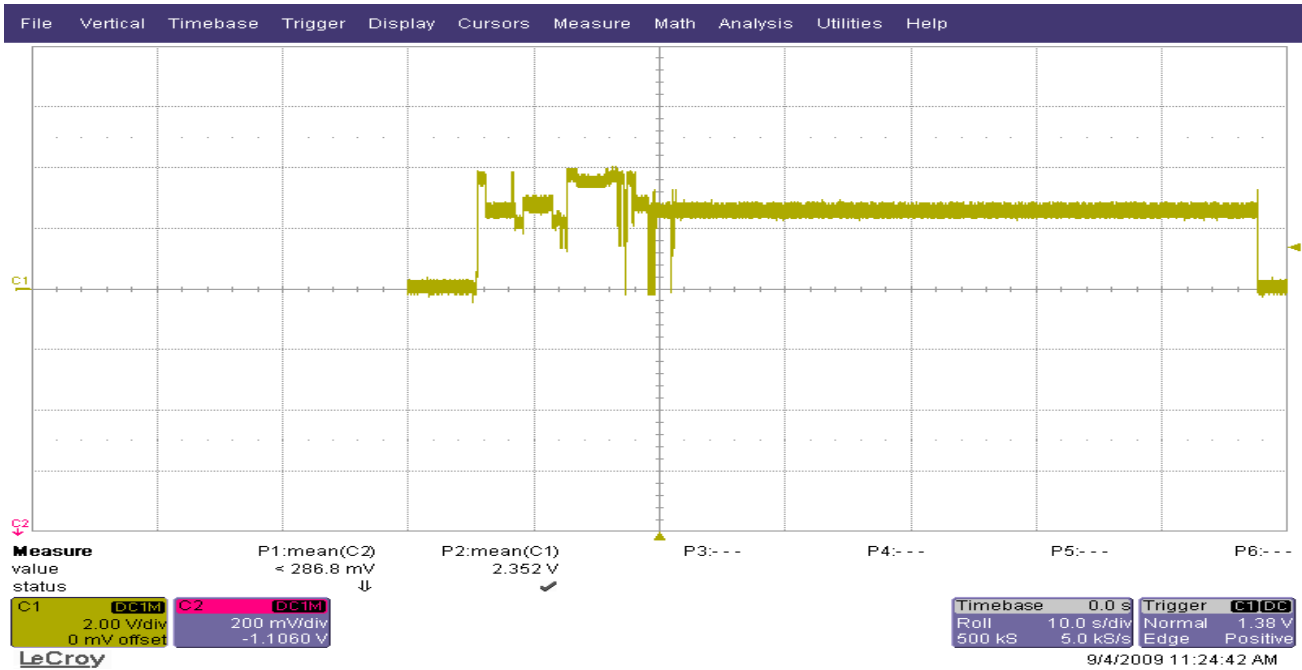
30% of the minimum Vdd Voltage Level = $0 - (1.5 \times 30\%) = -0.45\text{V}$.

None of the Vdd pin has voltage lower than 0V, no over-voltage observed

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Results :

HDVS (VDDE)



Summary:

30% of the maximum Vdde Voltage Level = $3.3 + (3.3 \times 30\%) = 4.29\text{V}$.

None of the Vdde pin exceeds 3.86V, no over-voltage observed

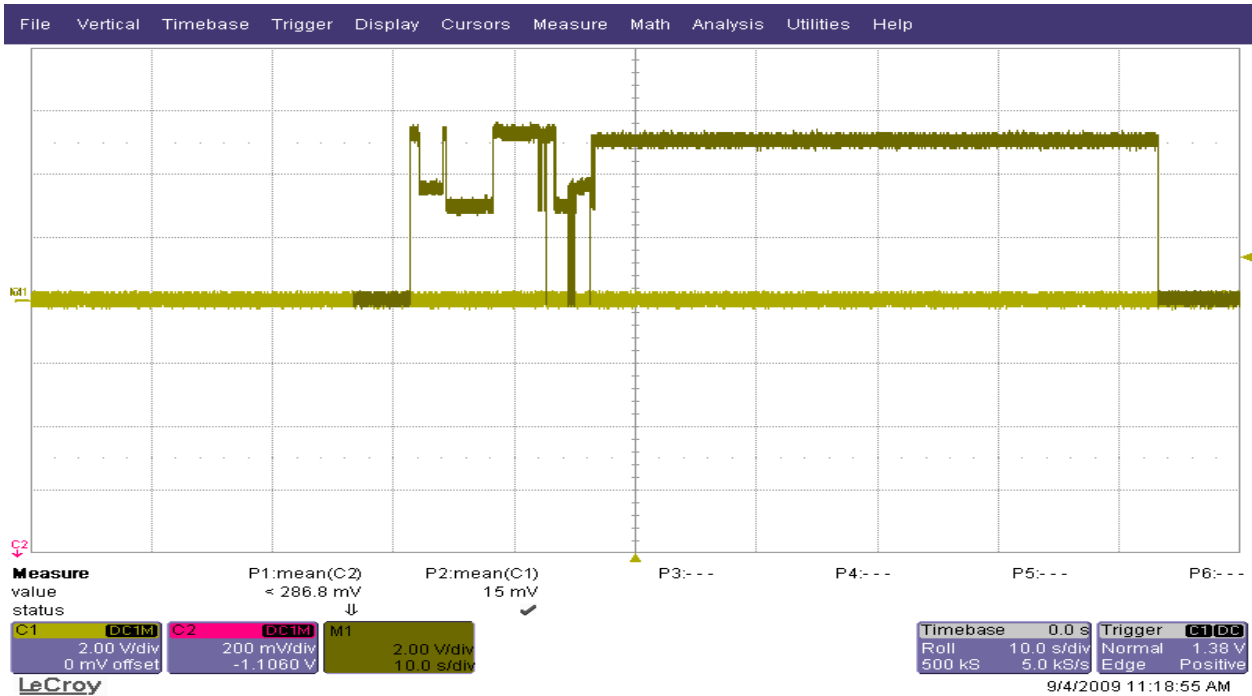
30% of the minimum Vdde Voltage Level = $0 - (3.3 \times 30\%) = -0.99\text{V}$.

None of the Vdde pin has voltage lower than 0V, no over-voltage observed

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

Results :

HDVS (VDDEH)



Summary:

30% of the maximum Vdkeh Voltage Level = $3.3 + (3.3 \times 30\%) = 4.29\text{V}$.

None of the Vdkeh pin exceeds 3.76V, no over-voltage observed

30% of the minimum Vdkeh Voltage Level = $0 - (3.3 \times 30\%) = -0.99\text{V}$.

None of the Vdkeh pin has voltage lower than 0V, no over-voltage observed.

VIPER (MPC5566) ULTRA FLEX B PLATFORM QUALIFICATION

6. CONCLUSION

Base on above data, Ultra Flex B is now a qualified production tester.

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~ End of Report ~