



# Notices

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### Safety Notices

### CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

# WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

# Safety Summary

	The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings or operating instructions in the product manuals violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements. Product manuals are provided with your instrument on CD-ROM and/or in printed form. Printed manuals are an option for many products. Manuals may also be available on the Web. Go to www.keysight.com and type in your product number in the Search field at the top of the page.				
General	Do not use this product in any manner not specified by the manufacturer. The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.				
Before Applying Power	Verify that all safety precautions are taken. Make all connections to the unit before applying power. Note the instrument's external markings described in "Safety Symbols".				
Ground the Instrument	If your product is provided with a grounding type power plug, the instrument chassis and cover must be connected to an electrical ground to minimize shock hazard. The ground pin must be firmly connected to an electrical ground (safety ground) terminal at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.				
Fuses	See the user's guide or operator's manual for information about line-fuse replacement. Some instruments contain an internal fuse, which is not user accessible.				
Do Not Operate in an Explosive Atmosphere	Do not operate the instrument in the presence of flammable gases or fumes.				
Do Not Remove the Instrument Cover	Only qualified, service-trained personnel who are aware of the hazards involved should remove instrument covers. Always disconnect the power cable and any external circuits before removing the instrument cover.				
Cleaning	Clean the outside of the instrument with a soft, lint-free, slightly dampened cloth. Do not use detergent or chemical solvents.				
Do Not Modify the Instrument	Do not install substitute parts or perform any unauthorized modification to the product. Return the product to an Keysight Sales and Service Office for service and repair to ensure that safety features are maintained.				
In Case of Damage	Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.				
CAUT	A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.				
WAR	A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.				

Safety Symbols

Table 1	Safety Symbol	
Symbol		Description
		Direct current
$\sim$		Alternating current
$\overline{\sim}$		Both direct and alternating current
37	J	Three phase alternating current
37		Three phase alternating current
<u> </u>		Earth ground terminal
		Protective earth ground terminal
H		Frame or chassis ground terminal
$\bot$		Terminal is at earth potential
$\Delta$		Equipotentiality
N		Neutral conductor on permanently installed equipment
L		Line conductor on permanently installed equipment
		On (mains supply)
0 ( <sup>1</sup> )		Off (mains supply)
		Stand by (mains supply). The instrument is not completely disconnected from the mains supply when the power switch is in the stand by position
		In position of a bi-stable push switch

Symbol	Description
	Out position of a bi-stable push switch
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION
$\wedge$	Caution, refer to accompanying documentation
$\bigwedge$	Caution, risk of electric shock
(K)	Do not apply around or remove from HAZARDOUS LIVE conductors
Ą	Application around and removal from HAZARDOUS LIVE conductors is permitted
	Caution, hot surface
	lonizing radiation
CAT I	IEC Measurement Category I
CAT II	Measurement Category II
CAT III	Measurement Category III
CAT IV	Measurement Category IV

# Compliance and Environmental Information

Table 2         Compliance and Environmental Information							
Safety Symbol	Description						
<b>\$₽</b> ∘	CSA is the Canadian certification mark to demonstrate compliance with the Safety requirements.						
<b>C</b> N10149	The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australia EMC Framework regulations under the terms of the Radio Communication Act of 1992.						
CE	CE compliance marking to the EU Safety and EMC Directives. ISM GRP-1A classification according to the international EMC standard. ICES/NMB-001 compliance marking to the Canadian EMC standard.						

### DDR Post Process Compliance-At a Glance

The DDR Post Process Compliance tool evaluates the captured DDR/LPDDR data against a set of user-defined limits to help you validate that a memory system is operating properly. The bus types supported by this tool are:

#### With B4622A license

- DDR1/2/3
- LPDDR1/2

#### With B4622B upgrade license

- DDR1/2/3/4
- LPDDR1/2/3

The automated test application guides you through the process of selecting and configuring tests, running tests, and evaluating the test results.

The application assumes that the Keysight logic analysis system has already been set up to properly capture DDR data.

To use the automated test application, see:

- Chapter 2, "What's New" on page 13
- Chapter 3, "Starting the DDR Post Process Compliance Tool" on page 15
- Chapter 4, "Configuring Tests" on page 19
- Chapter 5, "Setting Up the Test Environment" on page 31
- Chapter 6, "Selecting Tests" on page 35
- Chapter 7, "Running Tests" on page 39
- · Chapter 8, "Viewing Results" on page 43
- Chapter 9, "Viewing/Exporting/Printing the Report" on page 47
- Chapter 10, "Saving Test Projects" on page 51
- Chapter 11, "Creating or Opening a Test Project" on page 53

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DDR Post Process Compliance Tool User Guide

# 1 About the Tool

### Overview of the There are two types of tests: tests - Tests which sheal for time

- Tests which check for timing violations
- Tests which check for illegal DDR state transitions

The test limits can be (and must be) configured by the user.

The provided timing violation tests include:

Table 3         Timing violation tests	sts
--	-----

Paramete r	Description	Test
tRAS <sub>max</sub>	Row Active time ACTIVATE to PRECHARGE/Auto-PRECHARGE	must be < tRASmax
tRAS <sub>min</sub>	Row Active time ACTIVATE to PRECHARGE/Auto-PRECHARGE	must be > tRASmin
tRP	PRECHARGE to any other command (same bank)	must be > tRP
tCCD	Time between any read or write command	must be > tCCD
tRRD	ACTIVATE to ACTIVATE (any bank)	must be >= tRRD
tFAW	Time for four ACTIVATEs (any bank)	must be >= tFAW
tRFC	REFRESH to REFRESH or ACTIVATE	must be > tRFC
tDARW	ACTIVATE to external READ/WRITE	must be > tDARW
tDRP	Read to Precharge/AutoPrecharge	must be > tDRP
tDRW	Read to Write	must be > tDRW
tDWP	Write to Precharge/AutoPrecharge	must be > tDWP
tDWR	Write to Read	must be > tDWR

Description
READ or WRITE to an inactive row
REFRESH to an active bank
ACTIVATE to an active bank

**Compatibility** The DDR Post Process Compliance tool works for most DDR, DDR2, DDR3, DDR4, LPDDR, LPDDR2, and LPDDR3 systems.

The tool is not able to fully model systems which use the following optional DDR features:

- Partial Array Self-Refresh (PASR)
- Auto Self-Refresh (ASR)
- On-the-fly Burst Length switching

About the<br/>softwareThe DDR Post Process Compliance tool is part of the Keysight B4622B Protocol<br/>Compliance and Analysis Toolset package.

The application uses the same software framework which is used by Keysight Infiniium oscilloscopes.

DDR Post Process Compliance Tool User Guide

# 2 What's New

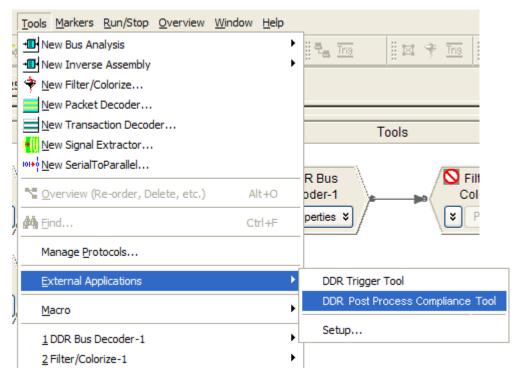
With this release, the tool supports DDR, DDR2, DDR3, DDR4, LPDDR, LPDDR2, and LPDDR3. Several new tests have been added for DDR3/4 and LPDDR2/3.

The DDR4 and LPDDR3 support is available only with the upgrade license - B4622B of the tool.

### 2 What's New

# 3 Starting the DDR Post Process Compliance Tool

1 From the logic analysis system's main menu, choose Tools>External Applications>DDR Post Process Compliance Tool.



The DDR Post Process Compliance tool window appears.

Post Process Complia	nce Tool DI	OR Device 1 *		
ew Tools Help				
P Select Tests Configu	re   Run Tests	Results Html Report	1	
- Module Selection				
Select a DDR module to	) analyze	LPDDR2 (8-bit) 📃 🗾	Refresh	
Select the DDR memory	/type	LPDDR3		
4				
Chip Selects				
	-			
Chip Select 0	CKE0 💌	Chip Select 4	CKE0 💌	
Chip Select 1	CKE0 💌	Chip Select 5	CKE0	
Chip Select 2	CKE0	Chip Select 6	CKEO 💌	
Chip Select 3	CKE0 💌	Chip Select 7	CKE0 💌	
Data Options				
Automatically acqui	re new Logic A	nalyzer data when runn	ina tests.	
Comments				10

See Also • "To view/hide the toolbar" on page 17

**Next** • "Creating or Opening a Test Project" on page 53

# To view/hide the toolbar

• To toggle between a hidden and visible toolbar, choose **View>Toolbar** from the menu.

### **3** Starting the DDR Post Process Compliance Tool

DDR Post Process Compliance Tool User Guide

# 4 Configuring Tests

You must configure a set of limits before you can run any tests.

These limits describe the memory part you are using and certain characteristics of the memory bus.

You can load, edit, and save limits from the **Tools>Compliance limits** menu.

See Also

• "To set the test limits" on page 20 (for information on how to calculate the limits)

- "To create/edit limit sets" on page 25 (for information on how to enter and save the limits)
- "To activate/refresh limit sets" on page 29 (for information on how to load a limit set which you have saved)

# To set the test limits

All timing violation tests are based on compliance limits that are specified by the user. Specify these limits based on the specific DDR memory parts you are using. Limits will vary depending on:

- Memory technology (DDR2, DDR3)
- Speed grade
- Clock speed
- Part density
- User selected options such as Additive Latency and burst length
- **Units** Some times must be entered in seconds (s). If the data sheet expresses these limits in terms of clock cycles, you will need to convert those limits to seconds.

Each logic analyzer sample has a timestamp. Results will be calculated by subtracting the time stamp of the first event from the timestamp of the second event. Note that the time stamps are only as good as the time stamp resolution of the logic analyzer card being used (this resolution may be as coarse as 2ns; see the Specifications and Characteristics in the logic analyzer's online help for details). The elapsed time includes time during which the DDR clock is inactive.

Other times must be entered as a number of clock cycles (CK). Results will be calculated by counting the number of logic analyzer samples between the two events.

Additive latency (AL) is normally expressed as a number of clocks (CK). For some calculations, you will need to convert AL to seconds (s) by dividing by the clock rate.

Burst length (BL) is simply an integer (4 or 8).

**Definitions of**<br/>the limitsYou will need to look up some of the limits from the part data sheet. You will then<br/>calculate values for the derived limits.

Keysight suggests using the formulas here to compute the derived limits. However, it is entirely the responsibility of the user to choose limits that are appropriate for the intended application.

Here are the limits you need to specify:

Par ame ter	Description	U n i t	Suggested Definition	Reference
tRA S <sub>ma</sub> x	Row Active time ACTIVE to PRECHARGE	s	Part dependent (9 * tREFI)	Data Sheet (tREFI). See DDR3 (see page 25) page 147.
tRA S <sub>min</sub>	Row Active time ACTIVE to PRECHARGE	s	Part dependent	Data Sheet
tDA RW	Min ACT to external READ/WRITE	s	tRCD-AL	DDR2 (see page 24) 3.5 / DDR3 (see page 25) 12.3
tRP	Row Precharge time min PRECHARGE to any other command (same bank)	s	Part dependent	Data Sheet
tDR P	Min Read to Precharge	C K	DDR2: AL + BL/2 + max (tRTP, 2CK) -2CK DDR3: AL + tRTP	DDR2 (see page 24) 3.7.1 / DDR3 (see page 25) 4.13.3
tDR W	Min Read to Write		DDR2: BL/2 + 2CK DDR3: BL4: RL + CCD/2 + 2CK – WL DDR3: BL8: RL + CCD + 2CK - WL	DDR2 (see page 24) figure 35 / DDR3 (see page 25) figure 35, 36
tRF C	REFRESH command time. min time REFRESH to REFRESH or ACTIVATE	s	Part dependent	Data Sheet
tD WP	Min Write to Precharge	C K	WL + BL/2 + tWR	DDR2 (see page 24) 3.7.2 / DDR3 (see page 25) Figure 49, 50
tD WR	Min Write to Read	C K	DDR2: CL -1 + BL/2 + tWTR DDR3: WL + BL/2 + tWTR	DDR2 (see page 24) Figure 41 / DDR3 (see page 25) Figure 53, 56
tCC D	CAS to CAS delay min time between any read or write command	C K	Part dependent	Data Sheet

**Table 5**Limits used by the tests

Par ame ter	Description	U n i t	Suggested Definition	Reference
tRR D	Min time between two ACTIVATE commans (different banks)	S	Part dependent	Data Sheet
tFA W	Min time for four ACTIVATE commands (different banks)	S	Part dependent	Data Sheet

 Table 5
 Limits used by the tests (continued)

To calculate the limits, you will need to look up or calculate the following values: Values used to calculate the limits

Par ame ter	Description	U n i t	Suggested Definition	Reference
AL	Additive Latency	C K , s	User selection	System Design
BL	Burst Length		User selection	System Design
CL	CAS (Read) Latency	C K	Part dependent	Data Sheet
CW L	CAS Write Latency	C K	Part dependent	Data Sheet
RL	Read Latency	C K	AL + CL	DDR3 (see page 25) 3.4.3.4
WL	Write latency	C K	AL + CWL	DDR3 (see page 25) 3.4.3.4
tRC D	RAS to CAS Delay (ACT to internal R/W)	s	Part dependent	Data Sheet
tRE FI	Refresh Interval; average time between Refresh commands	s	Part dependent	Data Sheet
tRT P	Internal Read to Precharge	s	Part dependent (max 4CK or 7.5ns)	Data Sheet

**Table 6**Values used to calculate the limits

	Par ame ter	Description	U n i t	Suggested Definition	Reference	
	tWR	Internal Write Recovery	s	Part dependent	Data Sheet	
	tWT R	Internal Write to internal Read	s	Part dependent (max 4CK or 7.5ns)	Data Sheet	
	Extern	al Read/Write + AL = Inter	nal	Read/Write		
Naming conventions	Limits which are normally expressed as maximum or minimum times have names beginning with 't'.					
	The names of derived timing limits begin with 'tD'. Derived limits are not usually specified directly in the part data sheet. In general, you will compute these from the standard timing parameters.					
		• -		as a number of clock cycles h these to seconds for use by th	-	
Customizing the limits					or in the JEDEC	
Example limits		ample limit set is supplied v 00 part with 6-6-6 timing.	vith	the validation tool. The exam	ple is based on a	
	To load and view the example limits, select <b>Tools&gt;Compliance Limits&gt;Create/Edit</b> <b>Limit Set</b> , then select <b>Load Limit Set</b> , select <b>Official limit sets</b> , then select <b>DDR</b> <b>Example</b> .					
	Example part:					
	<ul> <li>Data sheet: MICRON DDR3 MT41J256-32 Me x 4 x 8 Banks PDF: 09005aef82f1e6e2 Rev. M 9/ EN</li> </ul>					
		eed Grade 25 (6-6-6)				
	• Clo	ck 400 MHz (2.5ns)				
	Data Rate 800 MT/s					
	• Ten	nperature 0-85C				

 Table 6
 Values used to calculate the limits (continued)

Parameter	Value	Reference
tREFI	7.8 us (low temp)	Data Sheet, page 71
tRAS <sub>max</sub>	70.2us	Data Sheet (tREFI), page 63
tRAS <sub>min</sub>	37.5ns	Data Sheet, page 30
tRP	15ns	Data Sheet, page 30
tCCD	4CK (10ns)	Data Sheet, page 70
tRRD	10ns	Data Sheet, page 30
tFAW	50ns	Data Sheet, page 30
tRFC	110ns	Data Sheet, page 30
tRCD	15ns	Data Sheet, page 30
tRTP	10ns	Data Sheet, page 70
tWR	15ns	Data Sheet, page 70
tWTR	10ns	Data Sheet, page 70
AL	Ons (0CK)	User selected (MR1, 0 means no additive latency)
BL	10ns (8 bursts)	User selected (MR0)
CL	6CK (15ns)	Data Sheet, page 30 (MR0)
CWL	5CK (12.5ns)	Data Sheet, page 116 (MR2)

 Table 7
 Standard parameters used for example limit set

 Table 8
 Derived values used for example limit set

Parameter	Value
RL	6CK (15ns)
WL	5CK (12.5ns)
tDARW	15ns
tDRP	10ns
tDRW	17.5ns
tDWP	32.5ns
tDWR	27.5ns

**References** • DDR2 JEDEC Standard 79-2E, April 2008

• DDR3 JEDEC Standard 79-3C, November 2008

## To create/edit limit sets

You can create new limit sets by modifying existing limit sets and saving them to new files.

- 1 From the DDR Post Process Compliance tool's menu, choose Tools>Compliance limits>Create/Edit limit set....
- 2 In the Create/Edit User-Defined Limit Set dialog, click **Load Limit Set...** to pre-load the dialog with the supplied example limit set (or a user-defined limit set).

Create/Edit User-Defined Limit Set						
1.         Load Limit Set         Loaded:           2. Edit summary:         Name:         (None)           Shared reference:						
3. Select test limit           Name         Limits         Units         Nominal         Precision         Reference						
4. Edit selected test limit     Name:	_					
Description:	-					
Limits: (Min) n/a Value <= V (Max (Nominal)	c)					
Precision: Round Actual Value to nearest 10E ()						
Reference:						
Combine Spirt Save As Close						

- **3** Give the new limit set a unique name. If all of the tests come from the same reference, you can enter a base description (for example, document name) in the **Shared Reference** field and then add test-specific references (for example, page number) down below.
- 4 Select a limit to modify.

Create/Edit User-Defined Limit Set								
1. Load Limit Set Loaded: DDR Example (Official)								
2. Edit summary: Name: DDR Example								
Shared reference:								
3 Select test limit								
	1	11.2	NI 1					
Name	Limits	Units	Nominal	Preci:				
ACTIVATE to PRECHARGE/Auto-PRECHARGE must be < tRASmax	Value < 70.2E-06	S		.10E-				
ACTIVATE to PRECHARGE/Auto-PRECHARGE must be > tRASmin	37.5E-09 < Value	S		.10E-				
A CHARTER OF A CHARTER AND A	102 00 4 4000	S		.10E-				
PRECHAERGE to ACTIVATE/PRECHARGE must be > tRP	15E-09 < Value	s		.10E-				
<				>				
☐ 4. Edit selected test limit								
Name: ACTIVATE to PRECHARGE/Auto-PRECHARGE must be	>tRASmin							
Description:								
Description.								
Limits: (Min) 37.5E-09 < Value	▼ n/a			(Max)				
				(1100)				
(Nominal)								
Precision: Round Actual Value to nearest 10E-10 + (100 pico s)								
Reference: part manufacturer's data sheet								
,								
Combine Split Close								
OpineOpin	_	Jave As	····	Ciose				
				1				

- 5 Modify the limit as desired. See also:
- "To split a combined limit" on page 26
- "To combine limits" on page 27
- 6 Repeat the last two steps until all limits requiring change are modified.
- 7 Click **Save As...** to save your custom limit set to a file. Enter the file name in the Save File As dialog.
- Now, you can activate your newly-created limit set for use in the next run. See "To activate/refresh limit sets" on page 29.

# When Loading<br/>ProjectsWhen you load a project, the application will attempt to restore the limit set that was in<br/>use at the time the project was saved.

See Also • "To set the test limits" on page 20 (for information on how to calculate the limits)

### To split a combined limit

#### If a limit covers more than one test ID, you can split it into two limits.

• In the Create/Edit User-Defined Limit Set dialog (see "To create/edit limit sets" on page 25), select the limit that covers multiple tests, and click **Split...**.

Create/Edit User-Defined Limit Set							
1. Load Limit Set Loaded: Specification v1.00 (Official)							
2. Edit summary: Name:	Specification v1.00 (My Limit Se	t)					
Shared reference:	JEDEC Standard FBDIMM Spec	ification: High Spe	eed Differential PTP Li	ink at 1.5 V, Vers			
3. Select test limit							
Name		l	imits	~			
AC Common Mode		١	/alue <= 20E-03				
AC Common Mode			/alue <= 225E-03				
AC peak-to-peak common mode of in			/alue <= 270E-03				
AC peak-to-peak common mode outp	out voltage (Rg, -3.5/6.0dB) (2 test	s) \	/alue <= 80E-03	×			
<				>			
4. Edit selected test limit							
Name: AC peak-to-peak con	nmon mode output voltage (Rg, -3	5/6.0dB) (2 tests)					
Description: Transmitter regular sv	ving -3.5/6.0dB deemphasis AC pe	ak-to-peak comm	on mode output voltag	ge tests.			
Limits: (Min) n/a	Value <=	▼ 80E-03	}	(Max)			
(Nominal)							
Precision: Round Actual Value to nearest 10E 4 (100 micro V)							
Reference: Table 3-3							
Combine Split			Save As	Close			

In this case, we are splitting a 2-test limit into two single-test limits.

8 In the Split Test Limit dialog, assign one of the tests to the new limit by selecting it and clicking the --> button.

🔜 Split One Test Limit Into Two	
<u>TEST LIMIT #1</u>	TEST LIMIT #2
1. Assign tests:	
AC peak-to-peak common mode output voltage (Rg, -3.5d	> AC peak-to-peak common mode output voltage (Rg, -6.0c
(Select a single test to see its description.)	
2. Provide summary names (for multi-test limits only):	
AC peak-to-peak common mode output voltage (Rg, -3.5	AC peak-to-peak common mode output voltage (Rg, -6.0
3. Provide summary descriptions (for multi-test limits	only)
Transmitter regular swing -3.5dB deemphasis AC peak-to-	Transmitter regular swing -6.0dB deemphasis AC peak-to-
	Finish Cancel

### 9 Click Finish.

See Also · "To combine limits" on page 27

### To combine limits

• In the Create/Edit User-Defined Limit Set dialog (see "To create/edit limit sets" on page 25), select the limits you want to combine, and click **Combine...**.

Create/Edit User-Defined Limit Set							
1. Load Limit Set Loaded: Specification v1.00 (Official)							
2. Edit summary: Name: Specification v1.00 (My Limit Set)							
Shared reference: JEDEC Standard FBDIMM Specification: High	1 Speed Differential PTP Link at 1.5 V, Vers						
3. Select test limit							
Name	Limits						
AC peak-to-peak common mode of input voltage (Lg/Rg/Sm, -3.5/60dB) (6 tests)	Value <= 270E-03						
AC peak to peak common mode output voltage (Rg, -3.5dB)	Value <= 80E-03						
AC peak-to-peak common mode output voltage (Rg, -6.0dB) AC peak-to-peak common mode output voltage (Sm, -3.5/6.0dB) (2 tests)	Value <= 80E-03 Value <= 70E-03						
	>						
☐4. Edit selected test limit							
Name:							
Description:							
Limits: (Min) n/a	(М)						
Limits: (Min) n/a Value <= _	(Max)						
(Nominal)							
Precision: Round Actual Value to nearest 10E							
Reference:							
Combine Split	Save As Close						

**10** In the Combine Multiple Test Limits dialog, select which limit to copy values from and provide summary names and descriptions.

😬 Combine Multiple Test Limits Into One	
1. Copy limits from:	
AC peak-to-peak common mode output voltage (Rg, -3.5dB)	•
Transmitter regular swing -3.5dB deemphasis AC peak-to-peak common mode output voltage test.	
2. Provide a summary name for the combined test limit:	
AC peak-to-peak common mode output voltage (Rg, -3.5/6.0dB)	
3. Provide a summary description for the combined test limit:	
Transmitter regular swing -3.5/6.0dB deemphasis AC peak-to-peak common mode output voltage test.	
Finish	Cancel

11 Click Finish.

See Also • "To split a combined limit" on page 26

### To activate/refresh limit sets

NOTE

To load a previously defined limit set:

- 1 From the DDR Post Process Compliance tool's menu, choose Tools>Compliance limits>Activate/Refresh limit set....
- 2 In the Activate/Refresh Compliance Limit Set dialog, select one of the official limit sets or a user-defined limit set.

Activate/Refresh Compliance Limit Set						
Select a limit set to a						
Official limit sets:	Specification v1.00					
C User-defined limit se	s: Browse					
	Activate/Refresh Cancel					

### 3 Click Activate/Refresh.

If you have existing test results when you activate a different limit set, the application examines your results to see if any of them would experience a limit change when the different limit set is loaded. If any results would be affected in this way, the application tells you which ones they are and warns that they must be deleted.

See Also · "To combine limits" on page 27

### Configuring Tests

# **5 Setting Up the Test Environment**

- 1 Click the **Set Up** tab.
- 2 If more than one DDR bus decoder exists in the logic analysis system setup, select which one to use for the compliance tests from the **Select a DDR module to analyze** listbox.

If only one decoder exists, it will be selected automatically.

If needed, click **Refresh** to update the list. You may need to refresh the list and select a new decoder if you load a new logic analyzer configuration file, or whenever you add or remove a decoder.

3 Select the DDR memory type. The DDR Post Process Compliance tool can work with any of the following memory bus standards (depending on which license of the B4622 software is installed).

### With B4622A license -

- DDR1/2/3
- LPDDR1/2

#### With B4622B upgrade license -

- DDR1/2/3/4
- LPDDR1/2/3

**License Error** - If you have only the B4622A license and you try to select DDR4 or LPDDR3 as the DDR memory type in the DDR Post Process Compliance tool, the following error messages are displayed.

DDR Post Process Compliance Tool DDR Device 1									
File View Tools Help									
🗋 🚔									
Set Up	Select Te	ests Configure Run Tes	sts Results Html Report						
	, −Module S Select a D	· ·	F52502	Refresh					
			DDR4	×					
	Chip Sel		d with the B4622B license. lent Technologies sales repre :2B license	sentative for more					
				ОК					

To get DDR4 and LPDDR3 support, you must purchase the B4622B license.

4 From the **Data Options** section, select whether or not you want the tool to automatically acquire new data when compliance tests are run. Whether you plan to run tests once or multiple times, the selection of this checkbox instructs the tool to first run the logic analyzer for data acquisition. When the data acquisition run is complete, the tool starts post processing the newly acquired data by running the selected tests. If you plan to run the tests multiple times or forever, then you must select this checkbox to ensure that the tool runs the logic analyzer repetitively for data acquisition and then acquires the new data automatically for post processing.

Deselecting this checkbox instructs the tool to use the already acquired data for post processing. The tool does not run the logic analyzer for data acquisition in this case. Therefore, when you deselect this checkbox, you can run the tests only once on existing data.

5 (optional) Describe the test for future reference. The specified User Comments will appear on the HTML report which is generated for the test.

DDR F	Post Process Compliance Tool	DDR Device 1 *		_ 🗆 🗙
File View	v Tools Help			
🗅 😅				
Set Up	Select Tests Configure Run Te	sts   Results   Html Report		
	Module Selection			
	Select a DDR module to analyze	LPDDR2 (8-bit)	Refresh	
	Select the DDR memory type	LPDDR3		
3				
	Chip Select 0 CKE0	Chip Select 4 CKE0	) 🗾	
	Chip Select 1 CKE0	Chip Select 5 CKE0		
	Chip Select 2 CKE0	🔽 🛛 🗖 Chip Select 6 🛛 🤇 🤇 🤆		
	Chip Select 3 CKE0	Chip Select 7 CKE0		
-	Data Options	c Analyzer data when running test	:5,	
User C	omments			
I				
		T		
🖌 1 Test	<ul> <li>Follow instructions to describe y</li> </ul>	our test environment Connect	tion: UNKNOWN	11.

Next · "Selecting Tests" on page 35

### 5 Setting Up the Test Environment

DDR Post Process Compliance Tool User Guide

# 6 Selecting Tests

DDR Post Process Compliance Tool DDR Device 1 *									
e View Tools Help									
😂 🖶 🖬 🔎 🏹 🗀 🧐 💿									
Set Up Select Tests Configure Run Tests Results Html Report									
🖃 🗖 🔘 All DDR Tests (Note: tests are bank-specific unless stated otherwise)									
- C ACTIVATE to PRECHARGE must be >= tRASmin									
— O ACTIVATE to READ/WRITE must be >= tRCD									
C READ to WRITE must be >= tDRW									
WRITE to PRECHARGE must be >= tDWP									
<ul> <li>WRITE to READ must be &gt;= tDWR</li> <li>WRITE to WRITE, READ to READ must be &gt;= tCCD</li> <li>REFRESH to non-NOP/DES must be &gt;= tRFC</li> <li>ACTIVATE to ACTIVATE (different banks) must be &gt;= tRRD</li> </ul>									
					Four ACTIVATE window (different banks) must be >= tFAW				
					<ul> <li>ACTIVATE to ACTIVATE (same bank) must be &gt;= tRC</li> <li>REFRESH cmd to REFRESH cmd must be &lt;= tREFI * 9</li> </ul>				
Test: (None Selected)									
Description: (Select a Single Test) Limit Set: DDR2 400 444 2K									
A									
0 Tests Check the test(s) you would like to run Connection: UNKNOWN									

1 Click the **Select Tests** tab and then select the tests you want to run.

The tests displayed in this tab vary depending on the memory bus type that you selected in the Set Up tab and the type of software license installed for the B4622 toolset. (The DDR Post Process Compliance tool is a part of this toolset.)

There are two license versions available for B4622 - B4622A and B4622B. With B4622B, you get additional tests for each memory bus type as well as tests for DDR4 and LPDDR3 (which are not available with B4622A license). The following table lists the tests available for memory bus types with each of these two licenses.

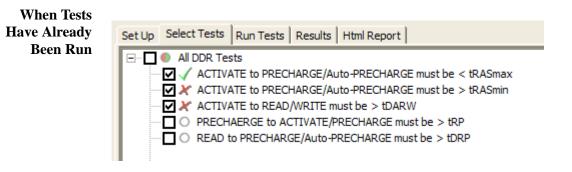
With B4622A license					
DDR1, 2, 3 tests	LPDDR, LPDDR2 tests	DDR4	LPDDR3		
		tests	tests		
<ul> <li>All DDR Tests (Note: tests are bank-specific unless stated othe</li> <li>ACTIVATE to PRECHARGE/Auto-PRECHARGE must be &lt;=</li> <li>ACTIVATE to PRECHARGE must be &gt;= tRASmin</li> <li>ACTIVATE to READ/WRITE must be &gt;= tRCD</li> <li>PRECHARGE to ACTIVATE must be &gt;= tRP</li> <li>READ to PRECHARGE must be &gt;= tRP</li> <li>READ to PRECHARGE must be &gt;= tDRW</li> <li>WRITE to PRECHARGE must be &gt;= tDWP</li> <li>WRITE to READ must be &gt;= tDWR</li> <li>WRITE to READ must be &gt;= tDWR</li> <li>WRITE to READ must be &gt;= tDWR</li> <li>WRITE to WRITE, READ to READ must be &gt;= tCCD</li> <li>REFRESH to non-NOP/DES must be &gt;= tRFC</li> <li>ACTIVATE to ACTIVATE (different banks) must be &gt;= tRA</li> <li>ACTIVATE to ACTIVATE (same bank) must be &gt;= tRC</li> <li>READ or WRITE to an inactive row</li> <li>REFRESH to an active bank</li> <li>ACTIVATE to an active bank</li> </ul>	ACTIVATE to PRECHARGE/Auto-PRECHARGE must be <= tRASma     ACTIVATE to PRECHARGE must be >= tRASmin     ACTIVATE to READ/WRITE must be >= tRCD     READ to PRECHARGE must be >= tRTP     READ to WRITE must be >= tDRW     WRITE to PRECHARGE must be >= tDWP     WRITE to PRECHARGE must be >= tDWP     WRITE to READ must be >= tDWR     WRITE to READ must be >= tDWR     ACTIVATE to ACTIVATE (different banks) must be >= tRD     ACTIVATE to ACTIVATE (same bank) must be >= tRC     ACTIVATE to ACTIVATE (same bank) must be >= tRC	Not available	Not available		

With B4622B license						
DDR1, 2 tests	DDR3 tests	DDR4 tests				
<ul> <li>ACTIVATE to PRECHARGE/Auto-PRECHARGE must be &lt;= 1</li> <li>ACTIVATE to PRECHARGE must be &gt;= tRA5min</li> <li>ACTIVATE to READ/WRITE must be &gt;= tRCD</li> <li>PRECHARGE to ACTIVATE must be &gt;= tRP</li> <li>READ to PRECHARGE must be &gt;= tDRW</li> <li>WRITE to READ must be &gt;= tDRW</li> <li>WRITE to READ must be &gt;= tDWR</li> <li>WRITE to ACTIVATE (afferent banks) must be &gt;= tRC1</li> <li>Four ACTIVATE window (different banks) must be &gt;= tFAY</li> <li>ACTIVATE to ACTIVATE (same bank) must be &gt;= tRC</li> <li>REFRESH mud to REFRESH cmd must be &lt;= tREFI * 9</li> <li>Mode Register Set command to Mode Register Set comman</li> <li>READ or WRITE to an active bank</li> <li>ACTIVATE to an active bank</li> </ul>		<ul> <li>ACTIVATE to PRECHARGE/Auto-PRECHARGE must bioget a command by the set of th</li></ul>				

LPDDR tests	LPDDR2 tests	LPDDR3 tests
ACTIVATE to PRECHARGE/Auto-PRECHARGE must be <=     ACTIVATE to PRECHARGE must be >= tRASmin     ACTIVATE to READ/WRITE must be >= tRCD     PRECHARGE to ACTIVATE must be >= tRP     READ to PRECHARGE must be >= tDRW     WRITE to PRECHARGE must be >= tDWP     WRITE to PRECHARGE must be >= tDWP     WRITE to READ must be >= tDWR     WRITE to WRITE, READ to READ must be >= tCCD     REFRESH to non-NOP/DES must be >= tRFC     ACTIVATE to ACTIVATE (different banks) must be >= tR	eu       All DDR Tests (Note: tests are bank-specific unless stated oth         t:	<ul> <li>ACTIVATE to PRECHARGE/Auto-PRECHARGE must</li> <li>ACTIVATE to PRECHARGE must be &gt;= tRASmin</li> <li>ACTIVATE to READ/WRITE must be &gt;= tRCD</li> <li>READ to PRECHARGE must be &gt;= tRTP</li> <li>READ to VRITE must be &gt;= tDWR</li> <li>WRITE to PRECHARGE must be &gt;= tDWR</li> <li>WRITE to READ must be &gt;= tDWR</li> <li>WRITE to ACTIVATE (afferent banks) must be</li> <li>Four ACTIVATE to ACTIVATE (afferent banks) must be</li> <li>ACTIVATE to ACTIVATE (same bank) must be &gt;= tOWR</li> <li>MRW Long Calibration command to any valid comm</li> <li>MRW Reset Calibration command to any valid commad</li> <li>MRW Reset Calibration command to any valid commad</li> <li>MRW command to any valid commad (or CKE low)</li> <li>PRECHARGE (all banks) to ACTIVATE must be &gt;=</li> <li>Duration of Self-refresh &gt;= tCKEs</li> <li>Duration of deep power down &gt;= tDPD</li> <li>Exit self-refresh to valid command &gt;= tXSR</li> <li>Exit power down to valid command &gt;= tXSR</li> <li>Exit power down to valid command &gt;= tXSR</li> <li>ACTIVATE to an inactive row</li> <li>REARSH to an active bank</li> <li>Refresh tests</li> <li>Greater than 8 REFRESH all bank commands in</li> <li>Refresh tests</li> <li>Refresh tests</li> </ul>

Some things to consider while selecting tests:

- Some tests might not make sense for your system. Do not select those tests.
- Checking a parent node/group will check all available sub-groups/tests.
- Unchecking a parent node/group will uncheck all sub-groups/tests.
- A parent node is checked if all subgroups are checked.
- A parent node is unchecked if ANY subgroup is unchecked.



#### **6** Selecting Tests

The marks have the following meanings:

4	The test passed.
×	The test failed.
0	The test has not been run, or no tests in the group have been run.
0	The test is currently running.
•	Some tests in the group have run and passed.
۲	Some tests in the group have run and failed.
•	Some tests in the group have passed and some have failed; not all of the tests have been run.
•	Some tests in the group have passed and some have failed; all of the tests have run.
•	All tests in the group have run and passed.
•	All tests in the group have run and failed.

- See Also · "To set the test limits" on page 20 (for information on how to calculate the limits)
  - "About the Tool" on page 11 (for an overview of the tests performed)
  - Next · "Configuring Tests" on page 19

DDR Post Process Compliance Tool User Guide

# 7 Running Tests

You can use the Run Tests tab to specify how the tests should be run and then run the tests as per these settings.

You can run the tests once or repetitively.

DDR Post Process Compliance Tool DDR Device 1 *	_ 🗆 🗵
ile View Tools Help	
) 🚅 🖬   🖆 🔎 🎜 🖛	
Set Up   Select Tests   Configure Run Tests   Results   Html Report	
18 tests selected to run.	22. 
Store Mode During run, store details for Worst 💌 trials (up to 25)	
Run Until Run tests N Times Number of runs: 7 🚊 🔽 Pause	
🔽 Send email Configure 🔽 On event Stop	
Fail	
Store: details for up to 25 worst trials (margin)     Run tests:     up to 7 times (pause at start of each run)     OR     until event detected     Repetition configuration:     N Times: Specify N using the 'Number of runs' control. Pause in between runs using the	Run
18 Tests Configure options for the tests you checked Connection: UNKNOWN	

#### To run the selected tests

- 1 Click the **Run Tests** tab.
- 2 Configure the settings for running the tests.
  - **a** From the **Store Mode** section, select which trial results from the test run(s) you want to store. You can store results for a maximum of 25 trials.
  - **b** From the **Run Until** section, select the number of times you want to run the tests. Following options are available:
    - Once The tests are run once.
    - **N Times-** The tests are run repetitively for the number of times specified in the **Number of Runs** field.
    - Forever- The tests are run repetitively until you press the Stop button.

If you select N Times or Forever, make sure you select the **Automatically** acquire new logic analyzer data when running tests checkbox in the Set up tab.

- c On selecting the **N Times** option, the **Pause** checkbox is displayed. Select this checkbox to instruct the tool to pause the test run after the completion of each run in the repetitive run.
- **d** Select the **Send email** checkbox to instruct the tool to send a notification email with the information about the test run when the test run completes or pauses. You can specify the email address to which email should be sent by clicking the Configure button displayed when this checkbox is selected.
- e Select the **On Event** checkbox to instruct the tool to perform a specified action when the specified event is detected in the test run. On selecting this checkbox, a listbox is displayed with this checkbox. From this listbox, you can select either Pause or Stop to pause or stop the test run when the selected event is detected during a test run.
- f When you select Event in the Store Mode section or select the On Event checkbox, the Event listbox is displayed to allow you to select the event. When the selected event occurs in the test run, the specified action is performed if the On Event checkbox is selected or the details for the event are stored if the Store Mode is set to Event. You can select from the following events:
  - **Pass** Perform the event action or store the event details when a test passes.
  - Fail Perform the event action or store the event details when a test fails.
  - **Margin** < **N** Perform the event action or store the event details when a test result margin is less than the specified minimum required margin percentage.

At times, you may receive warning messages when the selected event does not logically matches with the selected Store Mode. For instance, if the Store Mode is Best, then you can only use Pass as the event. Similarly, if the store mode is Worst, you cannot use Pass as the event. The tool automatically corrects the event selection in such cases.

While you select the test configurations, the tool automatically keeps documenting the test configurations for your reference in the open listbox in this tab.

- 3 Run the tests. There are several ways to run the selected tests:
  - Click  $\mathbb{M}$  in the toolbar. to run all the selected tests.
  - Select a branch in the Select Tests tab and then click <a>[1]</a> in the toolbar to run only the tests of the selected branch.
  - Click the big **Run** button in the Run Tests tab.
- 4 If there are existing test results, you are asked if you would like to keep them or re-test (delete) them.

If you would like to keep the existing test results to compare against new results, select **Append New ''Trial'' Results**.

Select **Replace the Existing Results** if you would like to delete the existing test results.

	Existing Results for Selected Tests	
ſ	Test Results already exist for the following tests: Existing Results for Selected Tests	
	Test Name	
	✓ ACTIVATE to PRECHARGE/Auto-PRECHARGE must be < tRASmax ★ ACTIVATE to PRECHARGE/Auto-PRECHARGE must be > tRASmin	
	C Replace the Existing Results	
	Append New "Trial" Results	
[	Cancel	Continue

- 5 While the tests are running, status dialogs appear to inform you about the test progress.
- 6 When the tests are complete, click **OK**.



- See Also · "To set the display preferences" on page 42
  - Next · "Viewing Results" on page 43

## To set the display preferences

Information, warning, and error conditions can occur while running tests. The display preferences let you choose whether message dialogs are shown. And, there are other display preferences that affect what happens as tests are run.

- 1 From the DDR Post Process Compliance tool's menu, choose View>Preferences....
- 2 In the Preferences dialog, select the **Display** tab.

Preferences
Display Remote Report Save/Load
Message Dialogs
✓ Show information dialogs
Show warning dialogs
Show error dialogs
<ul> <li>Invert scope display for screen shots (Won't invert if scope's ColorGrade is enabled)</li> <li>✓ Keep application on top (Mid-run dialogs are always on top)</li> <li>Log events (for use with Agilent Support)</li> <li>✓ Show tooltips</li> </ul>
OK Cancel Apply

- 3 In the Display tab, you can choose to show the following types of message dialogs:
  - Information dialogs.
  - Warning dialogs.
  - Error dialogs.

# **NOTE** Messages that require you to make a choice, such as "OK/Cancel" and "Yes/No" are always enabled.

- 4 Also, you can choose to:
  - **Invert scope display** (Not used) Use a white background when the application captures the screen shots.
  - Keep application on top Always keep the application's main dialog on the top of the logic analyzer application. Note that the mid-run dialogs are always displayed on the top.
  - **Log events** Use this option only when directed to by Keysight Support (Note that this option degrades the runtime performance).
  - **Show tooltips** By enabling this option, the tooltips appear as you move the pointer over various controls in the application.
- 5 Click Apply to save the changes and click **OK** to close the Preferences dialog.

DDR Post Process Compliance Tool User Guide

# 8 Viewing Results

1 Click 🔳 in the toolbar, or click the **Results** tab.

DDR Post Process C	Compliance Tool - DDR Device	1*			
File View Tools Help					
	F   🗙 🕼				
Set Up Select Tests Ru	n Tests Results Html Report				1
Test Name		Actual Val	Margin	Spec Range	<u>^</u>
ACTIVATE to PRECHA	RGE must be < tRASmax	49.2µs	29.9%	VALUE < 70.2µs	
ACTIVATE to PRECHA	RGE must be > tRASmin	36.0ns	-4.0%	VALUE > 37.5ns	
X ACTIVATE to READ/W	RITE must be > tDARW 🕏	13.5ns	-10.0%	VALUE > 15.0ns	
PRECHAERGE to ACTI	VATE/PRECHARGE must be > tRP	49.1513µs	327,575.3%	VALUE > 15.0ns	
READ to PRECHARGE/	Auto-PRECHARGE must be > tDRP	49.1513µs	491,413.0%	VALUE > 10.0ns	~
Details: ACTIVATE to F	PRECHARGE must be > tRASmin				
Parameter	Value				<u> </u>
Test Limits	> 37.5ns				
	tRASmin 36.0ns				
Referenced Values:	557615				
Number of tests	9				
Number of failures	2				
Average failure	8.000000e-009				
State	Failure				
✓ 10 Tests 10 results sho	own. [Html Report] tab shows details	Con	nection: UNKNC	WN	

The Results tab contains three resizable panes for test results information. If you select one of the tests in the top pane, details and reference images (if any) are shown in the lower panes.

TIP

A quick way to reset all configuration options and delete all test results is to create a new project (see page 53). The new project will have default configuration options.

For each individual test that you selected to run, the tool reports the total number of failures that occurred for that specific test. It can show up to a maximum of 250 failures in the Details screen for an individual test.

Each limit is measured as the time between two states. Each logic analyzer state has a number and a timestamp. In case of a failure, the numbers of the two states will be reported. Note that the time stamps are only as good as the time stamp resolution of the logic analyzer card being used (this resolution may be as coarse as 2ns; see the Specifications and Characteristics in the logic analyzer's online help for details).

#### **8** Viewing Results

If a test case is not encountered in the logic analyzer trace:

- In the details for the test, the number of tests will be 0.
- For limit tests, the "Actual Value" column will display "N/A."
- For pass/fail tests, the "Actual Value" column will display "Pass."

See Also · "To change margin thresholds" on page 45

Next · "Viewing/Exporting/Printing the Report" on page 47

## To change margin thresholds

1 From the DDR Post Process Compliance tool's menu, choose View>Preferences....

Or, when viewing the Results tab, click  $\mathbb{R}$  in the toolbar.

2 In the Preferences dialog, select the **Report** tab.

Preferences
Display Remote Report Save/Load
Margin Reporting
Enable Margin Highlighting
Warn at (%):         Onliced at (%)           2.0         •         0.0         •
Trial display Show details for up to 24 📩 worst trial(s)
Order trial details: C Chronologically
<ul> <li>Worst first</li> </ul>
Show images for up to 24 worst trial(s)
OK Cancel Apply

- 3 In the Margin Reporting area, you can:
  - Enable or disable margin highlighting.
  - You can change the percent of margin at which to give warnings or critical failures.
- 4 Click **OK** to close the Preferences dialog.

NOTE

The DDR Post Process Compliance tool runs the tests one time, so the Trial display options do not apply.

### Viewing Results

DDR Post Process Compliance Tool User Guide

9 Viewing/Exporting/Printing the Report

• To view the HTML test report, click the Html Report tab.

DDR Post Process Compliance Tool - DDR Device 1*
ile View Tools Help
Set Up   Select Tests   Run Tests   Results   Html Report
ACTIVATE to READ/WRITE must be > tDARW Reference: (EDEC 70.25 contine 3.5. (EDEC 70.25 contine 10.3)
Reference: JEDEC 79-2E section 3.5, JEDEC 79-3C section 12.3 Test Summary: FAIL Test Description:
Test Limits: > 15.0ns tNARW 13.5ns
Result Details           Number of tests         31         Number of failures         10         Average failure         4.354839e-009         State         Failure
State 17466 13ns (18 cycles) State 17546 13ns (18 cycles)
State 17626         13ns (18 cycles)         State 17706         13ns (18 cycles)         State 17786         13ns (18 cycles)
State 17866         13ns (18 cycles)         State 17946         13ns (18 cycles)         State 18158         13ns (18 cycles)
State 18346         13ns (18 cycles)         State 18534         13ns (18 cycles)
✓ PRECHAERGE to ACTIVATE/PRECHARGE must be > tRP
Reference: part manufacturer's data sheet
Test Summary: Pass Test Description:
Test Limits: > 15.0ns tRP 49.1513µs
10 Tests View/Save/Print detailed HTML results.     Connection: UNKNOWN

See Also • "Viewing/Exporting/Printing the Report" on page 47

- "To export the report" on page 48
- "To print the report" on page 50
- Next · "Saving Test Projects" on page 51

## To export the report

1 From the DDR Post Process Compliance tool's menu, choose **File>Export Results>** from the menu.

There are two options for exporting the HTML test report: CSV or HTML.

Select the CSV option to export the results as a comma-separated list of values.

To export results in CSV (comma-separat ed values) format

	DR P	ost Pr	ocess	s Complian
File	View	Tools	Help	
	ew Proj pen Pro	ject oject		i 🗆 🖻
	ave Pro ave Pro	ject ject As.	,	Run Tests R E to PRE
E	xport R	esults	×	CSV
P	rint			HTML 🎾

Save File As		
File name:	[test 1]	
Location:	C:\Documents and Settings\pg5712\My Documents\Agilent Technologies\Lo	Browse
	d at C:\Documents and Settings\pg5712\My Documents\Agilent Technologies\l  Apps\DDRApps\DDRValidationTool\test1.csv	Logic
	ОК	Cancel

The data format is shown in the first line of the exported \*.csv file.

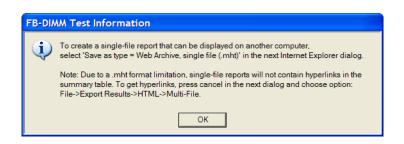
Test ID, Test Name, Measured Item, Trial 1 Value 100,"ACTIVATE to PRECHARGE/Auto-PRECHARGE must be < tRASmax",Number of t ests ,"9" 100,"ACTIVATE to PRECHARGE/Auto-PRECHARGE must be < tRASmax",Number of f ailures ,"0" 100,"ACTIVATE to PRECHARGE/Auto-PRECHARGE must be < tRASmax",Actual Valu e,"4.92E-05" 100,"ACTIVATE to PRECHARGE/Auto-PRECHARGE must be < tRASmax",Margin,"29. 9"

To export the report in HTML format

DDR Post Proces	s Compliance Tool - DDR
File View Tools Help	
New Project Open Project	: F   🖪 🥔
Save Project Save Project As	Run Tests Results Html Repo
Export Results 🔹 🕨	CSV
Print Page Setup	HTML → Single-File .5ns tRA Multi-File

There are two options for exporting HTML format test reports:

• **Single-File** — To save a single-file report, use the "save as" type "Web Archive, single file (.mht)".



#### NOTE

Single-file reports will not contain hyperlinks in the summary table (due to a .mht format limitation). If you want these hyperlinks, use the multi-file format.

• **Multi-File** — If your report is large and you would like to use links within the report, select the **HTML>Multi-File** option. Selecting the multi-file option exports the results as a set of separate image and HTML files. It creates a folder with the specified name that may be copied to any computer.

To view the exported report, open the HTML file stored in the folder.

**9** Viewing/Exporting/Printing the Report

## To print the report

- To preview the HTML test report printout, click 💁 or choose **File>Print Preview...** from the menu.
- To print the HTML test report, click  $\underline{\textcircled{B}}$  or choose **File>Print...** from the menu.

DDR Post Process Compliance Tool User Guide

# 10 Saving Test Projects

To save test settings and results to the current project directory:

1 Choose File>Save Project from the menu.

To save test settings and results to a new project directory:

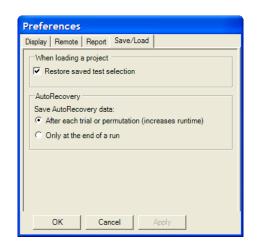
- 1 Choose File>Save Project As... from the menu.
- 2 In the Save Project As... dialog, enter the device name and location.

Project files will be saved in a directory whose name is the device name.

- 3 Click OK.
- See Also · "To set AutoRecovery preferences" on page 52

## To set AutoRecovery preferences

- 1 From the DDR Post Process Compliance tool's menu, choose View>Preferences....
- 2 In the Preferences dialog, select the Save/Load tab.



- 3 In the AutoRecovery area, you can choose:
  - To auto-save results after each trial or permutation even if the entire multi-trial is not completed. This option enables full recovery.
  - To auto-save results only upon the completion of the entire multi-trial.
- 4 Click Apply to save the changes and click **OK** to close the Preferences dialog.

# 11 Creating or Opening a Test Project

To create a new test project:

1 Choose File>New Project... from the menu.

A new, empty project, with all the default settings is created.

To open an existing test project:

- 1 Choose File>Open Project... from the menu.
- 2 In the Open dialog, browse to a test project directory and select the desired ".proj" file.
- 3 Click Open.
- See Also · "To set load preferences" on page 54
  - Next · "Setting Up the Test Environment" on page 31

#### 11 Creating or Opening a Test Project

## To set load preferences

- 1 From the DDR Post Process Compliance tool's menu, choose View>Preferences....
- 2 In the Preferences dialog, select the Save/Load tab.

<u> </u>	e <b>ferer</b> play   Re		Report	Save/Loa	ad				
	When los			election					
	AutoRec Save Aut		erv data						
		each tri	al or per	mutation (	incre	eases	runtim	ie)	
	After	each tri	al or per	mutation (	incre	ases	runtim	e)	
	After	each tri	al or per	mutation (	incre	ases	runtim	e)	

- **3** In the Save/Load tab, you can choose to restore saved test selections when loading a project.
- 4 Click Apply to save the changes and click **OK** to close the Preferences dialog.

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