

Agilent N5413B DDR2(+LP) Compliance Test Application Software Release Notes

Agilent N5413B Software Version 01.16

Released Date: 06 May 2014

Minimum Infiniium Oscilloscope Baseline Version: 3.11 (90000 series OR 9000 series), 4.60.0018 (DDR Debug Tool feature)

File Name: SetupInfLPDDR201160000.exe

Note:

- This will be the last version to support Infiniium Oscilloscope Baseline Version 4.20.

Agilent N5413B Software Version 01.15

Released Date: 07 March 2014

Minimum Infiniium Oscilloscope Baseline Version: 3.11 (90000 series OR 9000 series), 4.60.0018 (DDR Debug Tool feature)

File Name: SetupInfLPDDR201150000.exe

Additions:

- The 10 new test that had been added are tDQCKDS, tDQCKDM, tDS(Vref based), tDH(Vref based), tISCKE, tIHCKE, tISCKEb, tIHCKEb, tIPW and VIHCKE/VILCKE for LPDDR2.
- Added new test is tIPW for DDR2.
- Show RL and WL option.
- End User License Agreement is added for security purpose.
- Addition of new DDR Debug Tool feature.
- Addition of waveform files type support (HDF5|.h5) while running the test.

Bug Fixes:

- Solved Automation issue where the DDR2DataRate config is not updated even though selection on GUI changed.
- Solved Eye Diagram Test issue where Accumulated Eye Diagram cleared after Interpolation feature is ON.
- Solved missing linkage with BurstEnvelopeThreshold value.
- Solved the connection diagram prompt between two tests in the same tests group.
- Solved slew rate unit.



Modifications:

- Update LPDDR2 Mask File.
- Update the revision section and revision for all the tests.

Agilent N5413B Software Version 01.14

Released Date: 22 July 2013

Minimum Infiniium Oscilloscope Baseline Version: 3.11 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201140000.exe

Modifications:

- Support for MSOX90000.

Agilent N5413B Software Version 01.13

Released Date: 27 July 2012

Minimum Infiniium Oscilloscope Baseline Version: 3.11 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201130000.exe

Additions:

- Added new "Threshold Setting" configuration wizard in the Setup tab of the application.
- Prompt user if the custom derating table file isn't exist while loading project file.
- Added additional reporting of "Number Of Measurement" item for all tests.

Bug Fixes:

- Application not able to load project file which have result that contain table.
- AUTOMATION tab issue which not successfully perform command of *SetConfig TestMode 'Custom'*.
- Reporting issue of Voh(ac), Voh(dc), Vol(ac), Vol(dc), Vih/Vil for Command/Address, VihDiff/VilDiff For Clock while loading wrong waveform for reporting image.
- Both reporting marker channels are function 1 for tAC, tDQSCK and tQHS tests.
- Solve DDR2 Differential input tests configuration loading issue.

Modifications:

- Update tIS and tIH definition due to LPDDR2 specification which mention should refer to rising or falling for PUT is Command Address.



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- Report bogus value whether +99E36 or -99E36 which one could give fail status on the test in case of unable to perform measurement.
- Due to the application model re-structuring, the entire legacy saved project will be loaded as READ-ONLY for viewing purposes. User will not be able to append new test results to the legacy saved projects as the number of reported items for each of the tests may have changed.

Agilent N5413B Software Version 01.12

Released Date: 29 November 2011

Minimum Infiniium Oscilloscope Baseline Version: 3.11 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201120000.exe

Additions:

- Support Infiniium Baseline Version 3.21.
- Add signal requirement checking for Timing tests in Rank Separation case.

Bug Fixes:

- Solve runtime error of waveform memory loading.

Agilent N5413B Software Version 01.11

Released Date: 5 October 2011

Minimum Infiniium Oscilloscope Baseline Version: 3.11 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201110000.exe

Additions:

- Added multi-burst support feature for Electrical Tests.
- Enabled the Precision Probe setting of the oscilloscope.
- Support Window 7 based oscilloscope.

Modifications:

- Locate the InfiniiSim setting entry on menu Tool>Infiniium>InfiniiSim.
- Allow all tests to be run if there is no SDA license except Eye Diagram tests.

Bug Fixes:

- Solve the issue of finding the worst value in clock test.



Agilent N5413B Software Version 01.10

Released Date: 20 May 2011

Minimum Infiniium Oscilloscope Baseline Version: 2.10 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201100000.exe

Additions:

- Added derating feature support. 10 new tests that support this feature are added; tDS(derate) for Data, tDH(derate) for Data, tDS(derate) for Data Mask, tDH(derate) for Data Mask, tDS1(derate) for Data, tDH1(derate) for Data, tDS1(derate) for Data Mask, tDH1(derate) for Data Mask, tIS(derate) and tIH(derate).
- Added multi-burst support feature for Timing Tests.

Modifications:

- Replaced “tDS(base)” with “tDS(base) for Data” and “tDS(base) for Data Mask”.
- Replaced “tDH(base)” with “tDH(base) for Data” and “tDH(base) for Data Mask”.
- Replaced “tDS1(base)” with “tDS1(base) for Data” and “tDS1(base) for Data Mask”.
- Replaced “tDH1(base)” with “tDH1(base) for Data” and “tDH1(base) for Data Mask”.
- “tVAC” and “tDVAC” tests have been updated as Information-Only tests where the test result is not compared to any test limit.

Bug Fixes:

- Updated the test limit of all tDS and tDH test of LPDDR2 by using tDS(base) and tDH(base) limit (from Table 108 – Data Setup and Hold Base-Values, JESD209-2B) instead of using limit of tDS and tDH of Vref based(from Table 103 – LPDDR2 AC Timing Table, JESD209-2B).
- Updated the test limit of all tIS and tIH test of LPDDR2 by using tIS(base) and tIH(base) limit (from Table 104 – CA and CS_n Setup and Hold Base-Values for 1V/ns, JESD209-2B) instead of using limit of tIS and tIH (from Table 103 – LPDDR2 AC Timing Table, JESD209-2B).



Agilent N5413B Software Version 01.02

Released Date: 4 October 2010

Minimum Infiniium Oscilloscope Baseline Version: 2.10 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201020000.exe

Additions:

- Supports the Infiniium DSO-X 90000 Series High Performance Oscilloscope.
- The application will now require Microsoft's .net framework 3.5 to be installed on the scope in order to run.

Modifications:

- Updated the histogram measurement method in order for the application to support DSO-X 90000 series.

Bug Fixes:

- Fixed the wrong unit issue on LPDDR2 Overshoot/Undershoot Area tests.
- Fixed the LPDDR2 VIHdq/VILdq tests issue where the valid sampling window calculation has been updated to refer to the LPDDR2 tDS/tDH compliance specifications.

Agilent N5413B Software Version 01.01

Released Date: 12 July 2010

Minimum Infiniium Oscilloscope Baseline Version: 2.10 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201010000.exe

Additions:

- Added new template of mask file for LPDDR2.
- Enable user to define threshold of burst for Read Write Separation.
- Enable Application to load legacy of DDR2 project file.
- Enable Application to support Read Write Separation for Read and Write burst that have obvious different amplitude. For example, Read burst amplitude is much smaller than Write burst amplitude.
- Solve measurement issue of Vih(dc) and Vil(dc) where previously this test not perform measurement correctly if PUT is DM.

Modifications:

- Take the worst case from multitrail measurement as test result for Vix, VIXCA, VIXDQ and Vox test.



Agilent N5413B Software Version 01.00

Released Date: 21 May 2010

Minimum Infiniium Oscilloscope Baseline Version: 2.10 (90000 series OR 9000 series)

File Name: SetupInfLPDDR201000000.exe

Additions:

- Added new test for Low Power DDR2 (LPDDR2) such as SRQseR, SRQseF, VOH(AC), VOH(DC), VOL(AC), VOL(DC), VSEH(AC), VSEL(AC), tVAC, tDVAC, tQHS, tQSH, TQSL, tDIPW and tQHP.

Agilent N5413A Software Version 02.52

Released Date: 04 May 2010

Minimum Infiniium Oscilloscope Baseline Version: 5.71.00 (80000 series), 2.10 (90000 series OR 9000 series)

File Name: SetupInfDDR20252.exe

Modifications:

- Modified the software to load project that was saved in debug mode.
- Modified Undershoot test to return invalid value rather than throwing error messages when the test fail to measure undershoot.
- Modified tHZ, tRPST and tWPST tests to make better measurement when the signal is oscillating at the end of the burst.
- Modified Vox and Vix tests to correctly put the markers at the crossings.
- Modified Vid test not to fix channels to be used.

Miscellaneous Notes:

- This version still supports 80000 series oscilloscope.

Agilent N5413A Software Version 02.51

Released Date: 05 Apr 2010

Minimum Infiniium Oscilloscope Baseline Version: 5.71.00 (80000 series), 2.01 (90000 series OR 9000 series)

File Name: SetupInfDDR20251.exe

Additions:

- Added Read/Write Separation Threshold in the configuration. User can choose auto or manual threshold for read/write separation. Default as auto.



Miscellaneous Notes:

- This will be the last version to support the 80000 series oscilloscope. Following releases will only support 90000 series oscilloscope.

Agilent N5413A Software Version 02.50

Released Date: 22 February 2010

Minimum Infiniium Oscilloscope Baseline Version: 5.71.00 (80000 series), 2.01 (90000 series OR 9000 series)

File Name: SetupInfDDR20250.exe

Modifications:

- Increased test execution speed for Clock Timing, Data Strobe Timing and Data Mask Timing by testing all parameters on the same burst.
- Labeled all signal in the screenshot for Clock Timing, Data Strobe Timing and Data Mask Timing tests.

Agilent N5413A Software Version 02.42

Released Date: 17 November 2009

Minimum Infiniium Oscilloscope Baseline Version: 5.71.00 (80000 series), 2.01 (90000 series OR 9000 series)

File Name: SetupInfDDR20242.exe

Modifications:

- Enhanced the Overshoot/ Undershoot tests to handle the signal that occasionally fluctuate or exceed adjusted vertical range.
- Enhanced the tQH test to perform measurement on all DQ transition which associates with both rising and falling strobe transition.
- Enhanced to support multilevel signal (signal that have different amplitude among burst).

Agilent N5413A Software Version 02.41

Released Date: 22 June 2009

Minimum Infiniium Oscilloscope Baseline Version: 5.71.00 (80000 series), 1.41 (90000 series), 2.00 (9000 series)

File Name: SetupInfDDR20241.exe

Additions:

- Enabled the application to handle Read only or Write only test signal.
- Enabled the InfiniiSim de-embedding function setting of the oscilloscope.



- Added screenshot for clock test tCK(avg).
- Used oscilloscope's highest available sampling rate for all the tests.

Modifications:

- Updated the Vih(ac) test for DQ and DM signals to take the voltage level of test signal at tDS (DM and DQ input setup time in JEDEC specification) before the DQS midpoint for the high level voltage as the test result.
- Updated the Vil(ac) test for DQ and DM signal to take the voltage level of test signal at tDS (DM and DQ input setup time in JEDEC specification) before the DQS midpoint for the low level voltage as the test result.
- Updated the Vih(dc) test for DQ and DM signal to take the minimum of the histogram of the high level voltage value of the test signal within tDS (DM and DQ input setup time in JEDEC specification) before the DQS midpoint to tDH (DM and DQ input hold time in JEDEC specification) after DQS midpoint as the test result.
- Updated the Vil(dc) test for DQ and DM signal to take the maximum of histogram of the low level voltage value of the test signal within tDS (DM and DQ input setup time in JEDEC specification) before DQS midpoint to tDH (DM and DQ input hold time in JEDEC specification) after DQS midpoint as the test result.
- Updated the Overshoot Test to compare the maximum voltage of all acquired waveform at 10,000UI length with VDD/VDDQ.
- Updated the Undershoot test to compare the minimum voltage of all acquired waveform at 10,000UI length with VSS/VSSQ.

Agilent N5413A Software Version 02.40

Released Date: 06 March 2009

Minimum Infiniium Oscilloscope Baseline Version: 5.60.00 (80000 series), 1.31 (90000 series)

File Name: SetupInfDDR20240.exe

Additions:

- Enabled the User Define Limit (UDL) for all tests.
- Categorized the Overshoot and Undershoot tests into two groups: (address, control) and (clock, data, strobe, mask).
- Added "Skip Connection Diagram Prompt" configuration option. This option allows users to enable or disable all connection change prompts when running selected tests.
- Added "Skip Error Message" configuration option. This option allows users to enable or disable error message prompt when running selected tests.
- Added test support for DDR2-1066 tests under the compliance test mode. The reference document for this speed grade is the JESD208.



- The configuration options (in Configure tab) of the selected tests are shown in the test report.

Modifications:

- Renamed “Advanced Debug” test mode to “Custom” test mode.
- Test IDs have been updated for some tests due to the implementation of User Define Limit (UDL) feature.
- Removed all the “Optional” tests.
- Extended the maximum worst trial display and shown images from 25 trials to 64 trials.
- Removed the High/Low State Ringing tests from the Custom (former Advanced Debug) test mode.
- Updated the Vih(dc) test to use the histogram “mode” value as the test result.
- Updated the Vil(dc) test to use the histogram “mode” value as the test result.

Agilent N5413A Software Version 02.30

Released Date: 16 May 2008

Minimum Infiniium Oscilloscope Baseline Version: 5.20.00 (80000 series), 1.00 (90000 series)

File Name: SetupInfDDR20230.exe

Additions:

- Created another category for running characterization mode which is called Multi-trial mode.
- Added multi trial Vix test in M-Mode.
- Added multi trial for tDS and tDH (Differential)
- Added multi trial for tDQSQ
- Added multi trial for tIS and tIH
- Group all Debug mode config parameters.
- Added 3 news config param for M-Mode tests.
(A)Measurement (B)Time (C) Burst
- Adding in signal name for tIS and tIH tests.

Modifications:

- (Internal) Changes InfiniiScan % for Differential and Single-Ended InitScope function.
- Removed (differential) for tAC and tDQSCK
- Adding HOLDoff time of 200ns to Advance tests: tDQSQ, tDH,tDS,tIHIS to prevent certain signal unable to be triggered.



Agilent N5413A Software Version 02.21

Released Date: 05 February 2008

**Minimum Infiniium Oscilloscope Baseline Version: 5.20.00 (80000 series),
1.00 (90000 series)**

File Name: SetupInfDDR20221.exe

Additions:

- Added Individual threshold setting for the manual “threshold setting mode” specially designed for most embedded user.
- Added InfiniScan Min/Max setting in the configuration page.
- Added optional Infinite Persistence test for tDQSQ(Read-cycle test) and tDS/tDH(Write-cycle) tests. Infinite Persistence will measure setup and hold time of the respective signals and measure using histogram mode.
- Added configuration options for Single-Ended Signals (eg. DQS0,Gnd, /DQS0,Gnd) to provide more connection choices for users.
- Enhanced Eye-diagram analysis. Added configuration option under the Advance Debug Mode category – Read/Write Eye-diagram tests. The parameter name is “Total Unit Interval” with defaulted value to 10 UIs. Users are allowed to edit the parameter to any value > 0. *It is advisable to start with higher UI number and only reduce the UI if the signals are unable to obtain a nice Eye-Diagram due to specific signal behavior.
- Added tangent slew rate for the tDQSQ, tDS, tDH tests. Tangent slew rate and Nominal slew rate will be reported in the test results.
- Added derating table measurement for tDS and tDH tests based on the tangent and nominal slew rate. Unmatched slew rate will returned “N/A” in the result table.
- Added total measurement measured for the Timing Tests. This information will be available at test result’s report.



Agilent N5413A Software Version 02.20

Released Date: 11 January 2008

**Minimum Infiniium Oscilloscope Baseline Version: 5.20.00 (80000 series),
1.00 (90000 series)**

File Name: SetupInfDDR20220.exe

Additions:

- Supports the Infiniium 90000 Series High Performance Oscilloscope.
- Supports the Remote Programming Interface capability.
- Performance enhancement on all the Electrical and Timing tests.
- Added memory depth selection (in bits) for better eye-diagram tests.
- Enable running of all test without any connection prompt during the run in order to let the system run nightly.

Agilent N5413A Software Version 02.11

Released Date: 2 Oct 2007

Minimum Infiniium Oscilloscope Baseline Version: 05.20.00

File Name: SetupInfDDR20211.exe

Modifications:

- Changes made to address critical bugs which caused "Query Unterminated" while running the clock jitter test. It totally disabled this group of tests to run. This issue is fixed and currently all the clock jitter tests are able to complete the run.
- Changed terr(6-10per) Rising/Falling Edge Measurements specification from - 600ps - 600ps to -350ps – 350ps and terr(11-50per) Rising/Falling Edge Measurements specification from - 600ps – 600ps to -450ps – 450ps.

Agilent N5413A Software Version 02.10

Released Date: 23 Aug 2007

Minimum Infiniium Oscilloscope Baseline Version: 05.20.00

File Name: SetupInfDDR20210.exe

Additions:

- Added the Timing Tests that consists of Clock Timings, Data Strobe Timings, Data Mask Timing and Command and Address Timings. These tests are available under all test modes.



- Timing Tests are available under the Advance Debug Mode as well. Users may key in customized speed grade value. Test limit for the Advance debug mode will be based on the user defined speed grade value. For example, if the user defined the Speed grade as 430MT/s, then Specification limit of 533 will be used.
- Renamed Mhz to MT/s to avoid confusion.

Agilent N5413A Software Version 02.01

Released Date: 25 May 2007

Minimum Infiniium Oscilloscope Baseline Version: 05.10.00

File Name: SetupInfDDR20201.exe

Modifications:

- Changes made only impacts the Clock test. The affected tests are **tjit(CC) Rising Edge Measurement, 667Mhz, tjit(CC) Rising Edge Measurement, 800Mhz, tjit(CC) Falling Edge Measurements, 800Mhz**, where the results will return Infinite value such as 9999.9999...ms. This will only happen when the user installs new Software version 0.530. Some code has been fixed in Time Scale, in order to support the new Software version 0.530.
- With this patch (DDR2 2.01), this issue will not occur anymore in both, Software version 5.20 and 5.30.

Agilent N5413A Software Version 02.00

Released Date: 13 Dec 2006

Minimum Infiniium Oscilloscope Baseline Version: 05.10.00

File Name: SetupInfDDR20200.exe

Additions:

- Added the Advance Debug Test Mode that consists of Eye-diagram tests and High/Low state ringing tests. These tests are used by customers to perform the signal evaluations.
- Added the Electrical Tests(Single-Ended Tests & Differential Tests) under compliance test mode to cater for the DDR2-400 Mhz, DDR2-667Mhz and DDR2-800Mhz. Test limits are based on the DDR2-SDRAM specification: *JEDEC Standard No. 79-2C*.
- Added test limits checking for the Clock Tests based on the Intel DDR2 667/800 JEDEC Specification Addendum document. Clock Tests are only available under DDR2-667 and DDR2-800 speed grade for the compliance testing.



Modifications:

- Removed the Slew Rate (Rising Edge & Falling Edge) tests from the Clock Tests.

Agilent N5413A Software Version 01.12

Released Date: 18 Sept 2006

Minimum Infiniium Oscilloscope Baseline Version: 05.10.00

File Name: SetupInfDDR20112.exe

Additions:

- Initial released version of the Clock Tests.
- Used for the test characterization purpose. Compliance test limits were not available in the Intel DDR2 667/800 JEDEC Specification Addendum document during the release of this application version.

Modifications:

- Update to 1.0 specification
- 'Acquired cycles' count persists across appended runs. Previously, it used to reset across appended runs.
- Slew rate test markers are placed correctly at the thresholds where the measurement is made. Previously, the markers were not correctly placed.
- The results screen is updated immediately after the end of the run. Previously, it only updates after you click 'OK' at the end of the run.

Agilent N5413A Software Version 01.00

Released Date: 08 June 2005

Minimum Infiniium Oscilloscope Baseline Version: 04.02

File Name: SetupInfDDR20100.exe

Initial release.