N4917BSCB 400G Optical Receiver Test Application

This document contains the latest information on the Keysight N4917BSCB 400G Optical Receiver Test Application.

The N4917BSCB 400G Optical Receiver Test Application succeeds the earlier N4917BSCA 400G Optical Receiver Test Application with the difference that the N4917BSCB software has majorly transitioned to a new licensing model, in addition to the Enhancements listed in this document.

Related Document

For detailed information, refer to the following document for this application:

- "Keysight_N4917BSCB_UserGuide.pdf"

This document can be found at the following location after you install the application:
C:\Program Files\ Keysight\M8070B\Apps\N4917BSCB\help
The M8070B documents can be located by clicking *Start* > *All Programs* > *Keysight M8070B* > *Keysight M8070B Documentation*. Alternatively, you can also visit
www.keysight.com/find/m8070b to find the latest versions of M8070B document

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Installation Steps

To install the N4917BSCB 400G Optical Receiver Test Application, perform the following steps:

1. Review the System Requirements for this application.

2. Download the installer file from:
   http://www.keysight.com/find/N4917BSCB

3. Double-click the downloaded installer file on your PC.

4. Follow and respond to the installer's prompts.

5. Accept the terms of the Keysight Software End-User License Agreement and click Next.

6. Click Install.

7. Click Finish to finish the installation and exit the installation wizard.

8. Install the required licenses via the Keysight License Manager (if not done before). To know about the required licenses, refer to the Data Sheet.

Getting Started

To access the installed N4917BSCB application, perform the following steps:

1. From the **Start** menu of the Windows Operating System, select **All Programs** › **Keysight M8070B Applications** › **Launch Keysight N4917BSCB**.

2. If you are launching the Keysight N4917BSCB application for the first time, the End-User License Agreement window appears. Select **Agree** to continue.
   The N4917BSCB application banner is displayed.

3. If there is a single instance of the M8070B software running locally, the N4917BSCB application launches after automatically getting connected to the M8070B software.

4. If the N4917BSCB application does not detect any instance of the M8070B software running locally, the Connect to M8070 window appears.

5. When the application starts successfully, it will start with the default layout and will show the **Set Up** tab.

   For more information on how to use the various features in the N4917BSCB application, refer to the *Keysight N4917BSCB 400G Optical Receiver Test Application Online Help*.

Keysight N4917BSCB Software Version 3.6.0

Released Date:	August, 2025
Operating System:	Microsoft Windows 10 Microsoft Windows 11
Memory	8 GB RAM [minimum]
Display resolution:	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB LAN GPIB (optional)
Instrument Firmware	M8040A BERT - M8070B System Software. For the supported versions see the *Software Pre-requisites* row. DCA-M/DCA-X - FlexDCA version version A.07.61.12 or later 8164B LMS - Ver.V5.25 or later 8149xA Ref Tx - Ver.5.01 or later
BERT	M8070B system software 11.6.20.2 M8040A-BU2 mainframe with USB option M8045A-G32/**G64***/0G3/0G4/0P3/801 High Performance BERT module (driver v11.6.8.1) M8057A Remote head for M8045A pattern generator, 1 channel M8046A-A32/**0P3***/801 Analyzer module (driver v11.6.8.1) M8043A-A32/**A64***/0A3 Analyzer module (driver v4.5.6.2)
Signal Generator for Sinusoidal and Gaussian Noise Interference	M8195A-002/16G Arbitrary Waveform Generator driver v11.6.8.1) or M8196A-002 Arbitrary Waveform Generator (driver v11.6.8.1) or M8054A Interference Source, 32 GHz (driver v.4.4.1.0)
Lightwave Measurement System	8164B LMS Mainframe Tunable lasers N7779C Step-Tunable Laser Source, High Power and Low SSE, Basic Line or N7776C Tunable Laser 1240-1380 nm or N7778C Tunable Laser 1240-1380 nm or 81602A-013 Tunable Laser 1250-1370 nm or 81606A-113 Tunable Laser 1240-1380 nm or 81608A-113 Tunable Laser 1240-1380 nm or 81609A-113 Tunable Laser 1240-1380 nm Reference Transmitters 81490A-E05 Reference Transmitter or 81490A-E09 Reference Transmitter or

	81490A-E10 Reference Transmitter (multimode – for SR only)
	81491A-085* Reference Transmitter (multimode - for SR only)
	81491A-135 Reference Transmitter
	81492A-E01* Reference Transmitter
	81492A-135* Reference Transmitter (56GBaud)
	N7718C-E13 Reference Transmitter
	N7718C-313 Reference Transmitter
	81000FI Optical Connector Interface
	81000NI Optical Connector Interface
	Optical attenuators:
	N7752C 2-Channel Optical Attenuator and Power Meter or
	N7764C 4-Channel Optical Attenuator or
	81576A Attenuator module (straight SMF) or
	81577A Attenuator module (angled SMF) or
	N7761A external Attenuator (1 ch straight SMF) or
	N7762A external Attenuator (2 ch straight SMF) or
	N7764A external Attenuator (4 ch straight SMF)
	N7751A external Attenuator (1 ch with 2 optical power meter channels, SMF) or
	N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF)
	N7768C Four-Channel Multimode Optical Attenuator or
	N7766A Optical Attenuator for Multimode Fiber (2ch) or
	N7768A Optical Attenuator for Multimode Fiber (4ch)
DCA-X Oscilloscope	N1000A DCA-X Wide-Bandwidth mainframe
	N1000A-LOJ Low Jitter Timebase
	N1000A-PLK Pattern Lock Trigger Hardware
	N1000A-PTB Internal Precision Timebase
	N1030A/B Optical plug-in module
DCA-M Oscilloscope	N1092A one optical channel or
	N1092B two optical channels or
	N1092C one optical, two electrical channels or
	N1092D four optical channels or
	N1092E two optical, two electrical channels
	options LOJ/PLK/IRC/200/300/500
Clock Recovery	N1078A Optical/Electrical Clock Recovery
	N1077A-232/SMS/JSA Optical/Electrical Clock Recovery
	N1076A/B-Electrical Clock Recovery

Software Pre-requisites:	Keysight IO Library Version: 21.1.17.0 M8070B system software for M8000 series ver. 11.6.20.2 or later and M8070ADVB Advanced Measurement Package for M8000 series Version 1.13.220.14 N1010A FlexDCA Remote Access System A.07.61.12 with N1010100A R&D Package
Application Requirements:	Keysight M8070B System Software Version. For the required licenses, see User Guide. Keysight N4917BSCB 400G Optical Receiver Test Application. For the required licenses, see User Guide.
File Name:	SetupN4917BSCB_IEEE400GORSTApp_3.6.0.0.exe
License:	Please see the product data sheet on keysight.com

Note: the options highlighted **bold*** are required to address speed above 32Gbaud

New Features

- Added support for N7718C Reference transmitters.

- Added support for M8043A Error Analyzer.

- Introduced a new utility function to recall only BERT PG and SI settings without requiring a connection to the DCA and optical devices.

- Enabled stressed eye calibration without the use of an optical attenuator (OMA adjustment skipped)

- Added an option to inject a fixed amount of BUJ and RJ to the test signal before iSECQ tuning.

Fixed Issues

- DCI works only when an error detector module is detected.

- Calibration does not complete successfully when using GN only on M8054A or M8196A as interference source.

Known Issues

- When opening the application's user guide in the Acrobat Reader PDF Viewer from within the N4917BSCB application (Help → View Test Procedure), error pop-up messages have been observed in some cases. To view the PDF document in this case, please follow one of the following workarounds:

    o Open the PDF document directly from with the Acrobat Reader application either by browsing to the installation location "c:\Program Files\Keysight\M8070B\Apps\N4917BSCB\help\" or downloading the file from Keysight.com

o   Change the default file viewer program for PDF files in Windows to different software, e.g., Microsoft Edge.

- Saved projects files from previous versions (< 3.0.0) cannot be opened anymore due to the change of the application name. To re-enable opening these projects files, the tags "Application name" in the main project file (*.proj) and compliance file (compliance.lim) in the project directory must be modified manually and should read the actual application name (see application window or name in project file saved with latest version).

- Depending on the targeted standard and particular hardware configuration, a 6dB or 10dB RF attenuator might be required in the interference signal (SI + GN) path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: Set range clipped). See also note and figure 27 in N4917BSCB User Guide.

- During the installation of N4917BSCB Rev.3.0, a command window showing several "Access denied" messages might be visible. These messages are caused by internal installation processes and can be ignored and do not affect the installation success.

- The outer extinction ratio (OER) and outer optical modulation amplitude (OOMA) will be measured during the stress receiver signal calibration on the (TDECQ) filtered channel. Though the measurement results will mainly be the same as if measured on the unfiltered channel, this configuration might be changed in future release versions.

- The N4917BSCB software will automatically use a reduced SI and GN amplitude when using an 81492A reference transmitter or generating 53GBd PAM4 signals. This behavior can be disabled or configured using the following configuration variables:

o   SI attenuator (true/false), Gaussian Noise attenuator (true/false)
o   SI channel attenuation, GN channel attenuation available in "Debug Mode" under Configure (tab) -> Stress receiver signal calibration.

In case different attenuation values for SI and GN channel are used, the same configuration variables can also be used to shift the usable sinusoidal interferer to noise ratio ("SIGNRatio") to larger or smaller values.

Exemplary calculation:
SI attenuation: 10dB, GN attenuation: 10dB -> SI to GN range: –13dB .. +17dB
SI attenuation: 10dB, GN attenuation: off -> SI to GN range: –23dB .. +7dB
SI attenuation: off, GN attenuation: 10dB -> SI to GN range: –3dB .. +27dB

- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser ("Maximum TLS output Power" parameter in the Configure tab).

- When the Keysight N77xx Viewer software is connected via USB to a N77xx type attenuator which is also used by the N4917BSCB application, timeout errors might occur. To prevent these errors during ORST testing, disconnect the N77xx Viewer software from the attenuator.

- Stress signal calibration for 53GBd signals can only be carried out with SSPRQ pattern due to TDECQ stability reasons when using other shorter patterns (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

- Baudrates other than 26.5625 and 53.125 Gbd may not be supported when sinusoidal interference (SI) is injected in the stress signal

- GN calibration only (i.e. disabling SI generator) works only if the "channel 1" of the interference source is used for GN (for M8054A and M8196A)

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.

Keysight N4917BSCB Software Version 3.5.27

Released Date:	July 25, 2024
Operating System:	Microsoft Windows 10 Microsoft Windows 11
Memory	8 GB RAM [minimum]
Display resolution:	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB LAN GPIB (optional)
Instrument Firmware	M8040A BERT - M8070B System Software. For the supported versions see the *Software Pre-requisites* row. DCA-M/DCA-X - FlexDCA version A.07.50.258 or later 8164B LMS - Ver.V5.25 or later 8149xA Ref Tx - Ver.5.01 or later
BERT	M8040A-BU2 mainframe with USB option M8070A-0TP/ONP/1TP/1NP System Software. For the complete list of licenses for M8070B, see Chapter 2 of the User Guide. M8045A-G32/**G64***/0G3/0G4/0P3/801 High Performance BERT module M8057A Remote head for M8045A pattern generator, 1 channel M8046A-A32/**0P3***/801 Analyzer module
Signal Generator for Sinusoidal and Gaussian Noise Interference	M8195A-002/16G Arbitrary Waveform Generator or M8196A-002 Arbitrary Waveform Generator or M8054A Interference Source, 32 GHz
Lightwave Measurement System	8164B LMS Mainframe Tunable lasers N7779C Step-Tunable Laser Source, High Power and Low SSE, Basic Line or N7776C Tunable Laser 1240–1380 nm or N7778C Tunable Laser 1240–1380 nm or 81602A–013 Tunable Laser 1250–1370 nm or 81606A–113 Tunable Laser 1240–1380 nm or 81608A–113 Tunable Laser 1240–1380 nm or 81609A–113 Tunable Laser 1240–1380 nm Reference Transmitters 81490A–E05 Reference Transmitter or 81490A–E09 Reference Transmitter or 81490A–E10 Reference Transmitter (multimode – for SR only) **81491A–085*** Reference Transmitter (multimode - for SR only) 81491A–135 Reference Transmitter **81492A–E01*** Reference Transmitter

	81492A-135* Reference Transmitter (56GBaud)
	81000FI Optical Connector Interface 81000NI Optical Connector Interface
	Optical attenuators: N7752C 2-Channel Optical Attenuator and Power Meter or N7764C 4-Channel Optical Attenuator or 81576A Attenuator module (straight SMF) or 81577A Attenuator module (angled SMF) or N7761A external Attenuator (1 ch straight SMF) or N7762A external Attenuator (2 ch straight SMF) or N7764A external Attenuator (4 ch straight SMF) N7751A external Attenuator (1 ch with 2 optical power meter channels, SMF) or N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF) N7768C Four-Channel Multimode Optical Attenuator or N7766A Optical Attenuator for Multimode Fiber (2ch) or N7768A Optical Attenuator for Multimode Fiber (4ch)
DCA-X Oscilloscope	N1000A DCA-X Wide-Bandwidth mainframe 86100D-ETR/PTB/200/300 DCA-X mainframe N1030A/B Optical plug-in module for the N1000A DCA-X mainframe 86105D-281/IRC Electrical/Optical SMF module or 86115D-282 /IRC Dual Optical SMF module 86107A-020 Precision Time Base (not required, if DCA-X has the option –PTB)
DCA-M Oscilloscope	N1092A one optical channel or N1092B two optical channels or N1092C one optical, two electrical channels or N1092D four optical channels or N1092E two optical, two electrical channels options LOJ/PLK/IRC/200/300/500
Clock Recovery	N1078A Optical/Electrical Clock Recovery N1077A-232/SMS/JSA Optical/Electrical Clock Recovery N1076A/B-Electrical Clock Recovery
Software Pre-requisites:	Keysight IO Library rev. 18.2 or above M8070B system software for M8000 series ver. 11.0.60.4 or later and M8070ADVB Advanced Measurement Package for M8000 series ver. 1.3.200.4 N1010A FlexDCA Remote Access System A.07.50.258 or later

	In the newer releases of FlexDCA, analysis packages that combine many separate items that were available previously under individual licenses are now available. Refer to the Data Sheet to see how features of previous FlexDCA releases map into the more recent FlexDCA packages. For the N4917BSCB 400G Optical Receiver Test Application, you require the following analysis package:
	    • N1010100A R&D Package
	
	Alternatively, use the older licenses:
	    • N1010A-9FP (PAM-N Analysis Software)
	    • N1010A-TFP (TDECQ Transmitter and Dispersion Eye Closure for PAM4)

Application Requirements:	Keysight M8070B System Software Version. For the required licenses, see User Guide. Keysight M8045A with options G32 or G64; 03G or UG3; 0G4 or UG4; 0P3 or UP3 or 0P6 or UP6 Keysight M8046A with options A32 or A64; 0P3 or UP3 Keysight N4917BSCB 400G Optical Receiver Test Application. For the required licenses, see User Guide.
File Name:	SetupM80RxIEEE400G00305027.exe
License:	Please see the product data sheet on keysight.com

New Features

- Add support for N7752C, N7764C and N7768C optical attenuators

Fixed Issues

- Fix: can't run calibration with 8164B unless a TLS is plugged in
- Fix: PAM4 / NRZ PRBS sequences not working in config tab

Known Issues

- When opening the application's user guide in the Acrobat Reader PDF Viewer from within the N4917BSCB application (Help → View Test Procedure), error pop-up messages have been observed in some cases. To view the PDF document in this case the, please follow one of the following workarounds:

    o Open the PDF document directly from with the Acrobat Reader application either by browsing to the installation location "c:\Program Files\Keysight\M8070B\Apps\N4917BSCB\help\" or downloading the file from Keysight.com

    o Chance the default file viewer program for PDF files in Windows to a different software, as e.g., Microsoft Edge.

- Saved projects files from previous versions (< 3.0.0) cannot be opened anymore due to the change of the application name. To re-enable opening these projects files, the tags "Application name" in the main project file (*.proj) and compliance file (compliance.lim) in the project directory must be modified manually and should read the actual application name (see application window or name in project file saved with latest version).

- Depending on the targeted standard and particular hardware configuration, a 6dB or 10dB RF attenuator might be required in the interference signal (SI + GN) path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: Set range clipped). See also note and figure 27 in N4917BSCB User Guide.

- During the installation of N4917BSCB Rev.3.0, a command window showing several "Access denied" messages might be visible. These messages are caused by internal installation processes and can be ignored and do not affect the installation success.

- The outer extinction ratio (OER) and outer optical modulation amplitude (OOMA) will be measured during the stress receiver signal calibration on the (TDECQ) filtered channel. Though the measurement results will mainly be the same as if measured on the unfiltered channel, this configuration might be changed in future release versions.

- The N4917BSCB software will automatically use a reduced SI and GN amplitude when using an 81492A reference transmitter or generating 53GBd PAM4 signals. This behavior can be disabled or configured using the following configuration variables:

  o SI attenuator (true/false), Gaussian Noise attenuator (true/false)
  o SI channel attenuation, GN channel attenuation available in "Debug Mode" under Configure (tab) -> Stress receiver signal calibration.

  In case different attenuation values for SI and GN channel are used, the same configuration variables can also be used to shift the usable sinusoidal interferer to noise ratio ("SIGNRatio") to larger or smaller values.

  Exemplary calculation:
  SI attenuation: 10dB, GN attenuation: 10dB -> SI to GN range: –13dB .. +17dB
  SI attenuation: 10dB, GN attenuation: off -> SI to GN range: –23dB .. +7dB
  SI attenuation: off, GN attenuation: 10dB -> SI to GN range: –3dB .. +27dB

- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser ("Maximum TLS output Power" parameter in the Configure tab).

- When the Keysight N77xx Viewer software is connected via USB to a N77xx type attenuator which is also used by the N4917BSCB application, timeout errors might occur.

To prevent these errors during ORST testing, disconnect the N77xx Viewer software from the attenuator.

- Stress signal calibration for 53GBd signals can only be carried out with SSPRQ pattern due to TDECQ stability reasons when using other shorter patterns (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

- Baudrates other than 26.5625 and 53.125 Gbd may not be supported when sinusoidal interference (SI) is injected in the stress signal

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.

Keysight N4917BSCB Software Version 3.5.3

Release Date:	September 18, 2023
File Name:	SetupM80RxIEEE400G03050003.exe
Operating System	Microsoft Windows 7, Windows 8, Windows 10, (64 bit)
Requirements Category (e.g., instrument software version):	Please see the product data sheet on keysight.com
License:	Please see the product data sheet on keysight.com

New Features

- Added support for the following new transmission standard:

    o   IEEE 802.3db 100G/Lambda Multimode.

- Support for N7779C tunable lasers.

- Improved PAM4 linearity optimization algorithm for better results at high optical extinction ratios (ER), which could drive the E/O modulator in its non-linear regime.

Other changes

- The default "ISI optimization" method used for all transmission standards has been changed to "Method 3" which uses an improved readjustment algorithm that gives the best ISI calibration results for all transmission standards.

Fixed Issues

- Fixed a defect that caused the stress eye calibration to stop with an exception when the DCA measurement clipped hi or low.

- Fixed a defect that caused the software to stop with an exception when capturing the DCA stressed eye screenshot from a high-resolution monitor.

- Fixed a defect that inhibited the software from using the second internal laser source (1550nm) in the reference transmitter modules 8194xA.

- Fixed a defect in the calibration result PDF export.

- Fixed a defect in the calibration result CSV export.

Known Issues

- When opening the application's user guide in the Acrobat Reader PDF Viewer from within the N4917BSCB application (Help $\rightarrow$ View Test Procedure), error pop-up messages have been observed in some cases. To view the PDF document in this case the, please follow one of the following workarounds:

    o Open the PDF document directly from with the Acrobat Reader application either by browsing to the installation location "c:\Program Files\Keysight\M8070B\Apps\N4917BSCB\help\" or downloading the file from Keysight.com

    o Chance the default file viewer program for PDF files in Windows to a different software, as e.g., Microsoft Edge.

- Saved projects files from previous versions (< 3.0.0) cannot be opened anymore due to the change of the application name. To re-enable opening these projects files, the tags "Application name" in the main project file (*.proj) and compliance file (compliance.lim) in the project directory must be modified manually and should read the actual application name (see application window or name in project file saved with latest version).

- Depending on the targeted standard and particular hardware configuration, a 6dB or 10dB RF attenuator might be required in the interference signal (SI + GN) path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: Set range clipped). See also note and figure 27 in N4917BSCB User Guide.

- During the installation of N4917BSCB Rev.3.0, a command window showing several "Access denied" messages might be visible. These messages are caused by internal installation processes and can be ignored and do not affect the installation success.

- The outer extinction ratio (OER) and outer optical modulation amplitude (OOMA) will be measured during the stress receiver signal calibration on the (TDECQ) filtered channel. Though the measurement results will mainly be the same as if measured on the unfiltered channel, this configuration might be changed in future release versions.

- The N4917BSCB software will automatically use a reduced SI and GN amplitude when using an 81492A reference transmitter or generating 53GBd PAM4 signals. This behavior can be disabled or configured using the following configuration variables:

    o SI attenuator (true/false), Gaussian Noise attenuator (true/false)
    o SI channel attenuation, GN channel attenuation available in "Debug Mode" under Configure (tab) -> Stress receiver signal calibration.

    In case different attenuation values for SI and GN channel are used, the same configuration variables can also be used to shift the usable sinusoidal interferer to noise ratio ("SIGNRatio") to larger or smaller values.

Exemplary calculation:

SI attenuation: 10dB, GN attenuation: 10dB -> SI to GN range: –13dB .. +17dB

SI attenuation: 10dB, GN attenuation: off -> SI to GN range: –23dB .. +7dB

SI attenuation: off, GN attenuation: 10dB -> SI to GN range: –3dB .. +27dB

- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser ("Maximum TLS output Power" parameter in the Configure tab).

- When the Keysight N77xx Viewer software is connected via USB to a N77xx type attenuator which is also used by the N4917BSCB application, timeout errors might occur. To prevent these errors during ORST testing, disconnect the N77xx Viewer software from the attenuator.

- Stress signal calibration for 53GBd signals can only be carried out with SSPRQ pattern due to TDECQ stability reasons when using other shorter patterns (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.

Keysight N4917BSCB Software Version 03.00.0050

Release Date:	April 05, 2023
File Name:	SetupM80RxIEEE400G03000050.exe
License:	Please see the product data sheet on keysight.com

The system requirements for the N4917BSCB application remain the same as for the previous release. See system requirements.

Modification

- Update with Keysight License Manager 5

Known Issues

- See Known Issues.

Keysight N4917BSCB Software Version 03.00.0014

Release Date:	January 14, 2022
File Name:	SetupM80RxIEEE400G03000014.exe
License:	Please see the product data sheet on keysight.com

The system requirements for the N4917BSCB application remain the same as for the previous release. See system requirements.

Fixed Issues

- Fixed a defect that caused the software to not to recognize the connected multi-mode attenuators (N7766 and N7768) correctly when choosing the transmission standard "50G/100G/200G/400G-SR IEEE 802.3cd".

- Fixed a defect that caused the software to set a wrong clock divider for the DCA-M scope when using a recovered clock instead of the clean clock during the stress signal calibration.

- Fixed a defect that caused the stress signal calibration to abort during the BERT deemphasis coefficient optimization when using a recovered clock.

- Fixed a defect that caused the software to abort the RX sensitivity test when using the M8070 DUT Control Interface (DCI) due to a missing initialization step.

- Fixed a defect that caused the software to not update some standard settings when loading a saved project file or restoring the project settings after an unexpected software crash.

- Adjusted the notation of measurement units in the results tables (added spaces between the result value and unit in some cases).

- Added new choice ("Method 3") for the configuration variable "ISI Generation method" that is a slightly modified variant of "Method 2" that readjusts the ER during iteration to prevent a large initial SECQ excess.

Other changes

- Added a new configuration variable "TDECQ Filter Preset" (available in debug mode) that allows you to specify a different from the standard TDECQ Reference Equalizer preset (in the FlexDCA software) to be used for the stress signal calibration.

Known Issues

- See Known Issues.

Keysight N4917BSCB Software Version 03.00.0004

Release Date:	December 16, 2020
File Name:	SetupM80RxIEEE400G03000004.exe
License:	Please see the product data sheet on keysight.com

The system requirements for the N4917BSCB application remain the same as for the previous release. See system requirements.

Fixed Issues

- Fixed a defect that would cause the stress signal calibration to abort when using a N777xC class tunable laser as optical source.

- Fixed a defect that would cause the N4917BSCB application started in demo mode ("Launch Keysight N4917BSCB (Demo)" option in the Start menu) to shut down with an exception.

Known Issues

- See Known Issues.

Keysight N4917BSCB Software Version 03.00.0002

The following table lists the supported hardware and firmware for the N4917BSCB application. An "*" (asterisk) and bold text in this section indicates options required for 53.125 GBaud-based standards.

Released Date:	October 9, 2020
Operating System:	Microsoft Windows 7 (64 bit)
	Microsoft Windows 8 (64 bit)
	Microsoft Windows 10 (64 bit)
Memory	8 GB RAM [minimum]
Display resolution:	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB
	LAN
	GPIB (optional)
Instrument Firmware	M8040A BERT - M8070B System Software. For the supported versions see the *Software Pre-requisites* row.
	DCA-M/DCA-X - FlexDCA version A.06.60.378 or later
	8164B LMS - Ver.V5.25 or later
	8149xA Ref Tx - Ver.5.01 or later
BERT	M8040A-BU2 mainframe with USB option
	M8070A-0TP/ONP/1TP/1NP System Software. For the complete list of licenses for M8070B, see Chapter 2 of the User Guide.
	M8045A-G32/**G64***/0G3/0G4/0P3/801 High Performance BERT module
	M8057A Remote head for M8045A pattern generator, 1 channel
	M8046A-A32/**0P3***/801 Analyzer module
Signal Generator for Sinusoidal and Gaussian Noise Interference	M8195A-002/16G Arbitrary Waveform Generator or
	M8196A-002 Arbitrary Waveform Generator or
	M8054A Interference Source, 32 GHz

Lightwave Measurement System	8164B LMS Mainframe
	Tunable lasers
	N7776C Tunable Laser 1240-1380 nm or
	N7778C Tunable Laser 1240-1380 nm or
	81602A-013 Tunable Laser 1250-1370 nm or
	81606A-113 Tunable Laser 1240-1380 nm or
	81608A-113 Tunable Laser 1240-1380 nm or
	81609A-113 Tunable Laser 1240-1380 nm
	Reference Transmitters
	81490A-E05 Reference Transmitter or
	81490A-E09 Reference Transmitter or
	81490A-E10 Reference Transmitter (multimode – for SR only)
	81491A-085 Reference Transmitter (multimode - for SR only)
	81491A-135 Reference Transmitter
	81492A-E01* Reference Transmitter
	81492A-135* Reference Transmitter (56GBaud)
	81000FI Optical Connector Interface
	81000NI Optical Connector Interface
	Optical attenuators:
	81576A Attenuator module (straight SMF) or
	81577A Attenuator module (angled SMF) or
	N7761A external Attenuator (1 ch straight SMF) or
	N7762A external Attenuator (2 ch straight SMF) or
	N7764A external Attenuator (4 ch straight SMF)
	N7751A external Attenuator (1 ch with 2 optical power meter channels, SMF)
	N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF)
	N7766A Optical Attenuator for Multimode Fiber (2ch)
	N7768A Optical Attenuator for Multimode Fiber (4ch)
	8490D-010 - Coaxial Fixed Attenuator, DC to 50 GHz

DCA-X Oscilloscope	N1000A DCA-X Wide-Bandwidth mainframe
	86100D-ETR/PTB/200/300 DCA-X mainframe
	N1030A/B Optical plug-in module for the N1000A DCA-X mainframe
	86105D-281/IRC Electrical/Optical SMF module or
	86115D-282 /IRC Dual Optical SMF module
	86107A-020 Precision Time Base (not required, if DCA-X has the option –PTB)
DCA-M Oscilloscope	N1092A one optical channel or
	N1092B two optical channels or
	N1092C one optical, two electrical channels or
	N1092D four optical channels or
	N1092E two optical, two electrical channels
	options LOJ/PLK/IRC/200/300/500
Clock Recovery	N1078A Optical/Electrical Clock Recovery
	N1077A-232/SMS/JSA Optical/Electrical Clock Recovery
	N1076A/B-Electrical Clock Recovery
Software Pre-requisites:	Keysight IO Library rev. 18.1 or above
	M8070B system software for M8000 series ver. 7.2.40.2 or later and
	M8070ADVB Advanced Measurement Package for M8000 series ver. 1.3.200.4
	N1010A FlexDCA Remote Access System A.06.60.378 or later
	In the newer releases of FlexDCA, analysis packages that combine many separate items that were available previously under individual licenses are now available. Refer to the Data Sheet to see how features of previous FlexDCA releases map into the more recent FlexDCA packages. For the N4917BSCB 400G Optical Receiver Test Application, you require the following analysis package: • N1010100A R&D Package Alternatively, use the older licenses: • N1010A-9FP (PAM-N Analysis Software)

	• N1010A-TFP (TDECQ Transmitter and Dispersion Eye Closure for PAM4)
Application Requirements:	Keysight M8070B System Software Version. For the required licenses, see User Guide.
	Keysight M8045A with options G32 or G64; 03G or UG3; 0G4 or UG4; 0P3 or UP3 or 0P6 or UP6
	Keysight M8046A with options A32 or A64; 0P3 or UP3
	Keysight N4917BSCB 400G Optical Receiver Test Application. For the required licenses, see User Guide.
File Name:	SetupM80RxIEEE400G00300002.exe
License:	Please see the product data sheet on keysight.com

Enhancements

- Support for the more recent Keysight tunable laser sources:

  o N7776C Tunable Laser 1240-1380 nm
  o N7778C Tunable Laser 1240-1380 nm

- Support for the N1030A/B Optical plug-in modules for the N1000A DCA-X mainframe.

- Support for the following new Interference source for sinusoidal interference and Gaussian noise in all the supported measurement flavors:

  o M8054A Interference Source, 32 GHz

- Support for new firmware versions

  o M8070B - 7.2.40.2

    ▪ M8070ADVB Advanced Measurement Package for M8000 Series - 1.3.200.4

  o FlexDCA - A.06.60.378
  o M8195A SFP – 4.0.0.0

- Added the following new configuration variables:

  o Force Multichannel Attenuator Reset – By default, this configuration variable is set to "false", which means that if you reset or turn off one channel of the connected multichannel attenuator, it does not cause a reset or turning off of the remaining channels.
  If set to "true", a reset or turning off of one channel will reset/turn off all the channels in the multichannel attenuator.

  o DCA Screen Capture Mode – This variable enables you to choose which part of the DCA screen will be captured. The available choices include Display and Waveform.

Fixed Issues

- The M8045A PG 64GBaud option (G64 or U64) has been removed as mandatory license option to run N4917BSCB application. When running N4917BSCB without a BERT PG 64GBaud license option, compliance testing is now restricted to 26GBaud based transmission flavors.

- Fixed the earlier behavior of the application causing all the channel of a connected multichannel attenuator to get reset or turned off when one channel was reset or turned off. A new configuration variable has been added for this.

- The software now performs a check for the availability of the M8070ADVB package for M8070B and a valid license for using it, at the time of startup. This package is required for External CDR control, Jitter tolerance testing, and DUT control interface (DCI).

- The Error Detector Compare Mode configuration variable now supports the following three values for the correct handling of M8046A error detector module:

  o   Differential
  o   Single Ended Normal
  o   Single Ended Complement

- Fixed an issue that would cause the N1078A clock data recovery to not to be recognized in the configuration during stress signal calibration.

- Fixed an issue that prevented the correct loading of a previously saved project file

- Fixed an issue because of which the calibrated value of Initial SECQ was being displayed the same as the final SECQ value in the Results view.

Limitations

- Limited support for the functionality of the "Upload Results to Repository" feature in the Test Application.

Known Issues

- Saved projects files from previous versions (< 3.0.0) cannot be opened anymore due to the change of the application name. To re-enable opening these projects files, the tags "Application name" in the main project file (*.proj) and compliance file (compliance.lim) in the project directory must be modified manually and should read the actual application name (see application window or name in project file saved with latest version).

- Depending on the targeted standard and particular hardware configuration, a 6dB or 10dB RF attenuator might be required in the interference signal (SI + GN) path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: Set range clipped). See also note and figure 27 in N4917BSCB User Guide.

- When exporting calibration results as CSV file (File->Export Result...->CSV), the table containing the stressed eye calibration results is not contained in the created file. Please use the PDF or HTML file export instead.

- During the installation of N4917BSCB Rev.3.0, a command window showing several "Access denied" messages might be visible. These messages are caused by internal installation processes and can be ignored and do not affect the installation success.

- The outer extinction ratio (OER) and outer optical modulation amplitude (OOMA) will be measured during the stress receiver signal calibration on the (TDECQ) filtered channel. Though the measurement results will mainly be the same as if measured on the unfiltered channel, this configuration might be changed in future release versions.

- The N4917BSCB software will automatically use a reduced SI and GN amplitude when using an 81492A reference transmitter or generating 53GBd PAM4 signals. This behavior can be disabled or configured using the following configuration variables:

  o SI attenuator (true/false), Gaussian Noise attenuator (true/false)
  o SI channel attenuation, GN channel attenuation
     available in "Debug Mode" under Configure (tab) -> Stress receiver signal calibration.

  In case different attenuation values for SI and GN channel are used, the same configuration variables can also be used to shift the usable sinusoidal interferer to noise ratio ("SIGNRatio") to larger or smaller values

  Exemplary calculation:
  SI attenuation: 10dB, GN attenuation: 10dB -> SI to GN range: –13dB .. +17dB
  SI attenuation: 10dB, GN attenuation: off -> SI to GN range: –23dB .. +7dB
  SI attenuation: off, GN attenuation: 10dB -> SI to GN range: –3dB .. +27dB

- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser ("Maximum TLS output Power" parameter in the Configure tab).

- When the Keysight N77xx Viewer software is connected via USB to a N77xx type attenuator which is also used by the N4917BSCB application, timeout errors might occur. To prevent these errors during ORST testing, disconnect the N77xx Viewer software from the attenuator.

- Stress signal calibration for 53GBd signals can only be carried out with SSPRQ pattern due to TDECQ stability reasons when using other shorter patterns (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.

Keysight N4917BSCB Software Version 02.50.0001

The following table lists the supported hardware and firmware for the N4917BSCB application. An "*" (asterisk) and bold text in this section indicates options required for 53.125 GBaud–based standards.

Release Date:	June 28, 2019
Operating System:	Microsoft Windows 7 (64 bit)
	Microsoft Windows 8 (64 bit)
	Microsoft Windows 10 (64 bit)
Memory	8 GB RAM [minimum]
Display resolution:	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB
	LAN
	GPIB (optional)
Instrument Firmware	M8040A BERT - M8070B/A System Software. For the supported versions see the *Software Prerequisites* row.
	DCA-M/DCA-X - FlexDCA version A.06.02.17 or later
	8164B LMS - Ver.V5.25 or later
	8149xA Ref Tx - Ver.5.01 or later
BERT	M8040A-BU2 mainframe with USB option
	M8070A-0TP/ONP/1TP/1NP System Software. For the complete list of licenses for M8070B, see Chapter 2 of the User Guide.
	M8045A-G32/**G64***/0G3/0G4/0P3/801 High Performance BERT module
	M8057A Remote head for M8045A pattern generator, 1 channel
	M8046A-A32/**0P3***/801 Analyzer module
Signal Generator for Sinusoidal and Gaussian Noise Interference	M8195A-002/16G Arbitrary Waveform Generator or M8196A-002 Arbitrary Waveform Generator
Lightwave Measurement System	8164B LMS Mainframe
	Tunable lasers

81602A-013 Tunable Laser 1250-1370 nm or

81606A-113 Tunable Laser 1240-1380 nm or

81608A-113 Tunable Laser 1240-1380 nm or

81609A-113 Tunable Laser 1240-1380 nm

Reference Transmitters

81490A-E05 Reference Transmitter or

81490A-E09 Reference Transmitter or

81490A-E10 Reference Transmitter (multimode – for SR only)

81491A-085 Reference Transmitter (multimode - for SR only)

81491A-135 Reference Transmitter

81492A-E01* Reference Transmitter

81000FI Optical Connector Interface

81000NI Optical Connector Interface

Optical attenuators:

81576A Attenuator module (straight SMF) or

81577A Attenuator module (angled SMF) or

N7761A external Attenuator (1 ch straight SMF) or

N7762A external Attenuator (2 ch straight SMF) or

N7764A external Attenuator (4 ch straight SMF)

N7751A external Attenuator (1 ch with 2 optical power meter channels, SMF)

N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF)

N7766A Optical Attenuator for Multimode Fiber (2ch)

N7768A Optical Attenuator for Multimode Fiber (4ch)

8490D-010 - Coaxial Fixed Attenuator, DC to 50 GHz

| DCA-X Oscilloscope | N1000A DCA-X Wide-Bandwidth mainframe |

86100D-ETR/PTB/200/300 DCA-X mainframe

86105D-281/IRC Electrical/Optical SMF module or

86115D-282 /IRC Dual Optical SMF module

	86107A-020 Precision Time Base (not required, if DCA-X has the option –PTB)
DCA-M Oscilloscope	N1092A one optical channel or
	N1092B two optical channels or
	N1092C one optical, two electrical channels or
	N1092D four optical channels or
	N1092E two optical, two electrical channels
	options LOJ/PLK/IRC/200/300/500
Clock Recovery	N1078A Optical/Electrical Clock Recovery
	N1077A-232/SMS/JSA Optical/Electrical Clock Recovery
	N1076A/B-Electrical Clock Recovery
Software Pre-requisites:	Keysight IO Library rev. 18.1 or above
	M8070B system software for M8000 series ver. 6.0.210.6 or later and
	M8070ADVB Advanced Measurement Package for M8000 series ver. 1.0.70.0
	OR
	M8070A system software for M8000 series ver. 5.1.100.6
	N1010A FlexDCA Remote Access System A.06.02.17 or later
	In the newer releases of FlexDCA, analysis packages that combine many separate items that were available previously under individual licenses are now available. Refer to the Data Sheet to see how features of previous FlexDCA releases map into the more recent FlexDCA packages. For the N4917BSCB 400G Optical Receiver Test Application, you require the following analysis package:
	• N1010100A R&D Package
	Alternatively, use the older licenses:
	• N1010A-9FP (PAM-N Analysis Software)
	• N1010A-TFP (TDECQ Transmitter and Dispersion Eye Closure for PAM4)
Application Requirements:	Keysight M8070B/A System Software Version. For the required licenses, see User Guide.

	Keysight M8045A with options G32 or G64; 03G or UG3; 0G4 or UG4; 0P3 or UP3 or 0P6 or UP6
	Keysight M8046A with options A32 or A64; 0P3 or UP3
	Keysight N4917BSCB 400G Optical Receiver Test Application. For the required licenses, see User Guide.
File Name:	SetupM80RxIEEE400G02500001.exe
License:	Please see the product data sheet on keysight.com

Enhancements

- Updated licensing model.

  o Support for USB portable/network licenses.
  o Subscription-based license options are now available for all the license types.

  For details, refer to https://literature.cdn.keysight.com/litweb/pdf/5992-3419EN.pdf. Alternatively, contact Keysight Technical Support.

- Support for new optical IEEE 802.3cd (and relevant MSA) standards

- 400G-SR8, 200G-SR4, 100G-FR, 100G-LR, 100GBASE-DR, 100G-SR2, 50GBASE-FR, 50GBASE-LR, and 50GBASE-SR. Because of the similarities in their targets and implementation logic, the new multimode physical types (SR) are treated as a single category in the N4917BSCB application.

- Support for "Noise Enhancement Factor" (Ceq) criterion and TX transition time measurement introduced in IEEE 802.3cd calibration procedure.

- Support for new Keysight reference transmitter options: 81491A-135 and 81491A-085 (multimode – for SR only).

- Support for new Keysight N1000A DCA-X Wide-Bandwidth Oscilloscope Mainframe.

- Support for new M8070B System Software for M8000 Series of BER Test Solutions. This also requires M8070ADVB Advanced Measurement Package for M8000 Series of BERT Test Solutions.

- Support for new firmware versions

  o M8070B - 6.0.210.6

    ▪ M8070ADVB Advanced Measurement Package for M8000 Series - 1.0.70.0

  o M8070A - 5.1.100.6
  o FlexDCA - A.06.02.17
  o M8195A SFP – 3.6

- Enhanced initialization procedure for DUT Control Interface (DCI) to enable support for third-party error detectors. New configuration variables added for this purpose include:

DUT Control Interface Location and DUT Control Interface Address (in addition to the existing DUT Control Interface Script File configuration variable).

- Support for auxiliary VISA instruments, e.g. optical switch, to switch between the setups for calibration and testing. Two new configuration variables have been added for this purpose, Auxiliary Instrument VISA Address and Auxiliary Instrument SCPI Command.

- Support for internal clock recovery in the newer M8046A error detector modules (requires corresponding license option).

- Several usability enhancements

    o New configuration variable "Test Result Aggregation" to control whether the newer test results should replace or append to the existing test results, automatically, or if the application should prompt whether to replace or append the older test results with newer ones for each test run (default behavior).

    o New configuration variable "Jitter Tolerance CDR LBW Auto" to enable or disable the automatic loop bandwidth adjustment in case a clock data recovery (CDR) is used during jitter tolerance testing. This configuration variable is available in the Debug mode under the Configure tab.

    o TDECQ filter tabs are now reported in stress calibration results.

- New configuration variable "Stress Signal Recall Pattern" to select which data pattern (SSPRQ or PRBS31Q) to use for the calibration file to be recalled. The default behavior of the application is to ask for the pattern during test execution.

- Enhanced calibration file handling when switching between standards and reloading projects.

- New configuration variables "Ceq target value" and "ISI generation method" in view of introduction of the IEEE 802.3cd transmission standards.

- Several new configuration variables in the Debug mode under the Configure tab: Frequency Grid Mode, Frequency Increment Mode, Jitter Profile Frequency1, Jitter Profile Amplitude1, Jitter Profile Frequency2, Jitter Profile Amplitude2, Jitter Profile Frequency3, and Jitter Profile Amplitude3.

Limitations

- Limited support for the functionality of the "Upload Results to Repository" feature in the Test Application.

Known Issues

- Depending on the targeted standard and particular hardware configuration, a 6dB or 10dB RF attenuator might be required in the interference signal (SI + GN) path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: *Set range clipped*). See also note and figure 27 in N4917BSCB User Guide.

- When exporting calibration results as CSV file (File->Export Result...->CSV), the table containing the stressed eye calibration results is not contained in the created file. Please use the PDF or HTML file export instead.

- During the installation of N4917BSCB Rev.2.5, a command window showing several "Access denied" messages might be visible. These messages are caused by internal installation processes and can be ignored and do not affect the installation success.

- The outer extinction ratio (OER) and outer optical modulation amplitude (OOMA) will be measured during the stress receiver signal calibration on the (TDECQ) filtered channel. Though the measurement results will basically be the same as if measured on the unfiltered channel, this configuration might be changed in future release versions.

- The N4917BSCB software will automatically use a reduced SI and GN amplitude when using an 81492A reference transmitter or generating 53GBd PAM4 signals. This behavior can be disabled or configured using the following configuration variables

  o SI attenuator (true/false), Gaussian Noise attenuator (true/false)
  o SI channel attenuation, GN channel attenuation

  available in "Debug Mode" under Configure (tab) -> Stress receiver signal calibration.

  In case different attenuation values for SI and GN channel are used, the same configuration variables can also be used to shift the usable sinusoidal interferer to noise ratio ("SIGNRatio") to larger or smaller values

  Exemplary calculation:
  SI attenuation: 10dB, GN attenuation: 10dB -> SI to GN range: –13dB .. +17dB
  SI attenuation: 10dB, GN attenuation: off -> SI to GN range: –23dB .. +7dB
  SI attenuation: off, GN attenuation: 10dB -> SI to GN range: –3dB .. +27dB

- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser ("Maximum TLS output Power" parameter in the Configure tab).

- When the Keysight N77xx Viewer software is connected via USB to a N77xx type attenuator which is also used by the N4917BACA application, time-out errors might occur. To prevent these errors during ORST testing, disconnect the N77xx Viewer software from the attenuator.

- Stress signal calibration for 53GBd signals can only be carried out with SSPRQ pattern due to TDECQ stability reasons when using other shorter patterns (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.

Keysight N4917BSCB Software Version 02.00.0002

The following table lists the supported hardware and firmware for the N4917BSCA application. An "*" (asterisk) and bold text in this section indicates options required for 53.125 GBaud-based standards.

Release Date:	August 24, 2018
Operating System:	Microsoft Windows 7 (64 bit)
	Microsoft Windows 8 (64 bit)
	Microsoft Windows 10 (64 bit)
Memory	8 GB RAM [minimum]
Display resolution:	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB
	LAN
	GPIB (optional)
Instrument Firmware	M8040A BERT - M8070A System Software
	86100D DCA-X – N1010A FlexDCA version A.05.80.158 or later
	8164B LMS - Ver.V5.25 or later
	81490A Ref Tx - Ver.5.01 or later
BERT	M8040A-BU2 mainframe with USB option
	M8070A-0TP/ONP/1TP/1NP System Software
	M8045A-G32/**G64***/0G3/0G4/0P3/801 High Performance BERT module
	M8057A Remote head for M8045A pattern generator, 1 channel
	M8046A-A32/**0P3***/801 Analyzer module
Signal Generator for Sinusoidal and Gaussian Noise Interference	M8195A-002/16G Arbitrary Waveform Generator or M8196A-002 Arbitrary Waveform Generator
Lightwave Measurement System	8164B LMS Mainframe
	Tunable lasers
	81602A-013 Tunable Laser 1250-1370 nm or
	81606A-113 Tunable Laser 1240-1380 nm or
	81608A-113 Tunable Laser 1240-1380 nm or
	81609A-113 Tunable Laser 1240-1380 nm
	Reference Transmitters
	81490A-E05 Reference Transmitter or

	81490A-E09 Reference Transmitter or **81492A-E01*** Reference Transmitter
	81000FI Optical Connector Interface 81000NI Optical Connector Interface
	Optical attenuators: 81576A Attenuator module (straight SMF) or 81577A Attenuator module (angled SMF) or N7761A external Attenuator (1 ch straight SMF) or N7762A external Attenuator (2 ch straight SMF) or N7764A external Attenuator (4 ch straight SMF) N7751A external Attenuator (1 ch with 2 optical power meter channels, SMF) N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF) 8490D-010 - Coaxial Fixed Attenuator, DC to 50 GHz
DCA-X Oscilloscope	86100D-ETR/PTB/200/300 DCA-X mainframe 86105D-281/IRC Electrical/Optical SMF module or 86115D-282 /IRC Dual Optical SMF module 86107A-020 Precision Time Base (not required, if DCA-X has the option –PTB)
DCA-M Oscilloscope	N1092A one optical channel or N1092B two optical channels or N1092C one optical, two electrical channels or N1092D four optical channels or N1092E two optical, two electrical channels options LOJ/PLK/IRC/200/300/500
Clock Recovery	N1077A-232/SMS/JSA Optical/Electrical Clock Recovery N1076A-Electrical Clock Recovery
Software Pre-requisites:	Keysight IO Library rev. 18.1 or above M8070A system software for M8000 series Ver. 5.0.228.4 or later N1010A FlexDCA Remote Access System A.05.80.158 or later

	N1010A-9FP (PAM-N Analysis Software)
	N1010A-TFP (TDECQ Transmitter and Dispersion Eye Closure for PAM4)
Application Requirements:	Keysight M8070A System Software Version: 5.0.228.4 and above with options 0TP
	Keysight M8045A with options G32 or G64; 03G or UG3; 0G4 or UG4; 0P3 or UP3 or 0P6 or UP6
	Keysight M8046A with options A32 or A64; 0P3 or UP3
	Keysight N4917BSCA 400G Optical Receiver Test Application
	N4917BSCA-1FP or 1TP or 1NP or 1UP or 1FL or 1TL or 1NL or 1UL
File Name:	SetupM80RxIEEE400G02000002.exe
License:	Please see the product data sheet on keysight.com

Enhancements

- Support for 53 GBd-based standards - 400GBASE-DR4, 400G-FR4 (Lambda MSA Group)

- Full support for remote interface

- Addition of two new utility functions:

  o Readjust reference transmitter power
  o Recall aggressor channel

- Support for new reference transmitter 81492A-E01 (mandatory for all 53 GBd-based standards, but supports 26 GBd-based standards as well)

- Support of new firmware versions

  o M8070 - 5.0.228.4
  o FlexDCA - A.05.80.158

- Addition of new configuration parameters to support new 53 GBd-based standards and enhanced usability: REFTX Recalibration Threshold, Switch off PG during REFTX recal, Attenuator Settling Time, Optimize PAM4 Linearity, Skip receive power (OOMA) calibration, DCA Clock Source, Clock Data Recovery Module, PG ClockOut Divider, Pause before starting RX tests, Run ED Auto-Alignment before starting RX Tests, Error Detector Alignment Threshold, Recall Aggressor Channel, Aggressor Channel Source, Aggressor Channel Target, Error Detector Baud Rate, Error Detector Follow SYS Clock, Error Detector Timeout, Clock Data Recovery Source, and Clock Data Recovery Loop Bandwidth

- Several usability enhancements

  o Generation of aggressor channel on second M8045A pattern generator output channel (if available)

Usage:

The IEEE 802.3bs standard requires to use aggressor channels on all others than the RX channel under test, so the N4917BSCA software Rev 2.0 offers a new function to generate another electrical data output channel (if available in used M8045A module).

The second data channel can automatically be configured during the start of a receiver test (Configure (tab) > Receiver Testing > Recall aggressor channel > true) or using the utility function "Recall aggressor channel". As configuration source you can choose between the following settings (Configure (tab) > Receiver Testing > Aggressor Channel Source)

- PG Channel   - Copies settings from PG channel to configure CH2
- Current setting   - Recalls current settings for CH2 after BERT reset
- Configuration file - Uses XML configuration file from path: c:\ProgramData\Keysight\M8070A\Apps\N4917BSCA\Info\DefaultAggressorSettings.xml

o New optical power adjustment function to re-adjust the calibrated optical output power due to a reference transmitter operating point drift.

Usage:

The output power of the calibrated stress test signal must not change during RX conformance testing to ensure the specified and calibrated OMA level. A possible drift of the reference transmitter's (REFTX) operation point would cause the output power to change thus the measured optical power at the output of the attenuator can be used to recalibrate the REFTX's operation point. This can be done by using the new "Readjust reference transmitter power" utility function.

o New configuration variable (*Skip receive power (OOMA) calibration*) to skip the final optical power adjustment during stressed RX signal calibration
o Better organization of configuration parameters in logical groups

Limitations

- Limited support for the functionality of the "Upload Results to Repository" feature in the Test Application.

Known Issues

- Depending on the targeted standard and particular hardware configuration, a 6dB or 10dB attenuator might be required in the interference signal (SI + GN) path. Use this approach when the calibration fails, and an error related to clipping of AWG amplitude is reported (Error message: Set range clipped).

- The N4917BSCA software will use automatically use a reduced SI and GN amplitude when using an 81492A reference transmitter or generating 53GBd PAM4 signals. This behavior can be disabled or configured using "Debug Mode" (Configure (tab) > Stress receiver signal calibration)

- Laser safety errors are sometimes returned when the reference transmitter is calibrated, and an external TLS source is used. As a workaround restart the test task or reduce the maximum output power of the tunable laser ("Maximum TLS output Power" parameter in the configure tab).

- Stress signal calibration for 53GBd signals can only be carried out with SSPRQ pattern due to TDECQ stability reasons when using other shorter patterns (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

- The validity range of the parameter "Sinusoidal Interferer to Noise Ratio" (Configure (tab) > Stress receiver signal calibration) is around 3 to 13 dB. Other values may lead to calibration failure.

Keysight N4917BSCB Software Version 01.50.1000

The following table lists the information that has changed from release v01.50.0000. For the complete set of support information, refer to Release V01.50.0000.

Release Date:	March 27, 2018
File Name:	SetupM80RxIEEE400G01501000.exe
License:	Please see the product data sheet on keysight.com

Fixes

- Fix for a problem with the AWG M8195A and M8196A firmware that caused an invalid AWG sampling frequency (error message: "Clock is out of range.") for the external reference clock input.

Keysight N4917BSCB Software Version 01.50.0000

The following table lists the information that has changed from release v01.00.0000. For the complete set of support information, refer to Release V01.00.0000.

Release Date:	March 15, 2018
Instrument Firmware	81600D DCA-X - FlexDCA version A.05.71 or later
Software Pre-requisites:	Keysight IO Library rev. 18.1 or above
File Name:	SetupM80RxIEEE400G01500000.exe

Enhancements

-   Support for dual error detector (M8046A) configuration for all the receiver tests
-   Support for up to two clock data recovery modules as clock sources for receiver testing
-   Addition of two new utility functions:
    o   Set PG transmission format
    o   Set ED detection format
-   The "Optimize BERT deemphasis" utility function can be configured to run automatically before every Stressed Receiver Signal Calibration
-   Pauses in tests to enable manual settings before the error detector modules are aligned
-   Support for new configuration parameters: Maximum TLS Output Power, Use Offline Mode, Optimize deemphasis on calibration start, Pattern Generator Line Coding, Pattern Generator Data, Error Detector Line Coding, Error Detector Data Pattern, Error Detector Compare Mode, Error Detector Polarity, Error Detector (#1) Clock Source, Clock Data Recovery Module (ED #1), Error Detector (#2) Clock Source, and Clock Data Recovery Module (ED #2).
-   Better organization of configuration parameters in logical groups.
-   More comprehensive reporting of test results.

Limitations

-   Limited support for the functionality of the "Upload Results to Repository" feature in the Test Application.
-   Limited support for remote control features.

Known Issues

-   The validity range of the parameter "Sinusoidal Interferer to Noise Ratio" (Configure (tab) > Stress receiver signal calibration) is around 3 to 13 dB. Other values may lead to calibration failure.
-   Stress signal calibration can only be carried out with SSPRQ pattern (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

Keysight N4917BSCB Software Version 01.00.0000

Release Date:	December 6, 2017
Operating System:	Microsoft Windows 7 (64 bit)
	Microsoft Windows 8 (64 bit)
	Microsoft Windows 10 (64 bit)
Memory	8 GB RAM [minimum]
Display resolution:	WXGA+ (1440 x 900) [minimum]
PC Interfaces	USB
	LAN
	GPIB (optional)
Instrument Firmware	M8040A BERT - M8070A System Software
	81600D DCA-X - FlexDCA version A.05.70.772 or later
	8164B LMS - Ver.V5.25 or later
	81490A Ref Tx - Ver.5.01 or later
BERT	M8040A-BU2 mainframe with USB option
	M8070A-0TP/ONP/1TP/1NP System Software
	M8045A-G32/0G3/0G4/0P3/801 High Performance BERT module
	M8057A Remote head for M8045A pattern generator, 1 channel
	M8046A-A32/0P3/801 Analyzer module
Signal Generator for Sinusoidal and Gaussian Noise Interference	M8195A-002/16G Arbitrary Waveform Generator or
	M8196A-002 Arbitrary Waveform Generator or
	Any other source that is SCPI code compatible with the Signal Generator listed above for setting frequency and output amplitude
Signal Generator for System Clock	You may optionally use system clock, if the internal clock of the BERT is not used.
	E8257D PSG Analog Signal Generator up to 67 GHz or
	N5173B EXG X-series Microwave Analog Signal Generator up to 40 GHz or
	N5183B MXG X-series Microwave Analog Signal Generator up to 40 GHz or
	any other source that is SCPI code compatible with the Signal Generators listed above for setting frequency and output amplitude

Lightwave Measurement System	8164B LMS Mainframe
	Tunable lasers
	81602A-013 Tunable Laser 1250-1370 nm or
	81606A-113 Tunable Laser 1240-1380 nm or
	81608A-113 Tunable Laser 1240-1380 nm or
	81609A-113 Tunable Laser 1240-1380 nm
	Reference Transmitters
	81490A-E05 Reference Transmitter or
	81490A-E09 Reference Transmitter
	81000FI Optical Connector Interface
	81000NI Optical Connector Interface
	Optical attenuators:
	81576A Attenuator module (straight SMF) or
	81577A Attenuator module (angled SMF) or
	N7761A external Attenuator (1 ch straight SMF) or
	N7762A external Attenuator (2 ch straight SMF) or
	N7764A external Attenuator (4 ch straight SMF)
	N7751A external Attenuator (1 ch with 2 optical power meter channels, SMF)
	N7752A external Attenuator (2 ch with 2 optical power meter channels, SMF)
DCA-X Oscilloscope	86100D-ETR/PTB/200/300 DCA-X mainframe
	86105D-281/IRC Electrical/Optical SMF module or
	86115D-282 /IRC Dual Optical SMF module
	86107A-020 Precision Time Base (not required, if DCA-X has the option –PTB)
DCA-M Oscilloscope	N1092A one optical channel or
	N1092B two optical channels or
	N1092C one optical, two electrical channels or
	N1092D four optical channels or
	N1092E two optical, two electrical channels
	options LOJ/PLK/IRC/200/300/500

Clock Recovery	N1077A-232/SMS/JSA Optical/Electrical Clock Recovery
	N1076A-Electrical Clock Recovery
Software Pre-requisites:	Keysight IO Library rev. 17.2.20828 or above
	M8070A system software for M8000 series Ver. 4.0.0 or later
	N1010A FlexDCA Remote Access System A.05.70.772 or later
	N1010A-9FP
	N1010A-TFP
Application Requirements:	Keysight M8070A System Software Version: 4.0.100.2 and above with options 0TP
	Keysight M8045A with options G32 or G64; 03G or UG3; 0G4 or UG4; 0P3 or UP3 or 0P6 or UP6
	Keysight M8046A with options A32 or A64; 0P3 or UP3
	Keysight N4917BSCA 400G Optical Receiver Test Application
	N4917BSCA-1TP or N4917BSCA-1NP
File Name:	SetupM80RxIEEE400G01000000.exe

Features

First release of Keysight N4917BSCA 400G Optical Receiver Test Application. The application provides a platform for stressed receiver sensitivity test, which is compliant with automated standards for 200GBASE and 400GBASE Optical Receiver Stress Testing. The solution consists of several test instruments such as a Bit Error Rate Tester (BERT), an arbitrary waveform generator (AWG), Digital Sampling Scope (DCA), Optical Reference Transmitter, Tunable Laser, and Optical Attenuator operating together with the N4917BSCA software package.

Some salient features of the N4917BSCA 400G Optical Receiver Test Application include:

- Remote control of all the test instrumentation
- Automated calibration of the optical stressed eye parameters (ER, SECQ, and OMA) following the procedure recommended by IEEE
- Adjustable target values for ER, SECQ, and OMA
- Automated Stress Receiver Sensitivity test
- Automated jitter tolerance compliance and margin tests

Known Issues

- Remote Interface feature (View > Preference > Remote) is not officially supported. For instance, "Remote Interface Hint" (right click on "Tests" or "Utility Functions" in Select Tests" Tab) or the reference manual (Help > Automation > Remote Interface) are not final.

- The validity range of the parameter "Sinusoidal Interferer to Noise Ratio" (Configure (tab) > Stress receiver signal calibration) is around 3 to 13 dB. Other values may lead to calibration failure.

- Stress signal calibration can only be carried out with SSPRQ pattern (Configure (tab) > Stress receiver signal calibration > Calibration pattern).

Please contact Keysight Technical Support (www.keysight.com/find/supportrequest) if you encounter any other issue.