Release Notes

Keysight N4917BSCA 400G Optical Receiver Test Application

This document contains latest information on the Keysight N4917BSCA 400G Optical Receiver Test Application.

Related Document

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

- "Keysight_N4917BSCA_UserGuide.pdf"

This document can be found at the following location after you install the application:
C:\Program Files\ Keysight\M8070A\Apps\N4917BSCA\help
The M8070A documents can be located by clicking *Start* > *All Programs* > *Keysight M8070A* > *Keysight M8070A Documentation*. Alternatively, you can also visit www.keysight.com/find/m8070a to find the latest versions of M8070A documents.

Installation Steps

To install the N4917BSCA 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/N4917BSCA
3. Double-click the downloaded installer file on your PC.

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4. Follow and respond to the installer 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 release information in the last section of this document or see the User Guide.

Getting Started

To access the installed N4917BSCA application, perform the following steps:

1. From the Start menu of the Windows Operating System, select All Programs > Keysight M8070A Applications > Keysight N4917BSCA > Launch Keysight N4917BSCA.
2. If you are launching the Keysight N4917BSCA application for the first time, the End-User License Agreement window appears. Select Agree to continue.
   The N4917BSCA application banner is displayed.
3. If there is a single instance of the M8070A software running locally, the N4917BSCA application launches after automatically getting connected to the M8070A software.
4. If the N4917BSCA application does not detect any instance of the M8070A software running locally, the Connect to M8070A 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 N4917BSCA application, refer to the Keysight N4917BSCA 400G Optical Receiver Test Application Online Help.

Keysight N4917BSCA 400G Optical Receiver Test Application

Release V02.00.0002

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.

Released 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/200/201/300 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/200/201/300/500
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

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:

  - Readjust reference transmitter power
  - 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
  - M8070 - 5.0.228.4
  - 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
  - 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

- 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.

- New configuration variable (*Skip receive power (OOMA) calibration*) to skip the final optical power adjustment during stressed RX signal calibration

- 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.

Release V01.50.1000

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.

Released Date:	March 27, 2018
File Name:	SetupM80RxIEEE400G01501000.exe

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.

Release V01.50.0000

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.

Released 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:
    - Set PG transmission format
    - 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).

Release V01.00.0000

Released 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.