

AE2010R MIPI A-PHY[®] Automotive SerDes Receiver Test Software

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Manual Part Number

9922-02286.EN

Edition

Edition 1.0, September 2022

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Test Procedures

The following procedures are available to the advanced user:

Procedure 1: 2.4.1 Downlink RX BER Test (RFI / BCI Noise Generation)

Procedure 2: 2.4.1 Downlink RX BER Test (Fast Transient Noise Generation)

Procedure 3: 2.4.1 Downlink RX BER Test (Environmental Noise Generation)

Procedure 4: 2.4.1 Downlink RX BER Test (Combined Noise Generation)

Each procedure allows configuration and generation of noise profiles as required in the A-PHY spec. This software does not include the required calibrations needed to ensure that the generated signals are conformant to the MIPI A-PHY[®] specified limits. Certain procedures are configured to work best with the default parameters. All the procedures require further calibrations to ensure that the generated signal is as per the requirements or specified parameter settings.

The following pages explain the options for each of these procedures.

Procedure 1: 2.4.1 Downlink RX BER Test (RFI / BCI Noise Generation)

This procedure (Figure 1 and Figure 2) generates a sinusoidal interference waveform based on the specified parameters.

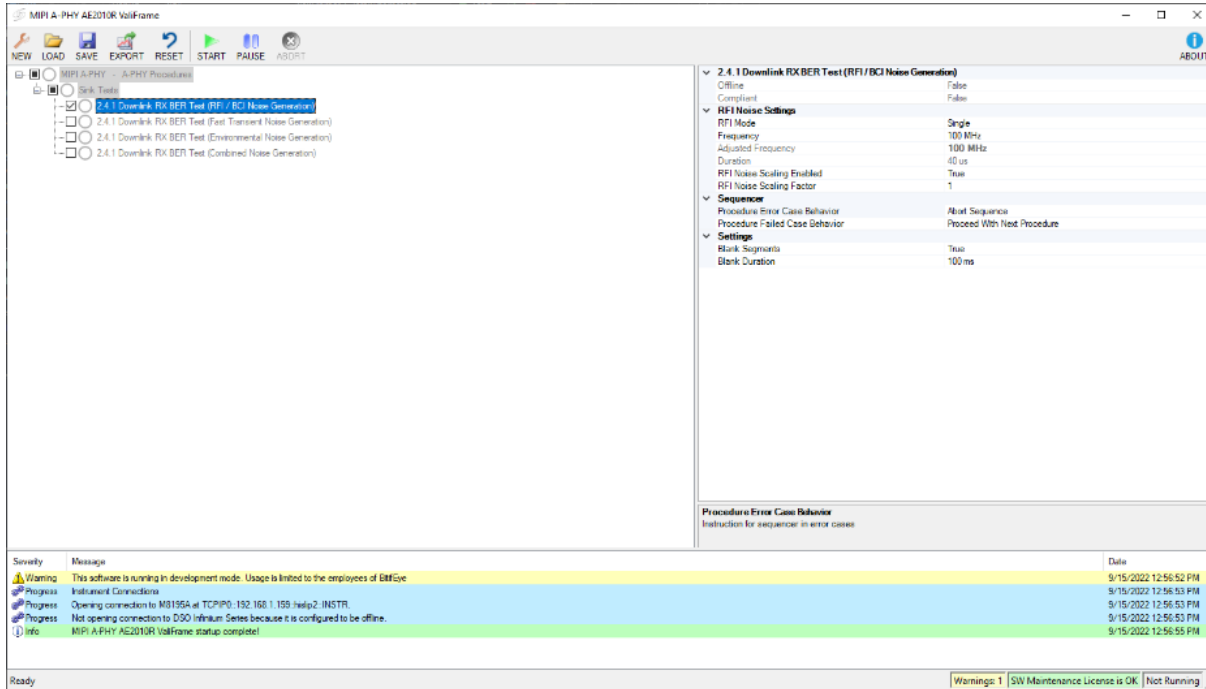


Figure 1: 2.4.1 Downlink RX BER Test (RFI Noise Generation) in Single RFI Mode

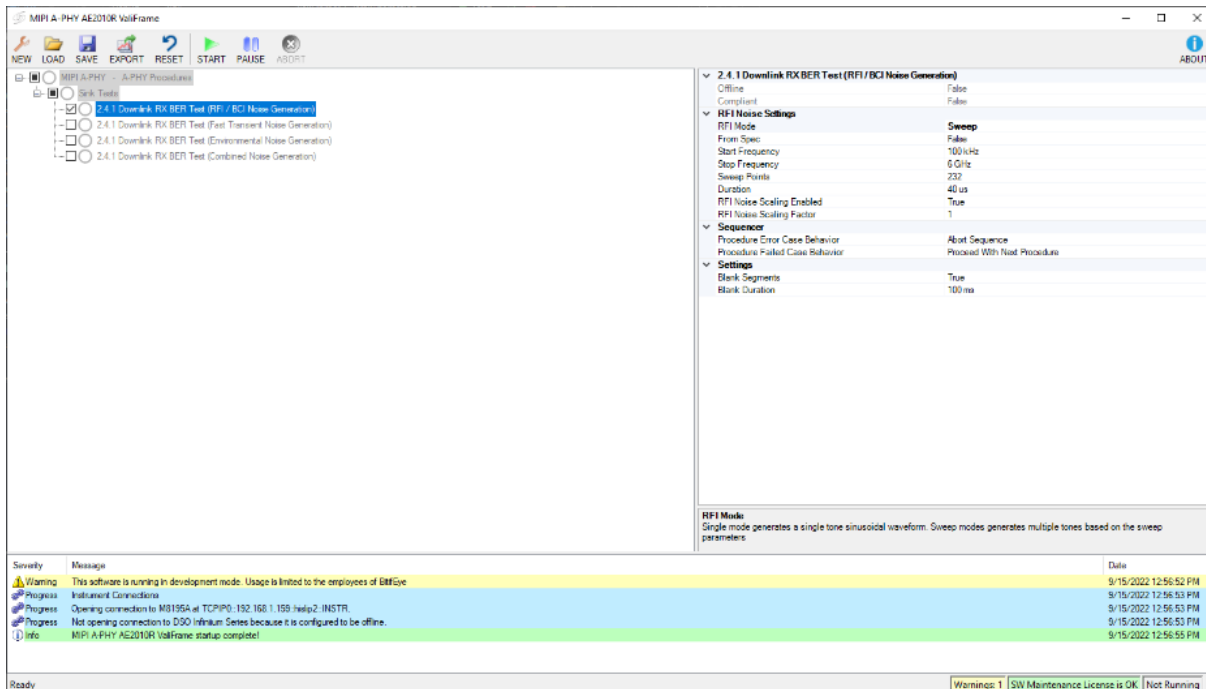


Figure 2: 2.4.1 Downlink RX BER Test (RFI Noise Generation) in Sweep RFI Mode

Parameters

RFI Mode

Single mode generates a single tone sinusoidal waveform.

Sweep mode generates multiple tones based on the sweep parameters.

Frequency

Frequency of the single tone RFI. This parameter is only available when RFI Mode is Single.

Adjusted Frequency

Auto-calculated expected frequency. This is based on the waveform duration and AWG settings. It is not editable by user. This parameter is only available when RFI Mode is Single.

Duration

Duration for which one frequency step should be output.

Scaling Enabled and Scaling Factor

Setting Scaling Enabled to 'True' enables the scaling of the waveform according to the Scaling Factor.

From Spec

Use sweep settings as defined in the EMI sweep requirements from CTS. This parameter is only available when RFI Mode is Sweep.

Start Frequency

Sweep start frequency. This parameter is only available when RFI Mode is Sweep.

Stop Frequency

Sweep stop frequency. This parameter is only available when RFI Mode is Sweep.

Sweep Points

Number of frequencies to be generated between Sweep start and stop. This parameter is only available when RFI Mode is Sweep.

Expected Output



Figure 3: Expected RFI waveform



Figure 4: RFI Swept with 40 μ s signal duration

NOTE: The amplitude settings for the frequency sweep signal apply on the entire waveform. Setting the amplitudes of the individual sweep points according to spec limits requires ENIS compensations and, if connected, de-embedding of the characteristics of the Noise Injection Fixture. These settings are currently not available.

NOTE: The Noise Injection Fixture attenuates frequency components in the kHz range and those above 4 GHz. Removing these effects requires de-embedding of the fixture characteristics, which can be achieved through calibrations.

Procedure 2: 2.4.1 Downlink RX BER Test (Fast Transient Noise Generation)

This procedure (Figure 5) generates fast transient pulses based on the specified parameters.

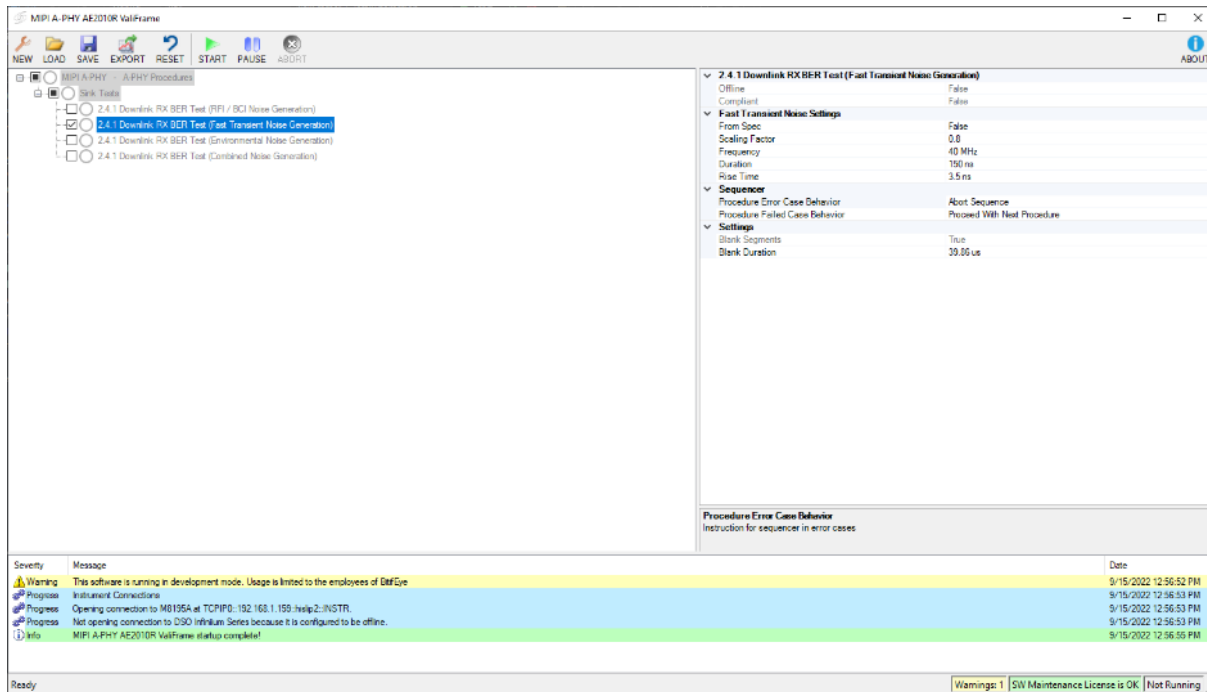


Figure 5: Options for Downlink RX BER (Fast Transient Noise Generation)

Parameters

From Spec

Set the parameters according to the spec-defined values.

Scaling Factor

Amplitude of the Fast-Transient Noise relative to the AWG amplitude. This artificially scales the generated waveform beyond the AWG limits.

Frequency

Fundamental pulse frequency of the transient pulses.

Duration

Time required for the transient to settle to its nominal (base) level.

Rise Time

Time required for the pulse to transition from its current low level to its next high level.

Expected Output

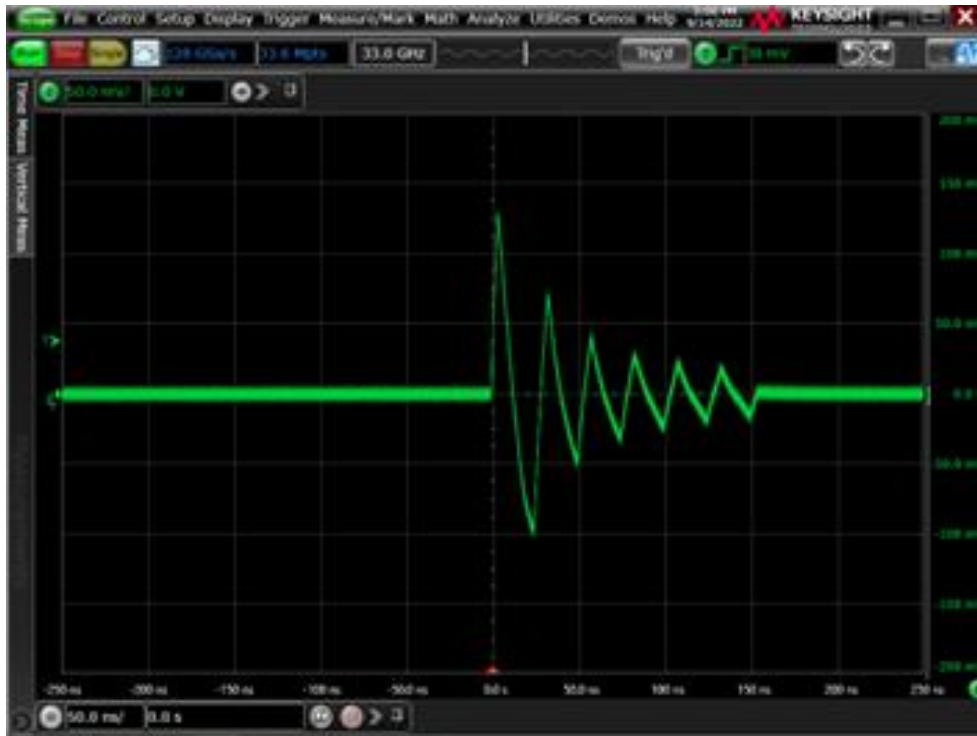


Figure 6: Expected fast transient waveform

Procedure 3: 2.4.1 Downlink RX BER Test (Environmental Noise Generation)

This procedure (Figure 7) generates either individual environmental noises (Alien cable bundle noise or Car noise) or both combined together.

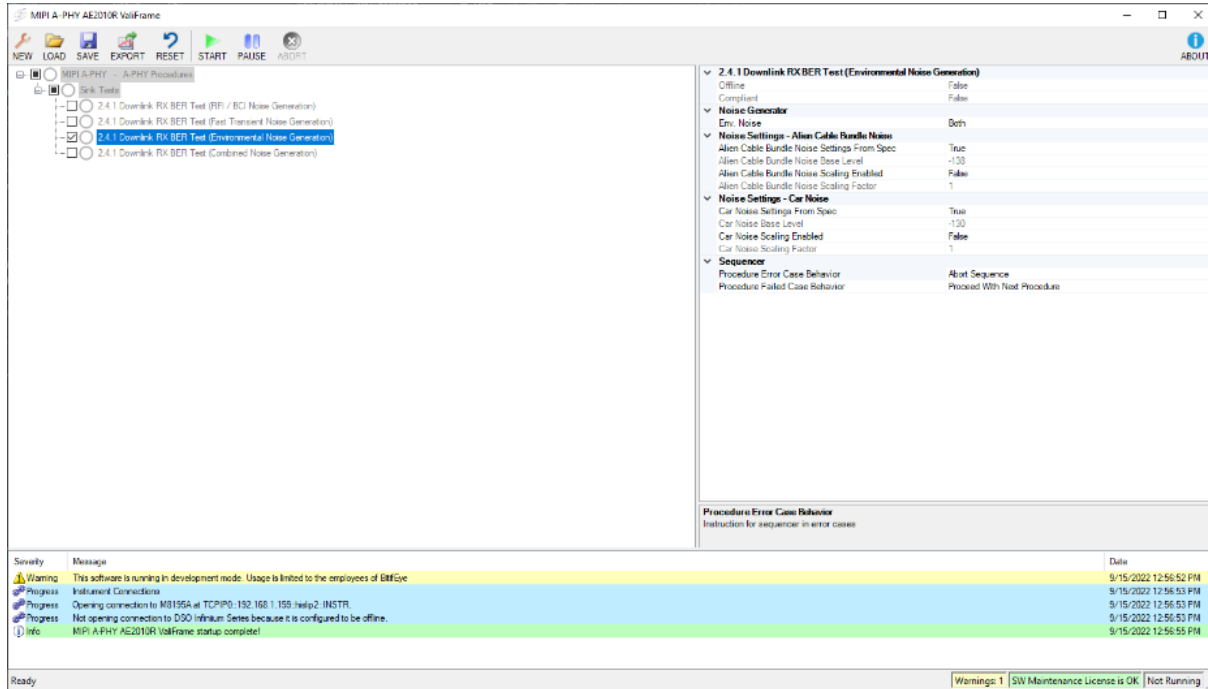


Figure 7: Options for Environmental Noise Generation

Parameters

Env. Noise

Select either individual environmental noises (Alien cable bundle noise or Car noise) or both combined together.

Base Level

Defines the base level for the calculated waveform. This does not correlate to the measured base level for the signal. This parameter is available for both types of environmental noises: Alien cable bundle noise and Car noise.

Scaling Enabled and Scaling Factor

Setting Scaling Enabled to 'True' enables the scaling of the waveform according to the Scaling Factor. These parameters are available for both types of environmental noises: Alien cable bundle noise and Car noise.

NOTE: Additional calibrations are required to match the PSD of the generated signal for lower frequencies. In any case, with the default values the PSD of the generated signal is below the requirements of the A-PHY specification.

Expected Output



Figure 8: Expected Power Spectrum Density of Alien Cable Bundle Noise

Procedure 4: 2.4.1 Downlink RX BER Test (Combined Noise Generation)

This procedure () generates a combination of Environmental noises along with either RFI / BCI or Fast transient noise.

The RFI / BCI and Fast transient noise parameters cannot be edited and are set to default spec values.

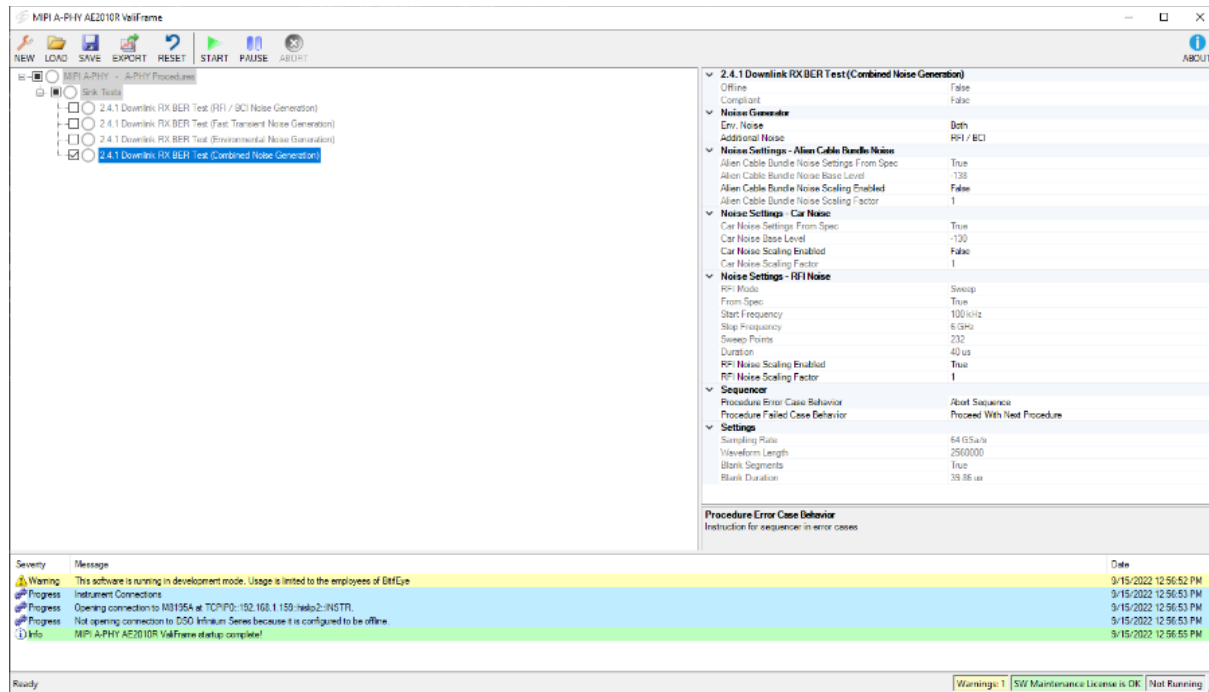


Figure 9: Options for Combined noise with RFI / BCI

Parameters

Env. Noise

Select either individual environmental noises (Alien cable bundle noise or Car noise) or both combined together.

Additional Noise

Select the additional noise type (RFI / BCI or Fast transient noise) with values as defined in the specification.

Expected Output

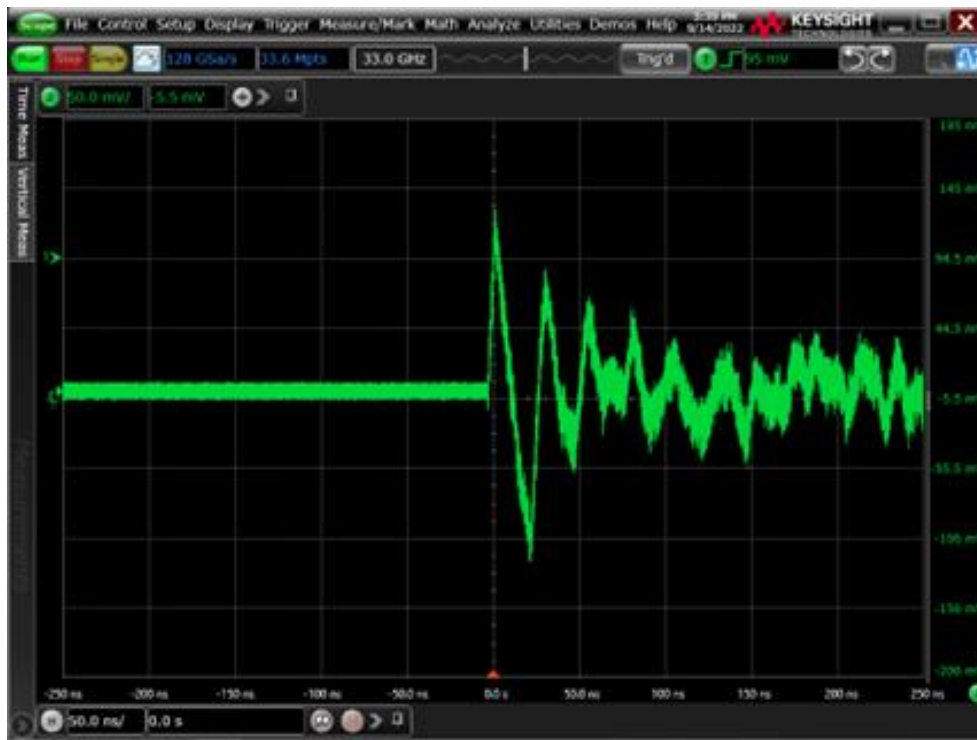


Figure 10: Expected spectrum of the combined noise with fast transient noise

Common Properties

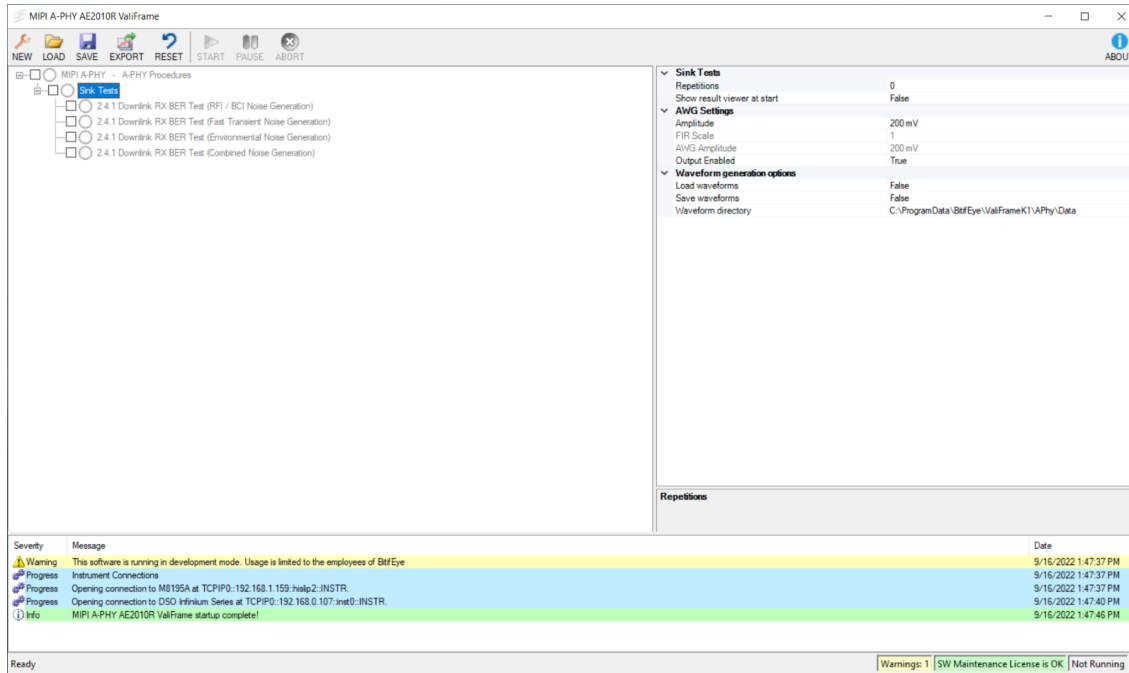


Figure 11: Common properties for sink test procedures

Sink Test Parameters

These parameters can be changed from the sink test node (Figure 11) and apply to all procedures.

Amplitude

Required amplitude at the output of the AWG amplifier.

FIR Scale

FIR scale of the AWG channel. $AWG\ Amplitude = Amplitude \times FIR\ Scale$.

AWG Amplitude

Set amplitude of the output amplifier.

Output Enabled

Enable (disable) AWG channel output.

Load waveforms

Load previously calculated and saved waveforms from the specified directory. If waveforms are not available, procedures will calculate required waveforms.

Save waveforms

Save calculated waveforms to the specified waveform directory. Waveforms with the same settings will be overwritten.

Waveform directory

Directory to be used for loading / saving waveforms.

Waveform Settings

These settings can be controlled individually for each procedure. They can be found under the heading 'Settings'.

Blank Segments

If set to True, a blank noise pattern of the duration specified in the Blank duration is inserted between consecutive noise patterns.

Blank Duration

Duration of 'Blank' period between two frequency sweep points. This parameter is only available when RFI Mode is Sweep.

Connection Dialog

The connection dialog (Figure 12) is shown at the start of each procedure.

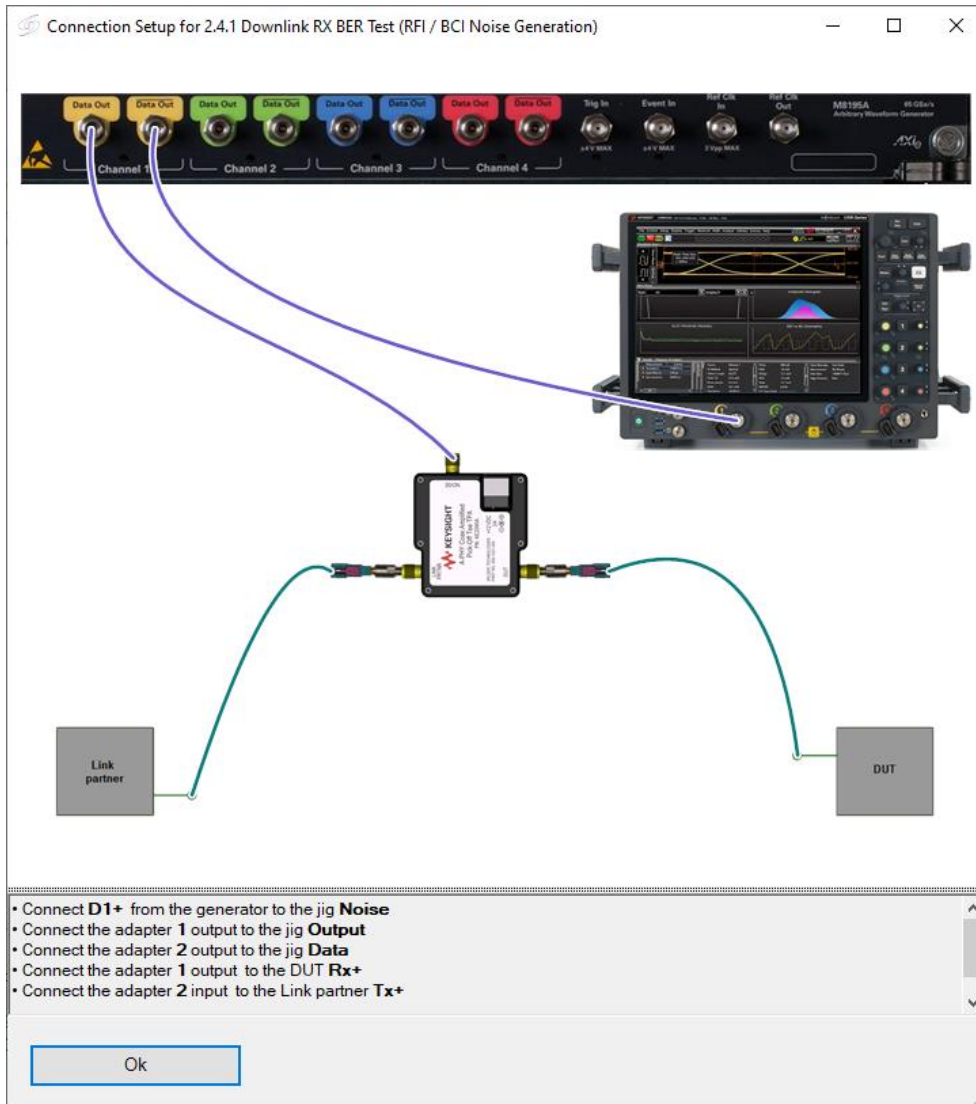


Figure 12: Example connection dialog

AWG Control Dialog

The AWG control dialog (Figure 13) is shown after every procedure. It allows you to change the AWG amplitude and toggle AWG outputs.

The 'End Procedure' button will stop the current procedure and start the next one.

If no further procedures are selected, the AWG will keep the signals from the last procedure.

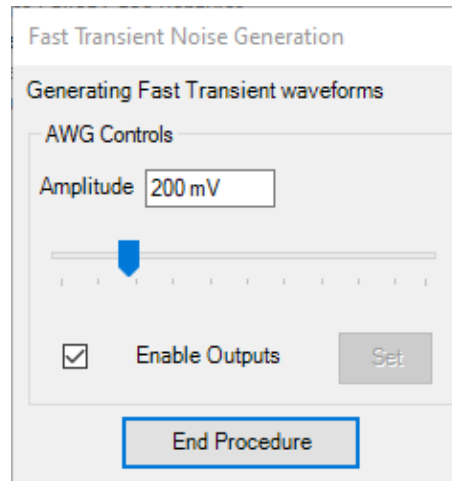


Figure 13: AWG control dialog

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