ANRITSU CORPORATION
5-1-1 Onna, Atsugi, Kanagawa Japan

MP1900A

Signal Quality Analyzer-R

Release Notes

77th Edition

Thank you for choosing Anritsu products for your business.
This document provides the latest information about version 12.03.01 of the software for the Anritsu MP1900A and current known bugs.
We look forward to continuing business with you in the future.

Contents

Item	Content
1. Released Version ···P2	Describes information for this release
2. Peripheral Devices ···P2	Shows list of devices that can be controlled by MX190000A
3. Added Functions ···P3	Describes added functions for MX190000A
4. Bug Fixes ···P11	Describes bug fixes in released software version
5. Known Issues ···P24	Describes known software bugs in this version to be fixed by future releases
6. Specification Changes ···P25	Describes specification changes in released software version
7. Usage Notes ···P27	Describes precautions for using this equipment

1. Released Version

Ver. 12.03.01

2. Peripheral Devices

The peripheral devices for the MX190000A are listed in the table.

Model	Product Name
MP1900A	Signal Quality Analyzer-R
MU195020A	21G/32G bit/s SI PPG
MU195040A	21G/32G bit/s SI ED
MU195050A	Noise Generator
MU181000A	12.5GHz Synthesizer
MU181000B	12.5GHz 4port Synthesizer
MU181500B	Jitter Modulation Source
MU183020A	28G/32G bit/s PPG
MU183040B	28G/32G bit/s High Sensitivity ED
MU183021A	28G/32G bit/s 4ch PPG
MU183041B	28G/32G bit/s 4ch High Sensitivity ED
MU191000A	Synthesizer
MU196020A	PAM4 PPG
MU196020C	PAM4 PPG
MU196040A	PAM4 ED
MU196040B	PAM4 ED
MU196050B	Noise Generator
MU196060A	32G baud NRZ/PAM4 Re-Driver

For the installation position in the main unit, refer to the Anritsu website (https://www.anritsu.com).

For restrictions on slot installation positions, refer to the selection guide.

3. Added Functions

Version	Item	Function
Ver. 12.02.01	Added G0447A Control Function	Added control functionality for the G0447A PCIe6 External Re-Driver to MX190000A.
Ver. 12.01.02	Added a supported module.	Support for the following module has been added: MU191000A Synthesizer MU196020C PAM4 PPG MU196050B Noise Generator
	Added new options.	New options are now supported for the following modules. ● MU196020A: ➢ MU196020A-z56 Sequence Editor Function PCIe6 and CXL3 Flits Extension ● MU196040B: ➢ MU196040B-005 64G baud ➢ MU196040B-115 32G to 64G baud Extension ➢ MU196040B-125 58G to 64G baud Extension
	Added parameters to PAM4 ED for PCIe 7.	Added PCIe 7 compatible parameters to PAM4 ED. MU196040B PAM4 ED PCIe 7 Test Pattern Compliance Pattern (CP) Modified Compliance Pattern (MCP)
	Added patterns for PCIe 7.	A dedicated pattern file for PCIe 7 has been added.
	Functionality expansion PCIe6/CXL3	The following instruments have been enhanced to support PCIe6/CXL3 measurements: ・Jump/Loop Function Available when MU196020A-z51 Sequence Editor Function option is installed. ・BER Measurement for Sync Header Bypass Available when MU196040B-z51 PCIe Sequence Editor Pattern Analysis option is installed.
Ver. 10.07.12	Support for G0447A Control Tool	A control tool for the G0447A PCIe6 External Re-Driver has been newly included.
Ver. 10.07.06	Added Confidence Level function to PAM4 ED / SI ED	The Confidence Level function has been added to MU196040B PAM4 ED and MU195040A SI ED.
	Added Unit Sync function to SI PPG	The Unit Sync function has been added to MU195020A SI PPG. Available when the MU195020A-y31 2ch Data Delay option is installed.
	Added Optimize for TX LEQ function	The “Optimize for TX LEQ” function has been added to Advanced Auto Search in MX190000A.

Version	Item	Function
	Added Pattern for PCIe6 RxLEQ TP2 Calibration	A dedicated pattern file for PCIe6 RxLEQ TP2 Calibration has been added.
Ver. 10.05.02	Added new application "BERT for PCIe1-6 Forced Link" to Application Selector.	Added the following application to Application Selector of the MX190000A. - BERT for PCIe1-6 Forced Link
	Added new options	New options are now supported for the following modules. ● MU196020A: ➢ MU196020A-z51 Sequence Editor Function ➢ MU196020A-z52 Sequence Editor Function for Multi-Channel ● MU196040B: ➢ MU196040B-z51 PCIe Sequence Editor Pattern Analysis
	Added patterns for Display Port	Added patterns dedicated to Display Port.
Ver. 10.04.02	Added USB4 Gen4 CTS 0.98 support	Added the following features to support USB4 Gen4 Compliance Test Specification (CTS) 0.98: ・Insertion Loss Compensation function ・Function to support LFPS Calibration #8 Available when MU196020A-z45 USB4 Gen4 Pattern Generation option is installed.
Ver. 10.03.02	Added new options	New options are now supported for the following modules. ● MU196020A: ➢ MU196020A-z45 USB4 Gen4 Pattern
	Functionality expansion USB4 Gen4 support	The following instruments have been enhanced to support USB4 Gen4 measurements: ・MU181500B Jitter Modulation Source ・MU196020A PAM4 PPG ・MU195050A Noise Source
Ver. 10.02.00	Added PCIe6 FEC Symbol Capture Function to MU196040B PAM4 ED	Added PCIe6 FEC Symbol Capture function to MU196040B PAM4 ED. MU196040B-w43 Available when the FEC Analysis for PCIe6 option is implemented.
Ver. 10.01.02	Added SJ3 capability in MU181500B Jitter Modulation Source module.	Added SJ3 capability in the MU181500B Jitter Modulation Source module to support DDR5 tests. ・SJ3 modulation is available by switching to SJ3 mode on the BUJ tab. ・Presets are added for DDR5 tests.
Ver. 10.00.01	Added a supported module.	Support for the following module has been added: MU196060A Re-Driver

Version	Item	Function
	Added new options	New options are now supported for the following modules. ● MU196020A: ➢ MU196020A-w43 FEC Error Insertion for PCIe6 ➢ MU196020A-z60 PCIe6 LEQ ● MU196040B: ➢ MU196040B-w43 FEC Analysis for PCIe6
	Extended the functionality of SI PPG DDR5 support	The following functions of MU195020A SI PPG have been enhanced to support DDR5 measurements. ・Expanded HPJ (Half Period Jitter) setting range for DCD (Duty Cycle Distortion) evaluation. ・Added PRBS7/15/23 pattern file for BER measurement.
Ver. 9.02.02	Added an indicator “Warming Up” to SI PPG.	Added an indicator “Warming Up” to the MU195020A SI PPG screen. This helps those who operate the measuring instrument understand if it is fully warmed up to deliver the guaranteed performance. After turning on the MP1900A series power, it is recommended to warm it up for about 30 minutes.
	Added support for the changes to Compliance Test pattern in the PCIe6 specifications.	Changed the initial value for Gray Code to OFF and the pattern in response to the changes to Compliance Test Pattern in the PCIe Base Spec 6.0.1.

Version	Item	Function
Ver. 9.00.00	Added new applications “BERT for PCIe1-6” and “BERT for PCIe1-5 and PCIe6 Base” to Application Selector.	Added the following applications to Application Selector of the MX190000A. - BERT for PCIe1-6 - BERT for PCIe1-5 and PCIe6 Base The installation of these applications enables output and error analysis of PCIe 1/2/3/4/5/6 signals. ■ MU196020A PAM4 PPG PCIe 1/2/3/4/5 Test Pattern Compliance Pattern (CP) Modified Compliance Pattern (MCP) Jitter Calibration Pattern Preset Calibration Pattern PCIe 6 Test Pattern Compliance Pattern (CP) Modified Compliance Pattern (MCP) Jitter Measurement Pattern (JMP) High Swing Toggle Pattern Low Swing Toggle Pattern Jitter Calibration Pattern Preset Calibration Pattern ■ MU196040B PAM4 ED PCIe 1/2/3/4/5 Test Pattern Compliance Pattern (CP) Modified Compliance Pattern (MCP) PCIe 6 Test Pattern Compliance Pattern (CP) Modified Compliance Pattern (MCP) * To upgrade from V8.03.14 or earlier to V9.00.00 or later for this functional addition, update the FPGA and firmware of the PAM4 ED twice. For how to update the FPGA and firmware, refer to the MX190000A Operation Manual.
	Added a new EZ SCPI Creator feature that outputs a Python code file.	Added the Python Code File feature to EZ SCPI Creator, in addition to SCPI Text File, the conventional feature. To run the generated Python code, download the Python interpreter installer from the Python Software Foundation website (https://www.python.org/downloads/), and install it on the external PC or the MP1900A.
Ver. 8.03.00	Added parameters to PAM4 PPG for PCIe 6.	Added PCIe 6 compatible parameters to PAM4 PPG. MU196020A PAM4 PPG Operation Bitrate, Emphasis Preset PCIe 6 Test Pattern Compliance Pattern (CP) Modified Compliance Pattern (MCP)

Version	Item	Function
Ver. 8.00.30	Added the Input Signal Decoder function to PAM4 ED.	Added the Input Signal Decoder function on the **Pattern** tab for the MU196040B PAM4 ED. This function makes it possible in PAM4 mode to count errors in the input data (Gray Code, etc.) after decoding.
Ver. 7.02.30	Added the support for Sequence Editor Function PCIe 5 to SI PPG.	Added the Option-51 Sequence Editor Function PCIe 5 Extension to the MU195020A SI PPG.
	Added the support for SSC Profile Function to Jitter Modulation Source.	Added the SSC Profile Function to the MU181500B Jitter Modulation Source.
Ver. 5.00.90	Added the FEC Analysis Function to PAM4 ED	Added the Option-42 FEC Analysis Function to the MU196040A PAM4 ED.
	Added preset standards for SI PPG / SI ED Bitrate.	Added USB4, DisplayPort, SAS3, and SAS4 as presets for Bitrate of the MU195020A SI PPG and MU195040A SI ED.
	Added a preset standard for SI PPG Emphasis.	Added USB4 for Standard/Preset of the Emphasis tab of the MU195020A SI PPG.
Ver. 4.10.20	Added the Sequence Editor function.	Added the Option-50 Sequence Editor Function to the MU195020A SI PPG. With this option installed, the MU195020A SI PPG can combine the patterns specified in the PCIe 1 to 4, USB 3.0, and USB 3.1 Gen 2 to transmit them in any order.
	Added the Glitch-Free function.	The MU195020A SI PPG can switch patterns between PRBS and Data without intermitting the Data output.
Ver. 4.09.41	Added support for the PAM4 ED Eye Contour function.	Added support for the Eye Contour measurement function to the MU196040B PAM4 ED.
	Added Advanced Mode to PAM4 ED Auto Search	Added “Advanced Mode” to the Auto Search function of the MU196040B PAM4 ED. With this function, the following settings of the MU196040B are optimally adjusted for the input signal. ・PRBS inv., Logic, Gray Coder ・Middle Eye Threshold ・Upper Eye Threshold ・Lower Eye Threshold ・Delay ・LFEQ ・DFE
	Added support for PAM4 PPG to the MX183000A PCIe Link Training Option.	Added control for the MU196020A PAM4 PPG to the MX183000A PCIe Link Training Option and PCIe 5 Link Training Option.

Version	Item	Function
Ver. 4.07.20	Added the FEC Symbol Capture function.	Added FEC Symbol Capture as a Capture mode of the MU196040B PAM4 ED. This function allows the PAM4 ED to capture the pattern data when the number of FEC Symbol Errors detected in the Codeword generated from the input data exceeds the set threshold.
	Added remote commands for pattern operations of the PAM4 PPG.	Added remote commands for pattern storing, recalling, and other operations of the MU196020A PAM4 PPG. :SOURce:PATTern:PAM4:DATA:LENGth :SOURce:PATTern:PAM4:DATA:WHOLe :SOURce:PATTern:PAM4:BDATa:WHOLe :SOURce:PATTern:PAM4:DATA:FILL :SYSTem:MMEMory:PATTern:RECall :SYSTem:MMEMory:PATTern:STORe
	Added the Bathtub measurement function.	Added the Bathtub measurement to the MU196040B PAM4 ED.
Ver. 4.06.02	Support for Windows 10.	Added support for the MP1900A with Windows 10 IoT OS. To use the MP1900A with Windows 10 IoT OS, use the software of this version or later.
Ver. 4.03.12	Added PCIe 5.0 Link Training function.	Added support for the MX183000A PCIe 5.0 Link Training function from this version.
Ver. 4.02.10	Added a function to SI ED.	Added "SKP Ordered Set Filtering" function for PCIe to MU195040A SI ED. This function can absorb the operating frequency difference between MP1900A and DUT without using MX183000A. It is available only when MU195040A Option x22 is installed.
	Added parameters that support PCIe 5.0.	Added parameters that support PCIe 5.0. MU195020A SI PPG Operation Bitrate, Emphasis Preset MU195040A SI ED CR, CDR Bitrate, CTLE PCIe 5.0 Test Pattern Compliance Pattern (CP) Modified Compliance Pattern (MCP)
Ver. 4.01.32	Added a supported module.	Support for the following module has been added: MU196040B PAM4 ED
Ver. 3.08.16	Added the Unit Sync function.	This function synchronizes multiple MP1900A units to generate the same pattern and is available only when the MU196020A PAM4 PPG (Option x30/x50) is installed.

Version	Item	Function
	Supported 400G BASE-FR8/LR8 specifications for FEC.	Added a test pattern “RS-FEC Scrambled Idle 400G 8Lanes” to the software option x42 FEC Pattern Generation for the MU196020A PAM4 PPG. This function is available on the **Pattern** tab. Also, added an error insertion mode “RS-FEC 400G 8Lanes”. This function is available on the **Error Addition** tab.
Ver. 3.01.07	Added PAM4 PPG Adjustable ISI function.	"MU196020A-x40 Adjustable ISI" was added to MU196020A PAM4 PPG. This function corrects the loss of the external ISI channel. A small amount of loss characteristic can be corrected with four taps.
	Added PAM4 PPG FEC Pattern Generation.	"MU196020A-x42 FEC Pattern Generation" was added to MU196020A PAM4 PPG. This function adds pattern generation and error addition for FEC evaluation.
	Added PAM4 PPG Inter-Module Synchronization.	"MU196020A-x50 Inter-Module Synchronization" was added to MU196020A PAM4 PPG. By using multiple modules of PAM4 PPG, data can be combined and synchronized.
Ver. 3.00.05	Added Supported modules	Support for the following modules has been added: MU196020A PAM4 PPG MU196040A PAM4 ED
Ver. 2.05.08	Added CH Sync function for syncing between 32G PPG modules	A Channel Synchronization function has been added for synchronizing the output signals between two to four MU183020A 2ch 32G PPG modules. This function is set at Menu Combination Setting → Inter module combination.
Ver. 2.03.06	Added PAM4 Patterns for use by SI PPG,SI ED and G0374A	Pattern files have been added for PAM4 signal generation and BER measurement using the MU18302xA 32G PPG, MU18304xB 32G High Sensitivity ED and G0374A. The added patterns are listed below: SSPRQ[D3_4]; IEEE802.3bs draft 3.4 To use the pattern files, refer to either Appendix G in the MU18302xA 32G PPG Operation Manual, or to Appendix F in the MU18304xB 32G High Sensitivity ED Operation Manual.
	Extended MU181500B SSC modulation	Extended MU181500B Jitter Modulation Source SSC modulation maximum from 5300 ppm to 7000 ppm
Ver. 2.02.02	Added Supported modules	Support for the following modules has been added: MU183021A 28G/32G bit/s 4ch PPG MU183041B 28G/32G bit/s 4ch High Sensitivity ED

Version	Item	Function
Ver. 2.00.00	Added SSC Extension function to MU181000B Synthesizer	This function adds the Option-x02 SSC Extension to the MU181000B Synthesizer. Installing this option supports SCC impression at the 8 GHz Clock output. In addition, it is also possible to output a clock that is synchronized to the 100 MHz Ref.Clock output from the DUT at PCIe Gen3/4/5 operation. This function can use all the MU195020A, MU181500B, and MU181000B at tracking operation.
	Added Built-in SJ2 function to MU181500B Jitter Modulation Source	This function adds the Built-in SJ2 function to the MU181500B Jitter Modulation Source. By using this function, SJ2 can be impressed solely using the MU181500B without tracking operation with the MU181000B Synthesizer.
	Added Variable ISI function to MU195020A SI PPG	This function adds the Opt-40/41 Variable ISI function to the MU195020A SI PPG. Installing this option supports output of waveforms simulating predetermined loss at the PPG output stage.
	Added Remote Log function	This function adds the ability to convert contents created using the GUI to SCPI commands and save them as text files. It is used by pressing the EZ SCPI Creator button at the lower screen.
	Added PRBS13Q and PRBS31Q pattern	Added PRBS13Q and PRBS31Q pattern for use by MU195020A and MU195040A. This function adds the pattern tab.
Ver. 1.01.03	Added 64Gx2ch Combination function	This function is added to support generation of a 64Gx2ch Combination signal using two units of the MU195020A 2ch SI PPG. It can be set from Combination Setting of Menu.
	Added Delay Calibration function	This function adds a Global Delay Calibration button to Menu. When the bit rate is known to have changed, this Calibration function can be used to batch calibrate delays for multiple channels of the SI PPG and SI ED.

4. Bug Fixes

Version	Item	Fault
Ver. 12.03.01	G0447A settings may be initialized	Fixed an issue where the G0447A settings could be initialized when closing the External Box Setting screen while controlling the G0447A from MX190000A.
	G0447A parameters are not supported by external file operations	Fixed an issue in MX190000A where parameters related to the G0447A configured from the Ext. Box button were not supported by File Save/Load and Initialize.
	S4P file characteristics may not be reflected correctly	Fixed an issue where the characteristics of S4P files in DB or MA format were not reflected correctly when loaded into the MU195020A, MU196020A, or MU196020C.
	Auto Search accuracy improvement	Reviewed the search process in the MU196040B PAM4 ED to improve the accuracy of Advanced Auto Search.
	Bathtub measurement results may not be displayed correctly	Fixed an issue where the measurement result graph might not be displayed correctly during Bathtub measurement on the MU195040A SI ED.
Ver. 12.02.01	Data Out green indicator may not light at 64.2 Gbaud	Fixed an issue where the Data Out green indicator on the MU196020A PAM4 PPG did not light correctly during 64.2 Gbaud operation.
	Detect-Polling 2.5G repeats and does not transition to Loopback	Fixed an issue where Detect-Polling 2.5G repeatedly occurred during PCIe Link Training on the MU196040B PAM4 ED, preventing the transition to Loopback.
	Data transmission count may be incorrect when EIEOS is enabled in PCIe Gen6	Fixed an issue in BERT for PCIe1-6 Forced Link where data was not transmitted according to the configured transmission count when EIEOS insertion was enabled in PCIe Gen6.
	Reference Data may not be output correctly when synchronizing to a Gen6 CP pattern	Fixed an issue where the reference data read from DRAM was not output correctly when synchronizing to a PCIe Gen6 Compliance Pattern (CP) during Auto Search on the MU196040B PAM4 ED.
	Inner Loop may not be executed correctly under specific conditions	Fixed an issue in BERT for PCIe1-6 Forced Link where the Inner Loop did not execute correctly under specific conditions when used together with the Outer Loop function.
	Sequence operation may fail when transmitting a 256B NULL Flit with SKP×2 enabled	Fixed an issue in BERT for PCIe1-6 Forced Link where sequence operation could become abnormal when transmitting a 256B NULL Flit with SKP Symbol Length ×2 enabled in 128b/130b mode.

Version	Item	Fault
Ver. 12.01.03	Bit shift may occur when three or more SI PPG modules are installed	Fixed an issue where, when three or more MU195020A SI PPG modules were installed and used in a multi-channel configuration, a bit shift of 128-bit units (128 bits × N) could occur in the output signals between modules.
Ver. 12.01.02	Unable to meet the USB4v2 BERT specification	Fixed an issue where the Connection Guide needed to be revised following changes to the configuration of the J1943A MP1900A USB4v2 Measurement Component Set so that it satisfies the USB4v2 BERT specification in the MU196020A PAM4 PPG.
	Waveform differs on CH2 when using SI PPG Unit Sync	Fixed an issue where, when using the Unit Sync function in the MU195020A SI PPG, different pattern waveforms were output on CH1 and CH2.
	Bathtub measurements did not complete normally during simultaneous measurements with multiple modules.	Fixed an issue where, when Bathtub measurements were performed simultaneously using multiple MU195040A SI ED or MU196040B PAM4 ED modules, completing a measurement on one module caused the measurements on the other modules to terminate unexpectedly.
Ver. 10.07.12	Sync Loss occurs after Gen5 Link Training	Fixed an issue where, in a configuration using MU195040A SI ED, MU196020A PAM4 PPG, and MU196060A Re-Driver, Sync Loss occurred after executing PCIe Gen5 Link Training during loopback operation, preventing BER measurement.
	Detect–Polling 2.5G repeats and does not transition to Loopback during LTR	Fixed an issue where, in a configuration using MU196020A PAM4 PPG and MU196040B PAM4 ED, executing PCIe Link Training caused the Detect–Polling 2.5G state to repeat and failed to transition to Loopback.
	PAM4 ED Test Pattern setting is unintentionally changed when launching JTOL	Fixed an issue where, during BER measurement using the PCIe Gen6 Standard configuration, launching the JTOL application caused the Gray Code setting in the PAM4 ED Pattern configuration to be unintentionally switched ON, resulting in Sync Loss.
	Bit shift may occur at rates below 4 GBaud when two or more PAM4 PPG modules are installed in one MP1900A mainframe	Fixed an issue where a bit shift occurred in the output signal when two or more MU196020A PAM4 PPG modules were installed in a single MP1900A and operated in Inter Module Combination mode at data rates below 4 GBaud. This issue could occur when pressing the Delay Cal button on the PPG(2^{nd} Slot, 3^{rd} Slot or 4^{th} Slot) or when changing the bit rate to below 4 GBaud. This issue occurred in MX190000A versions V10.07.06 to V10.07.09.

Version	Item	Fault
Ver. 10.07.09	The measurement is not executed according to the Gating setting	Fixed an issue in the MU196040B PAM4 ED and MU195040A SI ED where Repeat measurement was executed even when Gating was set to Single (Target CL).
	Auto Search does not function properly in some applications	Fixed an issue in BERT for PCIe1–6 Forced Link where Auto Search did not function properly with the TS0 pattern.
Ver. 10.07.06	SCPI command for recalling Emphasis Preset file does not work properly	Fixed an issue in MU195020A SI PPG where the following SCPI command did not operate correctly: • :SYSTem:MMEMory:EMPHasis:PRESet:RECall
	Module communication lost after Multical when restarting the application	Fixed an issue where MU196020A PAM4 PPG modules disappeared after restarting the application if multiple modules were synchronized.
	Incorrect pattern used in Preset Calibration	Updated the pattern used for Preset Calibration for PCIe6 to the latest specification.
	Improved accuracy of Preset Calibration	Reviewed the Emphasis compensation process in MU196020A PAM4 PPG to improve calibration accuracy for PCIe6.
	Combination settings not saved in configuration file	Fixed an issue where Inter-Module Sync state was not saved in the MX190000A combination settings file.
	Auto Search accuracy improvement	We corrected the fine-tuning processes for CTLE, VTH, and Delay when Optimize for TX LEQ Test is set to OFF to improve the accuracy of Auto Search.
Ver. 10.05.02	The FEC Symbol ER acquisition command returns the Bit ER value	Fixed the issue that incorrect values were returned when executing the following SCPI command with MU196040B PAM4 ED. :CALCulate:DATA:PAM4:EALarm? "CURRent:PCI6:FEC:ER:TOTal"
	The content of FEC Error Distribution Result is different when saved by SCPI command and when saved on screen	Fixed the issue that when saving the FEC Error Distribution result by executing the following remote command for MU196040B PAM4 ED, items were missing compared to when saving from the GUI. :SYSTem:MMEMory:FED:STORe
	NRZ/PAM4 settings are not reflected when opening an older version of the configuration file	Fixed the issue with the MU196020A PAM4 PPG where the Modulation (NRZ/PAM4) settings were not reflected correctly when a setting file saved with Ver. 9.xx.xx was opened with Ver. 10.xx.xx.

Version	Item	Fault
Ver. 10.04.03	Noise greater than the setting is applied to Data Output when DM ON-Amp is set to 0	Fixed an issue where noise larger than the setting was applied when Differential mode noise was set to On and Amplitude was set to 0 mVpp or a small value close to it in the MU195050A Noise Generator.
Ver. 10.04.02	PAM4 ED+Re-Driver Auto Search fails	When using the MU196040B PAM4 ED in combination with the MU196060A Re-Driver, Auto Search fails even when an error of around E-6 can be measured. This issue has been fixed.
Ver. 10.03.04	Pattern settings may not be restored when opening a configuration file	When opening a setting file in which a pattern other than the PRBS pattern was selected for the MU196020A PAM4 PPG, the pattern setting was not restored correctly, and the screen display and the actual output pattern were different. This issue has been fixed. This phenomenon occurs in V10.03.02 of the MX190000A. If this occurs, calibration using Tektronix Automation Software may fail.
	Emphasis waveforms may not be output according to GUI settings on PAM4 PPG	Fixed an issue where the MU196020A PAM4 PPG would output a waveform with Emphasis weaker than the GUI setting when the MP1900A main unit was turned on, affecting the results of calibration using Emphasis. This phenomenon occurs in V10.02.00 to V10.03.02 of the MX190000A.
Ver. 10.03.02	RJ sometimes change every time SSC is turned ON	Fixed the issue that the RJ amount added to the signal changes every time SSC of the MU181500B jitter modulation source is turned ON.
	SI ED+Re-Driver Auto Search fails	Fixed the issue that Auto Search failed when using the MU195040A SI ED in combination with the MU196060A Re-Driver.
	The Capture function does not work with the NRZ pattern of PAM4 ED.	Fixed the issue that the Capture function does not work when the BERT for PCIe1-6 application is started and the MU196040B PAM4 ED is used in NRZ mode.
Ver. 10.01.02	Remote Control setting in MP1900A may not be reflected correctly.	Fixed a bug in which the settings in Change Remote Control Options are not reflected correctly in Remote Control settings in MP1900A.
Ver. 10.00.02	Clock Recovery lock failure occurs at a specific rate when PAM4 signal is input	Fixed the issue where a clock recovery lock failure occurred at a certain rate when inputting a PAM4 signal in the Clock Recovery function of the MU196060A Re-Driver, making it impossible to perform BER measurements, etc. This phenomenon occurs in V10.00.01 of the MX190000A

Version	Item	Fault
Ver. 10.00.01	Total Jitter changes depending on the order in which SJ and SSC are turned on.	Fixed the issue in which the total jitter amount added to the data signal changes depending on the order in which SJ and SSC are added on the MU181500B Jitter Modulation Source.
	Display position of module screen is not backed up.	Fixed the issue where the display position of the module setting screen that was used last time (left and right in case of two-split screen) was not backed up, and the slot position was displayed in ascending order of slot position each time the application was started. This phenomenon occurs in V9.00.00 to V9.02.03 of the MX190000A.
	Auto search of PAM4 ED Tracking settings fails.	Fixed the issue that the auto search fails when Input Condition is set to Tracking on MU196040B PAM4 ED.
	No signal is output when changing the test pattern after PCIe Link Training.	Fixed the issue that the PAM4 PPG pattern signal was not output when PCIe Link Training was performed using MU196020A PAM4 PPG and MU195040A SI ED and the test pattern was changed after Loopback Active.
Ver. 9.02.03	SI PPG Warming up indicator sometimes does not turn off.	Fixed the issue that the Warming up indicator on the MU195020A SI PPG does not turn off. This phenomenon occurs in V9.02.02 of the MX190000A.
Ver. 9.02.02	SI PPG/PAM4 PPG: Displayed Reference Clock was incorrect.	When evaluating PCIe3-6, the Reference Clock set/displayed on the **Misc 2** tab of the SI PPG MU195020A and PAM4 PPG MU196020A screen was different from the actual input/output clock signal. Modifications were made to match the displayed setting and the actual clock signal.
	EZ SCPI Creator failed to work.	Fixed the issue that prevented the EZ SCPI Creator function from generating a SCPI text file. This phenomenon occurs in V9.00.00 to V9.00.02 of the MX190000A.
	SI ED sometimes failed in the Bathtub measurement.	Fixed the issue that prevented SI ED from performing the Bathtub measurement when SI ED and PAM4 ED were installed together.
Ver. 9.00.02	PAM4 PPG: An error was found in an output signal synchronized by Inter module combination.	Fixed the issue that an error occurred in the output signal when two or four MU196020As were synchronized by the Inter module combination function. This phenomenon occurs in V9.00.00 and V9.00.01 of the MX190000A.

Version	Item	Fault
Ver. 9.00.01	PAM4 ED: Clock loss occurrence around 27 GBaud	Fixed the issue that Clock Loss occurred when some production lots of the PAM4 ED performed BER measurement with set as follows: - Clock Selection: Recovered Clock - Baud Rate: 27.01 to 27.05 GBaud
	SKP LFSR Parity in Gen6 MCP pattern was incorrect.	Fixed the value incorrectly calculated for SKP LFSR Parity in the PCIe Gen6 MCP pattern.
Ver. 9.00.00	Bit shift occurrence at Multi CH synchronization of PAM4 PPG	Fixed the issue that a bit shift occurred in the output signal if **Delay Calibration** was clicked when two or four MU196020As were synchronized by the Inter module combination function.
	Failed to recall test patterns with the SCPI command.	Fixed the issue that test patterns could not be recalled to PPG/ED with the following SCPI command: :SYSTem:MMEMory:PATTern:RECall
	Some SCPI commands did not work properly.	Fixed the issue that the following SCPI commands for MU196020A and MU196040B did not work properly. :SYSTem:MMEMory:PATTern:STORe :SYSTem:MMEMory:PATTern:RECall :SENSe:PATTern:PAM4:LANE
Ver. 8.03.14	Some errors were found in the PCIe 6 MCP, a test pattern of the MU196020A.	Fixed the errors in the PCIe 6 MCP, a test pattern of the MU196020A.
	The value set for Initial Frequency as SSC Profile may not match that actually output from the MU181500B.	Fixed the issue that the value set for Initial Frequency as SSC Profile sometimes did not match that actually output from the MU181500B.
Ver. 8.03.00	The Pattern Editor didn't work properly.	The Pattern Editor closed when a pattern with CR as a line feed code was loaded.
	Displayed values and indicators didn't match actual values and status when Diagnostics mode of the PAM4 ED was switched.	Measured values and indicators were sometimes displayed incorrectly when Diagnostics mode of the PAM4 ED was switched ON / OFF.
Ver. 8.02.00	The MU181500B cannot modulate SJ normally.	The floor noise may increase when the Amplitude value for SJ was increased by the SJ function of the MU181500B This phenomenon occurs in V7.02.31 to V8.01.31 of MX190000A.

Version	Item	Fault
Ver. 8.01.31	MX190000A freezes when the MU196040A is installed.	If the MP1900A is installed with MU196040A, the MX190000A freezes when starting Expert BERT or PAM4 Standard BERT in it. This phenomenon occurs in V8.00.3x of the MX190000A.
Ver. 8.00.31	Any remote command related to PAM4 PPG's Error Addition function always returned a parameter error.	If remote command or query related to PAM4 PPG's Error Addition function was sent, a parameter error was returned. :SOURce:PATTern:EADDition:BOTH:METHod :SOURce:PATTern:EADDition:FEC:AERatio :SOURce:PATTern:EADDition:FEC:ONELane:RATE :SOURce:PATTern:EADDition:FEC:BER:MODE
Ver. 7.02.31	Made modifications to PCIe 5 PLL Bandwidth test.	The PCIe 5 PLL Bandwidth Automation Software could not run the test successfully.
Ver. 6.02.02	Made modifications to the Built-in SJ2 function of the MU181500B.	The following modifications were made to the Built-in SJ2 function of the MU181500B. • Saved parameters may not be restored by Recall. • Even though SJ2 is Off, the upper limit for Amplitude of SJ1 is halved. On the specification, the upper limit for SJ1 is halved only when SJ2 is On.
	When Clock Selection for ED is set to **Recovered Clock** or **Clock and Data Recover**, Clock Loss may occur occasionally.	Intended modules: MU195040A / MU196040B When Clock Selection for ED is set to **Recovered Clock** or **Clock and Data Recovery**, Clock Loss may occur occasionally even if a PRBS-equivalent random pattern is input.
Ver. 6.01.05	Center Frequency does not reach the expected value when SSC Deviation for SI PPG is set to 3000ppm.	Center Frequency does not reach the expected value when, on the Misc2 tab of SI PPG, SSC Deviation is set to 3000ppm (Down-spread).
	SI ED may detect an error incorrectly.	When SI ED is used in 2ch Combination mode and the bit rate of the signals input to SI ED is changed repeatedly, SI ED incorrectly detects an error rarely even though no error occurred.
	The bit position may shift in Inter module combination mode when two or more PAM4 PPGs are installed on one MP1900A.	When two or more PAM4 PPGs are installed in one MP1900A, which is then set to Inter Module Combination mode, the first bits of the data streams output from the PAM4 PPGs may shift if the Baud Rate is changed from under / over 32.1G to over / under 32.1G.

Version	Item	Fault
Ver. 5.01.00	The PAM4 ED FEC Analysis Function may change the codeword boundary.	The PAM4 ED FEC Analysis Function occasionally changed the codeword boundary.
Ver. 5.00.90	The BER of the PAM4 PPG's Error Addition function may not match the one measured by the PAM4 ED.	When BER is specified by Total BER for All Lane of the PAM4 PPG's Error Addition function, the value of BER measured by the PAM4 ED may not match the BER measured by the PAM4 PPG.
Ver. 4.10.23	Caution may be displayed in the System Information screen.	When the MU196020A PAM4 PPG is installed, "Caution! Not screening!" is displayed at MU196020A in the System Information screen. Though this version meets the specifications, the jitter tolerance may be lower than the previous versions.
Ver. 4.10.20	In PAM4 ED, the response to the :SENSe:MEASure:ASEarch:STATe? command may be "-1".	If the current state is queried with the :SENSe:MEASure:ASEarch:STATe? command during Auto Search by PAM4 ED, the response may be "-1 Unsuccessful Termination" not the expected value "1 In progress".
Ver. 4.09.50	The Emphasis waveform of PAM4 PPG may not be output correctly.	The Emphasis waveform may not be output correctly when the Cursor value is set in the Emphasis tab of PAM4 PPG. This phenomenon occurs in MX190000A V4.09.41.
	The query command result of PAM4 ED is not obtained normally.	The following remote query command will always return "0,0,0,0". ":SENSe:MEASure:EALarm:ELAPsed?"
Ver.4.09.41	When the 32G ED is installed, object programming is requested.	Immediately after the MP1900A is powered on with the MU183040B or MU183041B installed, the program request icon ( ) is displayed on the System Toolbar displayed at the right side of the Application Selector screen. In this case, if you click **Expert BERT** in the Application Selector screen without programming, the application will start normally. If the MX190000A Installer is upgraded, program the module settings as requested.
Ver. 4.07.23	The MP1900A mainframe may not be recognized.	When Windows OS on the MP1900A is restarted, the MX190000A and MX1830000A may not operate normally because the MP1900A mainframe is not recognized by Windows.
	Multi-Channel Calibration may fail.	If you perform Multi-Channel Calibration using PAM4 PPGs, the calibration may stop at a progress rate of around 80%.

Version	Item	Fault
	A version mismatch may occur between MU183021A/MU183041A's firmware/FPGA and MX190000A.	When the update is made to the firmware and FPGA on the MU183021A/MU183041A installed in the MP1900A, restarting the MX190000A may cause "Version Mismatch" to be displayed in the State column of the MU183021A/MU183041A.
Ver. 4.07.20	The FEC Error Addition function of the PAM4 PPG may not add the set number of FEC Symbol errors, if **Symbol Error per Codeword** is set to 13 or more.	In FEC Symbol Error mode, the number of errors actually added by the Error Addition function of the MU196020A PAM4 PPG is sometimes less than the set value. This phenomenon occurs when **Symbol Error per Codeword** is set to "13" or more and error addition is performed in Single mode.
Ver. 4.03.12	Sometimes, the timeout error occur.	During startup of MX190000A, a timeout error may occur. If this phenomenon occurs, shut down MP1900A, and then power it on again. This phenomenon occurs in V3.08.16 to V4.02.10 of MX190000A.
Ver. 4.01.32	Setting a long data pattern to the PAM4 PPG may cause the application to exit.	For the MU196020A PAM4 PPG, an attempt to edit Data Pattern may cause the MX190000A to exit during data loading. This phenomenon occurs when setting Data Length to 60,000,000 bits or more.
Ver. 3.08.20	Sync Loss may occur in the SI ED.	Frequent changes to the bit rate of data input to the MU195040A SI ED may cause Sync Loss in the SI ED. This phenomenon occurs in V3.08.16 of MX190000A.
Ver. 3.08.16	32G PPG and SI PPG always returned a parameter error in response to the :COMBination:OPERation:PPGChsync command.	The MU183020A/21A 32G PPG and MU195020A SI PPG always returned a parameter error in response to the following remote command: :COMBination:OPERation:PPGChsync This command works normally when operating using the touch panel. This phenomenon occurs in V3.01.07 to V3.01.15 of MX190000A.
	Registered PAM4 FEC patterns were found to be incorrect.	The following PAM4 FEC patterns for MU196020A were incorrect. RS-FEC Scrambled Idle 50G 1Lane RS-FEC Scrambled Idle 200G 4Lanes RS-FEC Scrambled Idle 400G 4Lanes This phenomenon occurs in V3.00.07 to V3.01.15 of MX190000A.

Version	Item	Fault
	The USB ports on MP1900A occasionally did not work after powering on.	In rare cases, the USB ports on MP1900A occasionally did not work after powering on. If this phenomenon occurs, shut down MP1900A, unplug the power cable, wait until the standby LED lamp on the front panel goes out, and then power it on again. This phenomenon occurs in V1.00.02 to V3.01.15 of MX190000A.
	The Bathtub measurement occasionally outputs an incorrectly-shaped result.	During the Bathtub measurement, BERs become smaller only at specific points, and as a result, the slope of the approximate straight line occasionally differ from the measured BERs. This phenomenon occurs in V1.00.02 to V3.01.15 of MX190000A
Ver. 3.01.14	Half Period Jitter of PAM4 PPG may not work properly.	Half Period Jitter of MU196020A may not be set correctly. Even if Half Period Jitter is set to 0, this bug may cause Eye cross points to shift in the time-axis direction. This phenomenon occurs in V3.00.05 to V3.01.11 of MX190000A.
Ver. 3.01.11	When the MU196020A-x30 Data Delay is not installed, MX190000A fails to load a backup file at startup.	When the MU196020A-x30 Data Delay is not installed, the following phenomena occurs each time MX190000A is started. - An error message “Failed to load the backup file.” is displayed. - The on-screen settings you made for the MU196020A PAM4 PPG are initialized. Even when **File Open** is touched, MX190000A fails to load the PAM4 PPG configuration file and displays an error message. Due to this phenomenon, the PAM4 PPG outputs an NRZ signal at MX190000A startup. The output signal differs from the setting (PAM4). This phenomenon occurs in V3.00.05 to V3.01.10 of MX190000A.

Version	Item	Fault
Ver. 3.01.10	PAM4 ED measurement results may not be displayed properly.	If in the Gating area of the **Measurement** tab for PAM4 ED, the **Current** button is set to **OFF**, measurement results will not be displayed properly. Also, the following remote query commands will always return "-----". :CALCulate:DATA:PAM4:EALarm? "LAST:FREQuency" :CALCulate:DATA:PAM4:EALarm? "LAST:LSB:EC:TOTal" :CALCulate:DATA:PAM4:EALarm? "LAST:MSB:EC:TOTal" This phenomenon occurs in V3.01.07 to V3.01.08 of MX190000A.
Ver. 3.01.10	Bit shift may occur in the Inter-Module Synchronization function.	With the MU196020A PAM4 PPGs installed in slot 1 to 4, the MU196020A-x50 Inter-Module Synchronization may cause the PAM4 PPG in slot 4 to generate a pattern having a bit shift of 1 bit or more when using at a baud rate of 32.1 Gbaud or less. This phenomenon occurs in V3.01.07 to V3.01.08 of MX190000A.
Ver. 3.01.07	SI PPG's ISI function may not work properly.	When ISI function of SI PPG is in grouping operation, ISI waveform may not be reflected correctly.
	Emphasis waveform of SI PPG may not be output correctly.	When generating PAM4 waveform using SI PPG and G0375A, the waveform may not be output correctly when set to specific values.
Ver.2.04.00	Sometimes, errors occur in the data output of the PPG when frequency changed.	Sometimes, errors occur in the data output of the MU183020A/21A 32G PPG when frequency changed.
Ver.2.03.05	Sometimes, module GUI not displayed when starting MX190000A.	With Expert BERT or Standard BERT selected when starting MX190000A, sometimes module control GUI either not displayed or freezes. Bug occurs in MX190000A version 1.00.02 to V2.02.00.
	Multi Ch Cal fails with configurations using 1ch SI PPG	Calibration fails when attempting to execute Multi Channel Calibration with module configuration using MU195020A 1ch SI PPG not supporting Multi Channel function. Modifications made to exclude 1ch SI PPG as target for Multi Channel function. Bug occurs in MX190000A version 1.00.02 to V2.02.00.

Version	Item	Fault
	Multi Ch Cal recommendation message displayed repeatedly over.	Calibration recommendation message wrongly displayed over when restarting MP1900A after executing Multi Channel Calibration. Modifications made to prevent message display if module configuration unchanged after executing Multi Ch Cal. Bug occurs in MX190000A version 1.00.02 to V2.02.00.
Ver.2.02.02	Sometimes, PAM4 signal Auto Search does not operate normally when changing Pattern Logic at 32G ED.	Sometimes, the PAM4 signal Auto Search function does not operate normally when the Pattern Logic setting (Positive/Negative) at the MU183040B 32G ED is set to Negative. This bug occurs in MX190000A V1.00.02 to V2.00.00.
Ver.2.00.00	Sometimes, application run by :SYSTem:CFUNction freezes.	Sometimes the application freezes when attempting to set :SYSTem:CFUNction using a remote command. This bug occurs with MX190000A V1.00.02 to V1.02.04.
	No MX190000A GUI operation	The GUI fails to start if the redistributed Visual Studio2013 library is not installed. The redistributed Visual Studio2013 library is included in the installer from this version. This bug occurs with MX190000A V1.00.02 to V1.02.04.
	Unable to set optimum value using PAM4 signal Auto Search	Sometimes, the PAM4 signal Auto Search function sets a different value from the optimum value. This bug occurs with MX190000A V1.00.02 to V1.02.04.
	Version mismatch occurs at application start after power-on	When the MX190000A control software is first started after powering-on the MP1900A, a version mismatch occurs because the MU183040B version information has not been correctly updated. After the MX190000A has been launched on a Standard BERT or Expert BERT and then quit, the correct version information is updated when it is next launched.
	MP1900A unable to recover from Remote status and freezes.	Sometime, the MP1900A fails to recover from the Remote status and operation freezes when the Return to Local button is pressed to return the MP1900A from remote operation to the local status. This bug occurs with MX190000A V1.00.02 to V1.02.04.

Version	Item	Fault
Ver.1.02.04	Sometimes, SI PPG Delay Busy lamp lights and error inserted	Sometimes, the MU195020A SI PPG Delay Busy lamp lights at any bit rate and an error is inserted in the output pattern. This fault occurs in MX190000A V1.00.02 to V1.01.03.
	Sometimes, Lower Eye Search fails at SI ED PAM4 auto-search	Sometimes, the Lower Eye search fails when executing auto-search and inputting a PAM4 signal at the MU195040A SI ED. This fault occurs in MX190000A V1.00.02 to V1.01.03.
	Sometimes, BER measurement does not become error free when using Zero- Substitution pattern at SI ED	Sometimes, the BER measurement does not become error free when using a Zero-Substitution pattern at the MU195040 SI ED. This fault occurs when the Length setting is 2^9 or 2^10.
Ver.1.01.03	Bug in Combination setting remote command causes error	Sometimes a parameter error occurs when attempting to set Combination using the remote command. :COMBination:OPERation:CHSetting

5. Known Issues

Version	Item	Fault
Ver. 12.02.01	G0447A parameters are not supported by File Save/Load	Parameters related to the G0447A configured from the Ext. Box button are not supported by the File Save/Load function. If it is necessary to retain the configured settings, use the G0447A control function provided by MX183000A.
Ver. 10.03.02	Using an external clock can degrade the PAM4 PPG output	When using the MU181000B Synthesizer 100MHz external clock, the output amplitude of the MU196020A PAM4 PPG may decrease. If this issue occurs, change the Operation Bitrate of the PAM4 PPG.
	Immediately after starting the app, an unintended PAM3 pattern may be output.	Immediately after starting an application, the PAM3 Data pattern of the MU196020A PAM4 PPG may output an unintended pattern. If this issue occurs, reload the data pattern file.
Ver. 10.02.00	Middle Eye may not be drawn in Eye Contour measurement	When performing Eye Contour measurement of the PAM4 signal with the MU196040B, the Middle Eye may not be drawn. If the phenomenon occurs, perform the Eye Contour measurement again.
Ver. 10.00.01	BER may vary by about E-2.	When performing BER measurement with 32GBaud PAM4 using a combination of MU196060A and MU196040B, the BER may vary by about E-2.
Ver. 9.00.00	Unstable output occurrence during the first 3 ms after switching patterns.	During 3 ms after switching test patterns for the MU196020A, an unstable signal may be output. Wait until **Data** turns green, and then start measurement.
Ver. 2.00.00	Object programming error in rare cases	During updating of a programmable object from the Module Setting screen, sometimes (very rarely) the update fails with a hang. In this case, turn off the MP19000A, restart it, and update again after restarting.

6. Specification Changes

Item	Version	Description
The specification of Option-w43 of PAM4 ED has been changed.	New specification (V12.01.02 and later)	The FBER (First Bit Error Rate) measurement function is available regardless of whether the Option-w43 FEC Analysis for PCIe6 is installed in the MU196040B PAM4 ED.
	Old specification (V11.00.01 or earlier)	The FBER (First Bit Error Rate) measurement function is provided by the Option-w43 FEC Analysis for PCIe6 of the MU196040B PAM4 ED.
The step sizes of SJ1, SJ2, Built-in SJ2, and RJ of the MU181500B Jitter Modulation Source have been updated.	New specification (V12.01.02 and later)	From V12.01.02, the step sizes of SJ1, SJ2, Built-in SJ2, and RJ of the MU181500B Jitter Modulation Source have been updated. For detailed information on the specific step values, refer to the Help screen.
The preset values for SI and PAM4 PPG are changed according to changes to TBT3.	New specification (V10.03.02 and later)	When on the Emphasis tab of the MU195020A SI PPG and MU196020A PAM4 PPG, Preset 14 is selected for Standard/Preset TBT3, coefficients are set as follows: C-1: -0.17, C0: 0.83, C+1: 0.00
	Old specification (V10.02.00 or earlier)	When on the Emphasis tab of the MU195020A SI PPG and MU196020A PAM4 PPG, Preset 14 is selected for Standard/Preset TBT3, coefficients are set as follows: C-1: -0.13, C0: 0.74, C+1: -0.13
A change has been made to the step size for the Half Period Jitter function of PAM4 PPG.	New specification (V8.00.30 and later)	The range of Half Period Jitter on the **Output** tab for the MU196020A PAM4 PPG is -20.0 to +20.0 in steps of 0.1.
	Old specification (V7.02.31 or earlier)	The range of Half Period Jitter on the **Output** tab for the MU196020A PAM4 PPG is -20 to +20 in steps of 1.
The preset values for SI PPG is changed according to changes to USB4.	New specification (V6.01.05 and later)	When on the Emphasis tab of the MU195020A SI PPG, Preset 14 is selected for Standard/Preset USB4, coefficients are set as follows: C-1: -0.17, C0: 0.83, C+1: 0.00
	Old specification (V6.00.02 or earlier)	When on the Emphasis tab of the MU195020A SI PPG, Preset 14 is selected for Standard/Preset USB4, coefficients are set as follows: C-1: -0.13, C0: 0.74, C+1: -0.13
The preset values for SI PPG and SI ED are changed according to changes to SAS and TBT3.	New specification (V5.00.90 and later)	When SAS4 is selected for Bitrate of the MU195020A SI PPG or MU195040A SI ED, the bit rate is set to 24G. When on the Emphasis tab of the MU195020A SI PPG, Preset 14 is selected for Standard/Preset TBT3, coefficients are set as follows: C-1: -0.13, C0: 0.74, C+1: -0.13
	Old specification (V4.10.23 or earlier)	When SAS is selected for Bitrate of the MU195020A SI PPG or MU195040A SI ED, the bit rate is set to 22.5G. When on the Emphasis tab of the MU195020A SI PPG, Preset 14 is selected for Standard/Preset TBT3, coefficients are set as follows: C-1: -0.09, C0: 0.64, C+1: -0.27

Item	Version	Description
The PAM4 ED's behavior during capturing has been changed.	New specification (V5.00.90 and later)	Even if a Sync Loss occurs in the PAM4 ED that is capturing data, the data captured so far will be maintained.
	Old specification (V4.10.23 or earlier)	If a Sync Loss occurs in the PAM4 ED that is capturing data, the data captured so far will be cleared.
The default setting of Output Clock Rate for PAM4 PPG has been changed to Halfrate.	New specification (V4.01.32 and later)	The default setting of **Output Clock Rate** on the **Misc2** tab for the MU196020A PAM4 PPG has been changed to **Halfrate**.
	Old specification (V3.00.05 to V3.08.20)	The default setting of **Output Clock Rate** on the **Misc2** tab for the MU196020A PAM4 PPG was **Fullrate**.
The default setting of Pre Coder for FEC pattern has been changed to OFF.	New specifications (V3.08.16 and later)	On the **Pattern** tab of the Option-x42 FEC Pattern Generation for MU196020A PAM4 PPG, the default setting of **Pre Coder** for RS-FEC pattern has been changed to **OFF**. Note that **Pre Coder** is available in PAM4 mode only. Changes have been made to the following patterns: RS-FEC Scrambled Idle 50G 1Lane RS-FEC Scrambled Idle 200G 4Lanes RS-FEC Scrambled Idle 400G 4Lanes RS-FEC Scrambled Idle 400G 8Lanes
	Old specifications (V3.00.05 to V3.01.15)	On the **Pattern** tab of the Option-x42 FEC Pattern Generation for MU196020A PAM4 PPG, the default setting of **Pre Coder** for RS-FEC pattern was **ON**.
A change has been made to the error rate setting procedure for RS-FEC Symbol Error insertion by PAM4 PPG.	New specifications (V3.08.16 and later)	On the **Error Addition** tab of the Option-x42 FEC Pattern Generation for MU196020A PAM4 PPG, the definition of Total SER for All Lane has been changed. In this version and later, BER decoded into an NRZ signal is used as a reference. For details of the error rate inserted in each lane, see on-screen help.
	Old specifications (V3.00.05 to V3.01.15)	In MX190000A, the RS-FEC Symbol Error function for MU196020A inserted an error rate, referring to the symbol error of the PAM4 signal as a reference.

7. Usage Notes

The precautions for using each version are described below.

7.1 Ver. 1.00.02 and Later

7.1.1 Precautions when Creating PAM Waveforms with MU195020A-020

PAM4 signals can be generated using the MU195020A-020 and 32 Gbaud Power PAM4 Converter G0375A. When executing the PAM4 Jitter Tolerance test, test with the MU195020A Jitter Input set to ON. In this case, execute PAM4 waveform adjustment with Jitter Input set to ON. Sometimes, if Jitter Input is set to ON after having been set to OFF, the adjusted PAM4 waveform may change.

7.1.2 Precautions when Generating SJ2 with MU181500B

SJ2 Jitter can be generated when the MU181500B and MU181000A/B are installed simultaneously in the MP1900A.To assure the SJ2 accuracy, the MU181500B and MU181000A/B installed simultaneously in the MP1900A must have been adjusted as a pair, so confirm the contents of the following calibration label attached to the MU181500B panel.



If the MU181500B and MU181000A/B installed in the same MP1900A are not a matched calibrated pair, the SJ2 Jitter accuracy cannot be assured; contact our sales representative.

7.2 Ver. 2.00.00 and Later

7.2.1 Precautions when using MU195040A

The 21G/32G bit/s SI ED MU195040A operates with software installer version 2.00.00 or newer. Function and performance specifications may not be satisfied if the installer version is older than version 2.00.00.

7.3 Precautions when recovering MP1900A

Executing a system recovery disables the activated MX183000A license. Before performing the system recovery, refer to 2.4 “License Key Activation” in the MX183000A High-Speed Serial Data Test Software Operation Manual and transfer the license to another PC temporarily. Please note that once disabled, the license key cannot be used anymore. In case you have disabled the license key, contact an Anritsu Service and Sales office.

7.4 Ver. 3.08.16 and Later

Note that Microsoft released the symptoms that occur when installing this Windows Update. For details, refer to the following page:
https://support.microsoft.com/en-us/help/4493472/windows-7-update-kb4493472

If these symptoms occur on MP1900A, the following two phenomena will occur.

1. MX190000A will not start.
2. The network adapter settings are initialized, and as a result, remote connection becomes unavailable.

Follow the recovery actions below:

1. Reinstall MX190000A V3.08.16 or later, and start MX190000A again.
2. If the network settings were configured manually, go to Network and Sharing Center and configure the Local Area Connection settings again.
   If you want to restore the Local Area Connection settings to the factory default values, execute the mp1900a_ip_setting.bat file installed on the desktop of MX190000A V3.08.16 or later.

7.5 Precautions for Using the MU195020A-50/51

The MU195020A-50 Sequence Editor Function and MU195020A-51 Sequence Editor Function PCIe 5 Extension options can work with the following software versions. Please note that older versions of the installers will not meet its functional and performance requirements.

MX190000A: Ver. 7.02.20 or later
MX183000A: Ver. 7.02.26 or later

7.6 Precautions for Using the MU196040B-42

The MU196040B-42 FEC Analysis Function Option can work with the following software versions. Please note that older versions of the installers will not meet its functional and performance requirements.

MX190000A: Ver. 5.00.90 or later
MX183000A: Ver. 5.00.30 or later

7.7 Precautions for Using the MU196040B-05/15/25

Special care is required regarding the installer when using the MU196040B-05/15/25 64G baud / 32G to 64G baud Extension / 58G to 64G baud Extension options.
When the MU196040B-05/15/25 is installed, the maximum BER measurement frequency for each application varies depending on the software version, as shown in the table below.

Application	- BERT for PCIe1-7	- Standard BERT for PAM4 - Expert BERT	- BERT for PCIe1-6 Forced Link
Ver. 11.xx.xx	64.2 Gbaud	64.2 Gbaud	32.1 Gbaud
Ver. 12.01.02 and later	32.1 Gbaud	64.2 Gbaud	32.1 Gbaud

7.8 Precautions for Using an USB Wi-Fi adapter

If a commercially available USB Wi-Fi adapter is installed to the MP1900A WES7, an error may occur in the MX190000A due to memory leak between WES7 and USB Wi-Fi adapter. In such a case, stop using the USB Wi-Fi adapter and uninstall the USB Wi-Fi adapter driver.

7.9 Software Version Compatibility List

When using the MX190000A and MX183000A high-speed serial data test software, it is necessary to combine those with compatible software versions for guaranteed performance. See the table below.

MX190000A	MX183000A	Windows Update Support No.	
		WES7	Windows10 IoT
V1.00.02	V2.00.00	-	-
V1.01.03	V2.01.00	-	-
V2.00.00	V3.00.00	-	-
V2.02.00	V3.01.00	-	-
V2.03.00	V3.02.00	KB4093118	-
V2.05.00	V3.04.00	KB4093118	-
V3.00.05	V3.06.16	KB4467107	-
V3.01.07	V3.07.12	KB4467107	-
V3.08.16	V3.08.05	KB4499178	-
V4.01.32	V4.00.08	KB4499178	-
V4.02.10	V4.02.10	KB4499178	-
V4.03.12	V4.03.15	KB4536952	-
V4.03.13	V4.03.15	KB4536952	-
V4.06.02	V4.06.03	KB4541731	-
V4.07.20	V4.06.03	KB4541731	-
V4.07.23	V4.06.03	KB4541731	-
V4.09.41	V4.09.15	KB4541731	-
V4.09.50	V4.09.15	KB4541731	-
V4.10.20	V4.10.05	KB4541731	KB4580390
V4.10.23	V4.10.05	KB4541731	KB4580390
V5.00.90	V5.00.30	KB4541731	KB4598230
V5.01.00	V5.00.30	KB4541731	KB4598230
V6.00.02	V5.00.30	KB4541731	KB5000854
V6.01.05	V6.00.05	KB4541731	KB5003703
V6.02.02	V6.00.05	KB4541731	KB5004308
V7.02.30	V7.02.30	KB4541731	KB5004308
V7.02.31	V7.02.31	KB4541731	KB5006744
V8.00.30	V8.00.30	KB4541731	KB5007266
V8.00.31	V8.00.30	KB4541731	KB5007266
V8.01.31	V8.01.31	KB4541731	KB5009718
V8.02.00	V8.01.31	KB4541731	KB5009718
V8.03.00	V8.03.00	-	KB5010791
V8.03.00	V8.03.02	-	KB5010791
V8.03.14	V8.03.13	-	KB5014022
V9.00.00	V9.00.00	-	KB5017855
V9.00.01	V9.00.00	-	KB5017855
V9.00.02	V9.00.00	-	KB5022840
V9.02.02	V9.02.03	-	KB5023702

MX190000A	MX183000A	Windows Update Support No.	
		WES7	Windows10 IoT
V9.02.03	V9.02.04	-	KB5027536
V10.00.01	V10.00.01	-	KB5030214
V10.00.02	V10.00.01	-	KB5030214
V10.01.02	V10.01.00	-	KB5034273
V10.02.00	V10.02.02	-	KB5038283
V10.03.02	V10.03.01	-	KB5042350
V10.03.04	V10.03.02	-	KB5044277
V10.04.02	V10.04.02	-	KB5050008
V10.04.03	V10.04.02	-	KB5053596
V10.05.02	V10.05.00	-	KB5062557
V10.07.06	V10.07.01	-	KB5071544
V10.07.09	V10.07.01	-	KB5071544
V10.07.12	V10.07.03	-	KB5078752
V12.01.02	V12.01.01	-	KB5082123
V12.01.03	V12.01.01	-	KB5087538
V12.02.01	V12.02.01	-	KB5099538
V12.03.01	V12.03.02	-	KB5126043

7.10 Precautions When Replacing Modules

If the module installed in the MP1900A has the serial number below, it can be operated with the specified version of the software.

Model Name	Serial Number	Performance-Guaranteed Software Version
MU196040B	6262081219 or greater	4.03.13 or newer
MU195040A	6272288328 or greater	6.00.02 or newer

For example, when replacing the module installed in the MP1900A with such as one purchased additionally, update the software with the latest installer before using.

7.11 Precautions for using network monitoring tool

When using the MP1900A with a network connection, the operation of the MP1900A may become unstable when using tools that monitor the connection of devices on the connected network. In these cases, discontinue use of the tool.