HYUNDAI AUTOEVER

AUTOSAR CanNm User Manual

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Table of Contents

1 Overview

This document is created based on the AUTOSAR SWS CANNetworkManagement Specification. For more detailed functional description, please refer to the below reference documents.

The following terms on configuration category mean:

- Changeable (C): Items that can be configured by user
- Fixed (F): Items that cannot be changed by user
- NotSupported (N): Items that are not used

2 Reference

Sl. No.	Title	Version
1	AUTOSAR SWS CANNetworkManagement	4.1.3

3 AUTOSAR System

3.1 CanNm Module

The CanNm module performs the following to synchronize the SLEEP entry of controllers on the same network based on the Autosar CanNm specification.

- Handle network request and release request of controllers
- Handle remote or local wake-up requests
- Provide network configurations
- Perform the procedure for CAN Bus Sleep synchronization

4 Product Release Notes

4.1 Overview

This chapter is intended to provide the release information on the Hyundai AutoEver CanNm module, describing the features and restrictions of different versions of the CanNm software product.

4.2 Scope of the Release

All content in this document is limited to the following Hyundai AutoEver CanNm modules.

Module name	AUTOSAR version	Module version
CanNm	4.1.3	2.5.1

※ Module version refers to the SW version of the BswModule Description (Bswmd) file of each module.

4.3 Change Log

4.3.1 Version 2.5.1.0

- Bug
  - The time of disable interrupt in CanNm_Mainfuction takes more than 100us, so interrupts can be delayed

Rationale	The time of disable interrupt in CanNm_Mainfunction takes more than 100us
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Improvement
  - Improve the generation result not to be changed when the configuration is not changed

Rationale	The order of generation data is not considered during generation
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.2 Version 2.5.0.0

- Feature
  - HMC Passive Node

Rationale	Apply ES95480-03 Passive Node Requirements
Impact on behavior	When the CanNmPassiveNodeEnabled setting is True, NmMessage transmission in NOS state is suspended
Impact on settings	CanNmGlobalConfig/CanNmPassiveNodeEnabled
Required ASW actions	N/A

- Feature
  - Change Wait Bus Sleep Time API

Rationale	CanNm_ChangeTWaitBusSleep(TwaitBusSleep) API development to provide Changing CanNmWaitBusSleep functionality of entire channel when ChangeTwaitBusSleepEnabled setting is True
Impact on behavior	When calling the Nm_ChangeTWaitBusSleep() API within ASW immediately after the BSW initialization time, change to CanNmWaitBusSleep() Argument value for all channels (unit is msec)
Impact on settings	CanNmGlobalConfig/CanNmChangeTwaitBusSleepEnabled
Required ASW actions	N/A

4.3.3 Version 2.4.1.0

- Improvement
  - Compile warning improvements

Rationale	Designating a global variable Section whose Section is not specified
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Bug
  - When a Network Request request occurs when the current state is Repeat Message State and the next state is Ready Sleep, the Network Request is not processed properly and the problem of transition to Bus Sleep has been improved.

Rationale	There is no exception handling logic when a Network Request request occurs when the current state is Repeat Message State and the next state

	is Ready Sleep.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.4 Version 2.4.0.0

- Feature
  - Nm Coodinator Feature Development

Rationale	Nm Coodinator Feature Development
Impact on behavior	N/A
Impact on settings	1. NM Coordinator function requires setting below to 'true' CanNmGlobalConfig/CanNmBusSynchronizationEnabled, CanNmGlobalConfig/CanNmRemoteSleepIndEnabled, CanNmGlobalConfig/CanNmChannelConfig/CanNmRemoteSleepIndTime 2. When using the NM Coordinator function in the Sub-Nested structure, the setting below must be set to 'true'. CanNmGlobalConfig/CanNmCoordinatorSyncSupport
Required ASW actions	N/A

4.3.5 Version 2.3.1.0

- Improvement
  - Support Post Build Selectable for Pn Filter Mask

Rationale	Support Post Build Selectable for Pn Filter Mask so that the Pn Filter Mask Value of specific Variant can be applied to CanNm module when CanNm module initialization
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Bug
  - Incorrect memory access problem when applying Post Build

Rationale	When applying Post Build, the channel index has been generated with wrong value then the overflow occurs when arrays are referenced via the channel index
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Improvement
  - Improve to set user data initialization value

Rationale	Add parameter CanNmUserDataInitValue to configure Initial Byte Value for User Data Field other than 0xFF. The default value should be 0xFF according to AUTOSAR Specification.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.6 Version 2.3.0.0

- Feature
  - Support Post Build Selectable for parameter Node Id of CanNmConfigChannel

Rationale	Support Post Build Selectable for parameter Node Id of CanNmConfigChannel so that Node Id of specific Variant can be applied to CanNm module when CanNm module initialization
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.7 Version 2.2.7.0

- Defect
  - When receiving a diagnostic message in Ready Sleep State after requesting NO COM, a problem of not entering NO COM occurred.
    Due to this, added NOK return logic when Network Release is not in Normal Operation State / Repeat Message State

Rationale	When the current state of CanNm is Ready Sleep State and the next state is Normal Operation State (transition to Normal Operation State in the next CanNm Mainfunction), when a Network Release is requested, the current state of CanNm is Ready Sleep State. For this reason, when a Network Release request is made, it does not normally enter Sleep and transitions to Normal Operation State.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Defect
  - Improvement of NO_COM not entering in Bus Off state (maintaining Ready Sleep State)

Rationale	When Bus Off occurs, CanNM_DisableCommunication function is called, and Network Timeout Timer is stopped within the function.

	And after Bor Timer, CanNM_EnableCommunication function is called, and Network Timeout Timer is initialized within the corresponding function. If BusOff is continuously occurring, Network Timeout Timer may not expire in Ready Sleep State (CanNm_DisableCommunication <=> CanNm_EnableCommunication is repeatedly called, so entering into PBSM is impossible).
Impact on behavior	When BusOff occurs, communication is disabled without stopping the timer When BusOff Recovery is attempted, communication is enabled without starting the timer
Impact on settings	BswM Rule settings need to be changed (refer to Confluence) (https://swpfaq.hyundai-autoever.com/x/nIdKAg)
Required ASW actions	N/A

- Improvement
  - Improved to retry only when transmitting Nm and sending immediate Nm

Rationale	When Message Timeout occurs or when sending request is not returned as OK, Nm duplicate transmission may occur by retrying. (In case of Immediate Nm, if it is not returned as OK in Autosar Spec, retry)
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.8 Version 2.2.6.0

- Improvement
  - When receiving nm msg with a length of Partial Network Infomation (8Byte Nm) that is smaller than the length of PN Info (Extended Nm), an adjacent memory area as large as the Extended CanNm Info Length is read and incorrect pnc mode control operation problem occurs for the unrelated pn

Rationale	Instead of checking the memory area by the length of the received PN Info, the memory area is checked by the length of the PN Info of Extended Nm.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.9 Version 2.2.5.0

- Improvement
  - UNECE Cyber Security

Rationale	UNECE Cyber Security.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW	N/A

actions	

4.3.10 Version 2.2.4.0

- Improvement
  - Fix const variable that is not specified in memory section

Rationale	Some variables in the generator generate code without designating a memory section.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Task
  - Change of company name & Specify scope of use

Rationale	Change of company name & Specify scope of use.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Defect
  - Fix an issue where if repeat message timer is expired and network release is made before normal operation state transition, no com is not entered

Rationale	After the full-com request, if the repeat message timer expires in the repeat message state and a network release is requested just before the transition to the normal operation state, the transition to the normal operation state occurs without transitioning to the ready sleep state
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.11 Version 2.2.3.0

- Improvement
  - Insert the code to sort the input file list in the generator

Rationale	Insert the code to sort the input file list in the generator.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Improvement
  - Remove constraint between CanNmImmediateNmCycleTime, CanNmMsgTimeoutTime,

Improved Msg Timeout Value of CanNmImmediateNmCycleTime

Rationale	When Nm Msg Timeout occurs, transmission message is dropped due to Controller Reset. Therefore, in order to reduce the occurrence of Nm Msg Timeout, CanNmMsgTimeoutTime can be modified to be set as much as CanNmMsgCycleTime.
Impact on behavior	Timeout of Immediate Nm operates in Immediate Nm Cycle. Timeout of Nm periodic operates as CanNmMsgTimeoutTime set.
Impact on settings	N/A
Required ASW actions	N/A

- Improvement
  - Improved the problem of not entering Sleep when requesting to enter NO COM in critical voltage state

Rationale	Improved the problem of not entering Sleep when requesting to enter NO COM in critical voltage state.
Impact on behavior	When entering critical voltage, communication is disabled without stopping the timer. When normal voltage is restored, communication is enabled without starting the timer.
Impact on settings	BswM Rule setting change required. (refer to Appendix 9.1)
Required ASW actions	N/A

4.3.12 Version 2.2.2.0

- Improvement
  - Add Rx Data Length Check Logic

Rationale	Add rx data length check logic. (receivable data length: 8, 12, 16, 20, 24, 32, 48, 64)
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.13 Version 2.2.1.0

- Improvement
  - Made code improvement to comply with the UNECE Cyber Security regulations

Rationale	Required to comply with the UNECE Cyber Security regulations.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.14 Version 2.2.0.0

- New feature
  - Extended PNC

Rationale	By increasing the support for NM from 8B to 64B, extend the PNC range from 32 to 480.
Impact on behavior	CanNmPnInfo range increase
Impact on settings	CanNmPnInfo [/AUTOSAR/CanNm/CanNmGlobalConfig/CanNmPnInfo]
Required ASW actions	N/A

- Improvement
  - Made a change to use a normal cycle, not immediate cycle when receiving node detection requests

Rationale	Add ES standard for node detection
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

- Improvement
  - Modified gray items for MISRA 2012

Rationale	Modified gray items for MISRA 2012
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.15 Version 2.1.1.0

- Improvement
  - Resolved failure to enter NoCom when NoCom/FullCom modes are repeated.

Rationale	If FullCom is requested when the timer value of Network Timeout is ‘0’ in the ReadySleep state, NoCom entry fails due to a logic error.
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.16 Version 2.1.0.1

- Improvement
  - Compliance with MISRA 2012

Rationale	Compliance with MISRA 2012
Impact on behavior	N/A

Impact on settings	N/A
Required ASW actions	N/A

4.3.17 Version 2.1.0.0

- Improvement
  - Applied the latest byte value for NM State

Rationale	Applied the latest byte value for NM State
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

  - Allow the CanNM module to support PduR N:M Mapping

Rationale	Allow the CanNM module to support PduR N:M Mapping
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

  - Added a feature to support PNC without CanTrcv calling ConfirmPnAvailability (Only support selective sleep, without selective wakeup)

Rationale	Added a feature to support PNC without CanTrcv calling ConfirmPnAvailability (Only support selective sleep, without selective wakeup)
Impact on behavior	N/A
Impact on settings	N/A
Required ASW actions	N/A

4.3.18 Version 2.0.1

- Improvement
  - Applied changes specification in ImmediateNmCycleTime and ImmediateNmTransmissions

Rationale	Changes specification in partial networking
Impact on behavior	ImmediateNmCycleTime: 10ms ImmediateNmTransmissions: 2 Default value applied
Impact on settings	N/A
Required ASW actions	N/A

  - Fixed an issue where Immediate Nm Message was sent in Passive Wakeup

Rationale	Fixed an issue where Immediate Nm Message was sent in Passive Wakeup

Impact on behavior	In Passive Wakeup, Cycle Nm Message is sent, not Immediate Nm Message.
Impact on settings	N/A
Required ASW actions	N/A

4.3.19 Version 2.0.0

- New feature
  - Initial release of the CanNm module

Rationale	Initial release of the CanNm module
Impact on behavior	Synchronize the SLEEP entry of controllers on the same network
Impact on settings	Required to add CanNm module configuration
Required ASW actions	Required to add CanNm module configuration

4.4 Module Release Notes

4.4.1 Limitations

- The BusLoadReduction feature is not supported
  This feature ensures reduced bus load by delaying NM Pdu transmission during CanNmMsgReducedTime when receiving NM PDUs from another controller on the same network. The feature is currently not supported.
- The ImmediateRestart feature is not supported
  The feature ensures that the transmission of a NM PDU is requested
  immediately upon network request in the Prepare-Bus-Sleep Mode. The feature is currently not supported.

- The ImmediateTxconf feature is not supported
  The feature ensures that Nm Pdu Transmission is regarded as successful without receiving Tx Confirmation. The feature is currently not supported.

- The CarWakeUp feature is not supported
  By defining CarWakeUp Bit, the feature calls Notification Callback when receiving a NM Pdu if CarWakeUp Bit in the NM Pdu is enabled. The feature is currently not supported.

4.4.2 Deviations

- User Data Init Value Configuration Support
  In AUTOSAR CanNm Specification, User Data Field should be initialized with 0xFF, but AUTOEVER provides User Data Init Value configuration to enable user to configure it.

- Remote Sleep Cancellation Support for CanNm Disable Communication
  In AUTOSAR CanNm Specification, There is no descriptions of Remote Sleep Cancellation call in Disable Communication state, CanNm_RemoteSleepCancellation() will be called for initializing Detection of Remote Sleep Indication. (If support “Nm Coordinator” Functionality in AUTOSAR 4.3.1)

- CanNm_ChangeTWaitBusSleep() API Functionality
  An API function that can change the value of "CanNmWaitBusSleepTime" existing in each channel,

although not described in the AUTOSAR CanNm specification. It is an interface called by the Nm module in msec unit and operates to change the "CanNmWaitBusSleepTime" of the entire channel with the value of TwaitBusSleep assigned as an argument.

- Non-sent Nm messages from Normal Operation State when using ES Passive Node
  Although it is not described in the AUTOSAR CanNm specification, it is a passiveNode feature within ES95480-03 that supports sending NmMessages in the corresponding controller Normal Operation State when the CanNmGlobalConfig/CanNmPassiveNodeEnabled setting is true.

5 Configuration Guide

The CanNm configuration for the AUTOSAR platform distributed by Hyundai AutoEver reflects the policies of Hyundai AutoEver and therefore any changes require consultation with Hyundai AutoEver.

5.1 CanNmGlobalConfig

Parameter Name	Value	Category
CanNmBusLoadReductionEnabled	-	N
CanNmBusSynchronizationEnabled	-	N
CanNmBusLoadReductionEnabled	-	N
CanNmBusSynchronizationEnabled	-	C
CanNmComControlEnabled	-	C
CanNmComUserDataSupport	-	C
CanNmCoordinatorSyncSupport	-	C
CanNmDevErrorDetect	-	C
CanNmGlobalPnSupport	-	C
CanNmImmediateRestartEnabled	-	N
CanNmImmediateTxconfEnabled	-	N
CanNmMainFunctionPeriod	-	C
CanNmNodeDetectionEnabled	-	C
CanNmNodeIdEnabled	-	C
CanNmPassiveModeEnabled	-	C
CanNmPduRxIndicationEnabled	-	C
CanNmPnEiraCalcEnabled	-	C
CanNmPnResetTime	-	C
CanNmRemoteSleepIndEnabled	-	C
CanNmRepeatMsgIndEnabled	-	C
CanNmStateChangeIndEnabled	-	C
CanNmUserDataEnabled	-	C
CanNmVersionInfoApi	-	C
CanNmForcePnAvailabilityConfEnabled	-	C
CanNmPnEiraRxNSduRef	-	C
CanNmChangeTwaitBusSleepEnabled	-	C
CanNmPassiveNodeEnabled	-	C

1) CanNmBusLoadReductionEnabled
   - Enables/disables Bus Load Reduction.
2) CanNmBusSynchronizationEnabled
   - Enables/disables Bus Synchronization. (More than CanNm 2.4.0.0)

3) CanNmComControlEnabled
   - Enables/disables Communication Control.
4) CanNmComUserDataSupport
   - Enables/disables User Data support using the Com module.
5) CanNmCoordinatorSyncSupport
   - Enables/disables Coordinator Synchronization. (More than CanNm 2.4.0.0)
6) CanNmDevErrorDetect
   - Switches Development Error Detection on or off.
7) CanNmGlobalPnSupport
   - Enables/disables partial networking support.
8) CanNmImmediateRestartEnabled
   - Enables/disables the immediate NM PDU Transmission upon bus-communication request in Prepare-Bus-Sleep mode.
9) CanNmImmediateTxconfEnabled
   - Enables/disables the immediate tx confirmation when transmitting Nm PDUs.
10) CanNmMainFunctionPeriod
   - Defines the cycle time of the CanNm MainFunction.
11) CanNmNodeDetectionEnabled
   - Enables/disables the node detection support.
12) CanNmNodeIdEnabled
   - Enables/disables the source node identifier in Nm PDU.
13) CanNmPassiveModeEnabled
   - Enables/disables NM Pdu transmission.
14) CanNmPduRxIndicationEnabled
   - Enables/disables the PDU Rx Notification.
15) CanNmPnEiraCalcEnabled
   - Specifies if CanNm calculates the PN request information in the NM Pdu for external and internal requests. (EIRA)
16) CanNmPnResetTime
   - Specifies the reset time to clear PN Request Bit in the EIRA and ERA.
17) CanNmRemoteSleepIndEnabled
   - Enables/disables the notification by detecting if other nodes are ready to sleep.

18) CanNmRepeatMsgIndEnabled
- Enables/disables the notification that a RepeatMessageRequest bit has been received in Rx Nm Pdu.

19) CanNmStateChangeIndEnabled
- Enables/disables the StateChange notification.

20) CanNmUserDataEnabled
- Enables/disables user data support in the NM PDU.

21) CanNmVersionInfoApi
- Enables/disables version info API support.

22) CanNmForcePnAvailabilityConfEnabled
- Should be set to true if a transceiver must support selective sleep but does not support selective wakeup.

23) CanNmPnEiraRxNSduRef
- EcuC Pdu for CanNm to notify EIRA Rx to Com-Stack.

24) CanNmChangeTwaitBusSleepEnabled (More than CanNm 2.5.0.0)
- Enables/disables to use CanNm_ChangeTWaitBusSleep() API
- Prepare Bus Sleep -> When entering Bus Sleep, it enters Bus Sleep after expiring for CanNmWaitBusSleepTime, which exists for each channel. When calling the CanNm_ChangeTwaitBusSleep() API, the CanNmWaitBusSleepTime value of the entire channel is changed to the Argument value
- If the " CanNmChangeTwaitBusSleepTimeEnabled " setting is true during generation, the " NmChangeTwaitBusSleepTimeEnabled " setting is true, and false when setting false.

25) CanNmPassiveNodeEnabled(More than CanNm 2.5.0.0)
- It is a setting for whether to operate as a passive node or an active node as a requirement in ES95480-03.
- For controllers designated as CanNm Passive Node, it shall be operated to prevent sending Nm messages within the Normal Operation State.
- If operates like Passive Node and “CanNmPassiveNodeEnabled” is true, “CanNmBusSynchronizationEnabled”, “CanNmCoordinatorSyncSupport”, “CanNmRemoteSleepIndEnabled”, “CanNmPassiveModeEnabled” should be false.

- If operates with Active Node, “CanNmPassiveNodeEnabled” configurations should be false, and the others of above configurations has no dependencies.

5.1.1 CanNmChannelConfig

Parameter Name	Value	Category
CanNmActiveWakeupBitEnabled	-	C
CanNmAllNmMessagesKeepAwake	-	C
CanNmBusLoadReductionActive	-	N
CanNmCarWakeUpBitPosition	-	N
CanNmCarWakeUpBytePosition	-	N
CanNmCarWakeUpFilterEnabled	-	N
CanNmCarWakeUpFilterNodeId	-	N
CanNmCarWakeUpRxEnabled	-	N
CanNmImmediateNmCycleTime	-	C
CanNmImmediateNmTransmissions	-	C
CanNmMsgCycleOffset	-	C
CanNmMsgCycleTime	-	C
CanNmMsgReducedTime	-	N
CanNmMsgTimeoutTime	-	C
CanNmNodeDetectionEnabled	-	C
CanNmNodeId	-	C
CanNmNodeIdEnabled	-	C
CanNmPduCbvPosition	-	C
CanNmPduNidPosition	-	C
CanNmPnEnabled	-	C
CanNmPnEraCalcEnabled	-	C
CanNmPnHandleMultipleNetworkRequests	-	C
CanNmRemoteSleepIndTime	-	C
CanNmRepeatMessageTime	-	C
CanNmRepeatMessageIndEnabled	-	C
CanNmTimeoutTime	-	C
CanNmWaitBusSleepTime	-	C
CanNmComMNetworkHandleRef	-	C
CanNmPnEraRxNSduRef	-	C
CanNmUserDataInitValue	-	C

1) CanNmActiveWakeupBitEnabled
   - Enables/Disables the handling of the Active Wakeup Bit in NM PDUs
2) CanNmAllNmMessagesKeepAwake
   - Specifies if CanNm handles irrelevant NM PDUs.
3) CanNmBusLoadReductionActive
   - Enables/disables Bus Load Reduction.

4) CanNmCarWakeUpBitPosition
   - Specifies the Bit position of the CarWakeUp Bit.
5) CanNmCarWakeUpBytePosition
   - Specifies the Byte position of the CarWakeUp Bit.
6) CanNmCarWakeUpFilterEnabled
   - Defines if CarWakeUpFiltering using Source Node Identifier is supported or not.
7) CanNmCarWakeUpFilterNodeId
   - Specifies Source Node Identifier for CarWakeUpFiltering.
8) CanNmCarWakeUpRxEnabled
   - Enables/disables notification by checking CarWakeUp bit.
9) CanNmImmediateNmCycleTime
   - Defines the cycle time for transmitting immediate NM PDUs when Repeat-Message-State is entered.
10) CanNmImmediateNmTransmissions
   - Defines the number of immediate NM PDUs which shall be transmitted when Repeat-Message-State is entered.
11) CanNmMsgCycleOffset
   - Determines the start offset of the periodic transmission of NM PDUs.
12) CanNmMsgCycleTime
   - Determines the periodic transmission cycle of NM PDUs.
13) CanNmMsgReducedTime
   - Determines the periodic transmission cycle of NM PDUs when Bus Load Reduction is enabled.
14) CanNmMsgTimeoutTime
   - Defines the timeout time from NM PDU transmission till transmission confirmation is received.
15) CanNmNodeDetectionEnabled
   - Enables/disables the node detection support.
16) CanNmNodeId
   - Specifies the node identifier.
17) CanNmNodeIdEnabled
   - Enables/disables the source node identifier in Nm PDU.

18) CanNmPduCbvPosition
- Defines the position (index) of the control bit vector within the NM PDU.

19) CanNmPduNidPosition
- Defines the position (index) of the source node identifier within the NM PDU.

20) CanNmPnEnabled
- Enables/disables partial networking support.

21) CanNmPnEraCalcEnabled
- Specifies if CanNm calculates the PN request information in the NM Pdu for external requests. (ERA)

22) CanNmPnHandleMultipleNetworkRequests
- Specifies if CanNm performs a transition from Network Mode to Repeat Message State or not.

23) CanNmRemoteSleepIndTime
- Defines the time it shall take to recognize that all other nodes are ready to sleep.
- If Nm messages are not received from other nodes during the time, the nodes are recognized as ready to sleep.

24) CanNmRepeatMessageTime
- Defines the time the NM shall stay in the Repeat-Message-State.

25) CanNmRepeatMessageIndEnabled
- Enables/disables the notification that a RepeatMessageRequest bit has been received in Rx Nm Pdu.

26) CanNmTimeoutTime
- Defines the time the NM shall stay in the Ready-Sleep-State before transition into the Prepare-Bus-Sleep Mode is initiated.

27) CanNmWaitBusSleepTime
- Defines the time the NM shall stay in the Prepare-Bus-Sleep Mode before transition into Bus-Sleep Mode shall take place.

28) CanNmComMNetworkHandleRef
- Specifies ComM Channel corresponding to CanNm Channel.

29) CanNmPnEraRxNSduRef
- EcuC Pdu for CanNm to notify ERA Rx to Com-Stack.

30) CanNmUserDataInitValue

- Defines Initial Byte value for User Data Field. If it is not set, User Data Field will be initialized to '0xFF' for each bytes.

5.1.1.1 CanNmRxPdu

Parameter Name	Value	Category
CanNmRxPduId	-	C
CanNmRxPduRef	-	C

1) CanNmRxPduId
   - Defines the Handle ID to indicate the reception of the Nm Rx I-PDU.
2) CanNmRxPduRef
   - Specifies the EcuC Pdu for the NM Rx I-PDU.

5.1.1.2 CanNmTxPdu

Parameter Name	Value	Category
CanNmTxConfirmationPduId	-	C
CanNmTxPduRef	-	C

3) CanNmTxConfirmationPduId
   - Defines the Handle ID to confirm the transmission of the Nm Tx I-PDU.
4) CanNmTxPduRef
   - Specifies the EcuC Pdu for the NM Tx I-PDU.

5.1.1.3 CanNmUserDataTxPdu

Parameter Name	Value	Category
CanNmTxUserDataPduId	-	C
CanNmTxUserDataPduRef	-	C

5) CanNmTxUserDataPduId
   - Defines the Handle ID of the NM User Data I-PDU.
6) CanNmTxUserDataPduRef
   - Specifies the EcuC Pdu for the NM User Data I-PDU.

5.1.2 CanNmPnInfo

Parameter Name	Value	Category
CanNmPnInfoLength	-	C
CanNmPnInfoOffset	-	C

7) CanNmPnInfoLength

- Specifies the length of the PN request information in the NM PDU.

8) CanNmPnInfoOffset

- Specifies the offset of the PN request information in the NM PDU.

5.1.2.1 CanNmPnFilterMask

Parameter Name	Value	Category
CanNmPnFilterMaskByteIndex	-	C
CanNmPnFilterMaskByteValue	-	C

1) CanNmPnFilterMaskByteIndex

- Specifies the position (Index) of the filter mask byte.

2) CanNmPnFilterMaskByteValue

- Specifies FilterMask Byte value.

6 Application Programming Interface (API)

6.1 Type Definitions

None

6.2 Macro Constants

None

6.3 Functions

Function Name	CanNm_SetNetworkRequestReason	
Syntax	FUNC(Std_ReturnType, CANNM_CODE) CanNm_SetNetworkRequestReason(CONST(NetworkHandleType, CANNM_APPL_CONST) nmChannelHandle, CONST(uint8, CANNM_APPL_CONST) nmNetworkRequestReason)	
Service ID	NA	
Sync/Async	Synchronous	
Reentrancy	Non-Reentrant	
Parameters (In)	nmChannelHandle	Nm Channel Handle, whose network request reason mode shall be put out

	nmNetworkRequestReason	Network Request Reason
Parameters (Inout)	None	
Parameters (Out)	None	
Return Value	Std_ReturnType: E_OK: Service accepted E_NOT_OK: Service denied	
Description	This service sets Network Request Reason to Tx NM Pdu	
Preconditions	CanSM Module should be initialized	
Configuration Dependency	None	

Function Name	CanNm_GetNetworkRequestReason	
Syntax	FUNC(Std_ReturnType, CANNM_CODE) CanNm_GetNetworkRequestReason(CONST(NetworkHandleType, CANNM_APPL_CONST) nmChannelHandle, CONSTP2VAR(uint8, AUTOMATIC, CANNM_APPL_DATA) pNmNetworkRequestReason)	
Service ID	NA	
Sync/Async	Synchronous	
Reentrancy	Non-Reentrant	
Parameters (In)	nmChannelHandle	Nm Channel Handle, whose network request reason mode shall be put out
Parameters (Inout)	None	

Parameters (Out)	pNmNetworkRequestReason	Pointer, where to put out the recent Network Request Reason
Return Value	Std_ReturnType: E_OK: Service accepted E_NOT_OK: Service denied	
Description	This service gets recent Network Request Reason from Rx NM Pdu	
Preconditions	CanSM Module should be initialized	
Configuration Dependency	None	

Function Name	CanNm_ChangeTWaitBusSleep	
Syntax	FUNC(void, CANNM_CODE) CanNm_ChangeTWaitBusSleep(CONST(CanNm_LTimeType, CANNM_CONST) TwaitBusSleep)	
Service ID	NA	
Sync/Async	Asynchronous	
Reentrancy	Non-Reentrant	
Parameters (In)	TwaitBusSleep	Parameters contains changed “CanNmWaitBusSleepTime” values for all channels
Parameters (Inout)	None	
Parameters (Out)	None	
Return Value	N/A	
Description	CanNm_ChangeTWaitBusSleep(TwaitBusSleep) API to provide functionality of changing CanNmWaitBusSleepTime for entire channels.	
Preconditions	BSW should be initialized	

Configuration Dependency	CanNmGlobalConfig/CanNmChangeTwaitBusSleepEnabled, NmGlobalFeatures/NmChangeTwaitBusSleepEnabled

7 Generator

7.1 Generator Option

Options	Description
-H/-Help	To display help regarding usage of the tool. Displays help for EthDiag Generator.
-O/-Output	To generate the output files in the specified directory location. Specifies the output location of the generated files.
-V/-Version	To display the copyright information and the tool version. Displays the copyright and generator version information.
-L/-Log	To generate “$BswConfig::Lis_File_Name” file. Displays a log message in a file.
-I/-Info	To disable an Information Message(s). Information messages are not displayed.
-W/-Warn	To disable Warning Message(s). Warning messages are not displayed.

7.2 Generator Error Message

7.2.1 Error Messages

1	If CanNmPnEraCalcEnabled is set TRUE, CanNmPnEraRxNSduRef shall be set.
2	If CanNmPnEraRxNSduRef is set, PduRSrcPdu shall be set.
3	PduRSourcePduHandleId in PduRSrcPdu shall be set.
4	The number of CanNmGlobalConfig in CanNm shall be 1.
5	If CanNmPnEiraCalcEnabled is set TRUE, CanNmPnEiraRxNSduRef shall be set.
6	If CanNmPnEiraRxNSduRef is set, PduRSrcPdu shall be set.
7	CanNmPnEraCalcEnabled in CanNmChannelConfig is only valid when CanNmGlobalPnSupport in CanNmGlobalConfig is set true. CanNmGlobalPnSupport in CanNmGlobalConfig shall be set.
8	CanNmPnEiraCalcEnabled in CanNmGlobalConfig is only valid when CanNmGlobalPnSupport in CanNmGlobalConfig is set true. CanNmGlobalPnSupport in CanNmGlobalConfig shall be set.
9	CanNmPnEraRxNSduRef in CanNmChannelConfig is only valid when CanNmPnEraCalcEnabled in CanNmChannelConfig is set true. CanNmPnEraCalcEnabled in CanNmChannelConfig shall be set.

10	CanNmPnEiraRxNSduRef in CanNmGlobalConfig is only valid when CanNmPnEiraCalcEnabled in CanNmGlobalConfig is set true. CanNmPnEiraCalcEnabled in CanNmGlobalConfig shall be set.
11	CanNmMsgCycleTime in CanNmChannelConfig is mandatory. CanNmMsgCycleTime in CanNmChannelConfig shall be set.
12	CanNmTimeoutTime in CanNmChannelConfig is mandatory. CanNmTimeoutTime in CanNmChannelConfig shall be set.
13	CanNmPnResetTime in CanNmGlobalConfig shall be greater than CanNmMsgCycleTime in CanNmChannelConfig. And CanNmPnResetTime in CanNmGlobalConfig shall be less than CanNmTimeoutTime in CanNmChannelConfig.
14	CanNmTimeoutTime in CanNmChannelConfig shall be greater than CanNmMsgCycleTime in CanNmChannelConfig.
15	If CanNmGlobalPnSupport is set true, CanNmPnResetTime shall be set.
16	CanNmPnHandleMultipleNetworkRequests in CanNmChannelConfig is only valid if CanNmGlobalPnSupport in CanNmGlobalConfig is set true. You can choose one of the below solutions. Solution 1: Set CanNmPnHandleMultipleNetworkRequests in CanNmChannelConfig as false. Solution 2: Set CanNmGlobalPnSupport in CanNmGlobalConfig as true.
17	CanNmComMNetworkHandleRef in CanNmChannelConfig is not set or invalid. You can choose one of the below solutions. Solution: Set CanNmComMNetworkHandleRef in CanNmChannelConfig as valid value.
18	If ComMPncNmRequest in ComMNetworkManagement is set true, CanNmPnHandleMultipleNetworkRequests in CanNmChannelConfig shall be set true. You can choose one of the below solutions. Solution 1: Set CanNmPnHandleMultipleNetworkRequests in CanNmChannelConfig as true. Solution 2: Set ComMPncNmRequest in ComMNetworkManagement as false.
19	CanNmBusLoadReductionEnabled in CanNmGlobalConfig is not supported by current version. CanNmBusLoadReductionEnabled in CanNmGlobalConfig shall be set false.
20	The number of NmGlobalConfig in Nm shall be 1.
21	The number of NmGlobalFeatures in Nm shall be 1.
24	The number of NmGlobalConstants in Nm shall be 1.
25	The number of NmGlobalProperties in Nm shall be 1.
26	CanNmComControlEnabled in CanNmGlobalConfig shall equal false if CanNmPassiveModeEnabled in CanNmGlobalConfig equals true. You can choose one of the below solutions. Solution 1: Set CanNmComControlEnabled in CanNmGlobalConfig as false. Solution 2: Set CanNmPassiveModeEnabled in CanNmGlobalConfig as false.

27	CanNmComControlEnabled in CanNmGlobalConfig shall equal NmComControlEnabled in NmGlobalFeatures if CanNmPassiveModeEnabled in CanNmGlobalConfig equals false. You can choose one of the below solutions. Solution: Set CanNmComControlEnabled in CanNmGlobalConfig as NmComControlEnabled in NmGlobalFeatures.
28	CanNmComUserDataSupport in CanNmGlobalConfig shall equal false if CanNmPassiveModeEnabled in CanNmGlobalConfig equals true. You can choose one of the below solutions. Solution 1: Set CanNmComUserDataSupport in CanNmGlobalConfig as false. Solution 2: Set CanNmPassiveModeEnabled in CanNmGlobalConfig as false.
30	CanNmImmediateRestartEnabled in CanNmGlobalConfig is not supported by current version. CanNmImmediateRestartEnabled in CanNmGlobalConfig shall be set false.
31	CanNmImmediateTxconfEnabled in CanNmGlobalConfig is not supported by current version. CanNmImmediateTxconfEnabled in CanNmGlobalConfig shall be set false.
32	CanNmNodeDetectionEnabled in CanNmGlobalConfig shall equal false if CanNmPassiveModeEnabled in CanNmGlobalConfig equals true. You can choose one of the below solutions. Solution 1: Set CanNmNodeDetectionEnabled in CanNmGlobalConfig as false. Solution 2: Set CanNmPassiveModeEnabled in CanNmGlobalConfig as false.
33	CanNmNodeIdEnabled in CanNmGlobalConfig shall equal NmNodeIdEnabled in NmGlobalFeatures. You can choose one of the below solutions. Solution: Set CanNmNodeIdEnabled in CanNmGlobalConfig as NmNodeIdEnabled in NmGlobalFeatures.
34	CanNmUserDataEnabled in CanNmGlobalConfig shall equal NmUserDataEnabled in NmGlobalFeatures. You can choose one of the below solutions. Solution: Set CanNmUserDataEnabled in CanNmGlobalConfig as NmUserDataEnabled in NmGlobalFeatures.
35	CanNmStateChangeIndEnabled in CanNmGlobalConfig shall equal NmStateChangeIndEnabled in NmGlobalFeatures. You can choose one of the below solutions. Solution: Set CanNmStateChangeIndEnabled in CanNmGlobalConfig as NmStateChangeIndEnabled in NmGlobalFeatures.
36	CanNmPduRxIndicationEnabled in CanNmGlobalConfig shall equal NmPduRxIndicationEnabled in NmGlobalFeatures. You can choose one of the below solutions. Solution: Set CanNmPduRxIndicationEnabled in CanNmGlobalConfig as NmPduRxIndicationEnabled in NmGlobalFeatures.
37	CanNmRemoteSleepIndEnabled in CanNmGlobalConfig shall equal false if CanNmPassiveModeEnabled in CanNmGlobalConfig equals true. You can choose one of the below solutions.

	Solution 1: Set CanNmRemoteSleepIndEnabled in CanNmGlobalConfig as false. Solution 2: Set CanNmPassiveModeEnabled in CanNmGlobalConfig as false.
38	CanNmRepeatMsgIndEnabled in CanNmGlobalConfig shall equal false if CanNmPassiveModeEnabled in CanNmGlobalConfig equals true. You can choose one of the below solutions. Solution 1: Set CanNmRepeatMsgIndEnabled in CanNmGlobalConfig as false. Solution 2: Set CanNmPassiveModeEnabled in CanNmGlobalConfig as false.
39	CanNmRepeatMsgIndEnabled in CanNmGlobalConfig shall equal NmRepeatMsgIndEnabled in NmGlobalFeatures if CanNmPassiveModeEnabled in CanNmGlobalConfig equals false. You can choose one of the below solutions. Solution: Set CanNmRepeatMsgIndEnabled in CanNmGlobalConfig as NmRepeatMsgIndEnabled in NmGlobalFeatures.
40	CanNmRemoteSleepIndEnabled in CanNmGlobalConfig shall equal NmRemoteSleepIndEnabled in NmGlobalFeatures if CanNmPassiveModeEnabled in CanNmGlobalConfig equals false. You can choose one of the below solutions. Solution: Set CanNmRemoteSleepIndEnabled in CanNmGlobalConfig as NmRemoteSleepIndEnabled in NmGlobalFeatures.
41	The number of CanNmPnInfo in CanNm shall be 1.
42	CanNmBusLoadReductionActive in CanNmChannelConfig is not supported by current version. CanNmBusLoadReductionActive in CanNmChannelConfig shall be set false.
43	CanNmCarWakeUpRxEnabled in CanNmChannelConfig is not supported by current version. CanNmCarWakeUpRxEnabled in CanNmChannelConfig shall be set false.
44	CanNmCarWakeUpBitPosition in CanNmChannelConfig is not supported by current version. CanNmCarWakeUpBitPosition in CanNmChannelConfig shall be unset.
45	CanNmCarWakeUpBytePosition in CanNmChannelConfig is not supported by current version. CanNmCarWakeUpBytePosition in CanNmChannelConfig shall be unset.
46	CanNmCarWakeUpFilterNodeId in CanNmChannelConfig is not supported by current version. CanNmCarWakeUpFilterNodeId in CanNmChannelConfig shall be unset.
47	CanNmCarWakeUpFilterEnabled in CanNmChannelConfig is not supported by current version. CanNmCarWakeUpFilterEnabled in CanNmChannelConfig shall be set false.
48	PduRBswModules in PduR is not set for the CanNm. PduRBswModules in PduR shall be set for the CanNm.
49	PduRCancelReceive in PduRBswModules shall be set false.
50	PduRCancelTransmit in PduRBswModules shall be set false.
51	PduRChangeParameterRequestApi in PduRBswModules shall be set false.
52	PduRCommunicationInterface in PduRBswModules shall be set true.

53	PduRLowerModule in PduRBswModules shall be set true.
54	PduRRetransmission in PduRBswModules shall be set false.
55	PduRTransportProtocol in PduRBswModules shall be set false.
56	PduRTriggerTransmit in PduRBswModules shall be set true.
57	PduRTxConfirmation in PduRBswModules shall be set true.
58	PduRUpperModule in PduRBswModules shall be set false.
59	PduRUseTag in PduRBswModules shall be set false.
60	CanNmRxPduId in CanNmRxPdu shall be set.
61	CanNmRxPduRef in CanNmRxPdu shall be set.
62	If CanNmRxPduRef is set, PduRSrcPdu shall be set.
63	CanNmTxConfirmationPduId in CanNmTxPdu shall be set.
64	CanNmTxPduRef in CanNmTxPdu shall be set.
65	If CanNmTxPduRef is set, PduRDestPdu shall be set.
66	CanNmTxUserDataPduId in CanNmUserDataTxPdu shall be set.
67	CanNmTxUserDataPduRef in CanNmUserDataTxPdu shall be set.
68	If CanNmTxUserDataPduRef is set, PduRDestPdu shall be set.
69	If CanNmImmediateNmTransmissions in CanNmChannelConfig is greater than 0, CanNmImmediateNmCycleTime in CanNmChannelConfig shall be set.
70	If CanNmRepeatMsgIndEnabled in CanNmChannelConfig is set true, CanNmRepeatMsgIndEnabled in CanNmGlobalConfig shall be set true.
71	CanNmMsgTimeoutTime in CanNmChannelConfig shall not be greater than CanNmMsgCycleTime in CanNmChannelConfig.
72	CanNmMsgTimeoutTime in CanNmChannelConfig shall not be greater than CanNmImmediateNmCycleTime in CanNmChannelConfig.
73	CanNmPduNmStatePosition in CanNmChannelConfig is not set. CanNmPduNmStatePosition in CanNmChannelConfig shall be set.
74	PduRDestPduHandleId in PduRDestPdu is not set. PduRDestPduHandleId in PduRDestPdu shall be set.

75	CanNmPduNetworkRequestReasonPosition in CanNmChannelConfig is not set. CanNmPduNetworkRequestReasonPosition in CanNmChannelConfig shall be set.
76	CanNmPnEnabled in CanNmChannelConfig is only valid when CanNmGlobalPnSupport in CanNmGlobalConfig is set true. CanNmGlobalPnSupport in CanNmGlobalConfig shall be set.
77	CanNmPnInfo in CanNmGlobalConfig is only valid when CanNmGlobalPnSupport in CanNmGlobalConfig is set true. CanNmGlobalPnSupport in CanNmGlobalConfig shall be set.
78	CanNmNodeId in CanNmChannelConfig is not set. CanNmNodeId in CanNmChannelConfig shall be set.
79	CanNmNodeId in CanNmChannelConfig is not set. CanNmNodeId in CanNmChannelConfig shall be set. "Variants are partly applied to Parameter <CanNmPnFilterMaskByte /CanNmPnFilterMaskByteValue>. Please consider to completely remove or apply all variants for this parameter. To apply variant, you should set to 'true' for Apply Variant configuration, which is on the right side of the parameter. And should set parameter values for each variant.
84	If use Nm Coordinator Functionality, Please set below Configurations. 1.CanNmBusSynchronizationEnabled to True, 2.CanNmCoordinatorSyncSupport to True, 3.CanNmRemoteSleepIndEnabled to True, 4.CanNmPassiveModeEnabled to False.
85	CanNmBusSynchronizationEnabled in CanNmGlobalConfig shall equal false if CanNmPassiveModeEnabled in CanNmGlobalConfig equals true.
86	CanNmCoordinatorSyncSupport in CanNmGlobalConfig shall equal false if CanNmPassiveModeEnabled in CanNmGlobalConfig equals true.
87	CanNmChangeTwaitBusSleepEnabled in CanNmGlobalConfig shall equal NmChangeTwaitBusSleepEnabled in NmGlobalFeatures.
88	CanNmGlobalConfig's CanNmPassiveNode must not be turned on at the same time as the following settings. "CanNmCoordinatorSyncSupport, CanNmBusSynchronizationEnabled, CanNmRemoteSleepIndEnabled, CanNmPassiveModeEnabled".

7.2.2 Warning Messages

None

8 Dem Error

N/A

9 Det Error

Detected development errors shall be reported to the Det_ReportError(uint8 InstanceId, uint8 ApiId, uint8 ErrorId) service of the Development Error Tracer (DET) if the pre-processor switch **CanNmDevErrorDetect** is set “on”.

Type or error	Relevance	Related error code	Value
API service used without module initialization	Development	CANNM_E_UNINIT	0x01
API service called with wrong channel handle	Development	CANNM_E_INVALID_CHANNEL	0x02
API service called with wrong PDU-ID	Development	CANNM_E_INVALID_PDUID	0x03
Reception of NM PDUs in Bus-Sleep Mode.	Development	CANNM_E_NET_START_IND	0x04
CanNm initialization has failed, e.g. selected configuration set doesn't exist.	Development	CANNM_E_INIT_FAILED	0x05
NM-Timeout Timer has abnormally expired outside of the Ready Sleep State	Development	CANNM_E_NETWORK_TIMEOUT	0x11
Null pointer has been passed as an argument	Development	CANNM_E_PARAM_POINTER	0x12
DeInit API service called when not all CAN networks are in Bus Sleep mode	Development	CANNM_E_NOT_IN_BUS_SLEEP	0x13
API service called with invalid status	Development	CANNM_E_INVALID_REQUEST	0x20

8.1. Service ID

CanSM function name	Service ID[hex]
CANNM_INIT_SID	0x00
CANNM_PASSIVE_STARTUP_SID	0x01
CANNM_NETWORK_REQUEST_SID	0x02
CANNM_NETWORK_RELEASE_SID	0x03
CANNM_SET_USERDATA_SID	0x04
CANNM_GET_USERDATA_SID	0x05
CANNM_GET_NODEIDENTIFIER_SID	0x06
CANNM_GET_LOCALNODEIDENTIFIER_SID	0x07
CANNM_REPEAT_MESSAGEREQUEST_SID	0x08
CANNM_GET_PDUDATA_SID	0x0a
CANNM_GET_STATE_SID	0x0b
CANNM_DISABLE_COMMUNICATION_SID	0x0c
CANNM_ENABLE_COMMUNICATION_SID	0x0d
CANNM_DEINIT_SID	0x10
CANNM_MAINFUNCTION_SID	0x13
CANNM_CONFIRM_PNAVAILABILITY_SID	0x16
CANNM_SET_SLEEP_READYBIT_SID	0x17
CANNM_TX_CONFIRMATION_SID	0x40
CANNM_TRIGGER_TRANSMIT_SID	0x41
CANNM_RX_INDICATION_SID	0x42
CANNM_TRANSMIT_SID	0x49
CANNM_REQUEST_BUSSYNCHRONIZATION_SID	0xc0
CANNM_CHECK_REMOTESLEEPINDICATION_SID	0xd0
CANNM_GET_VERSIONINFO_SID	0xf1

10 Appendix

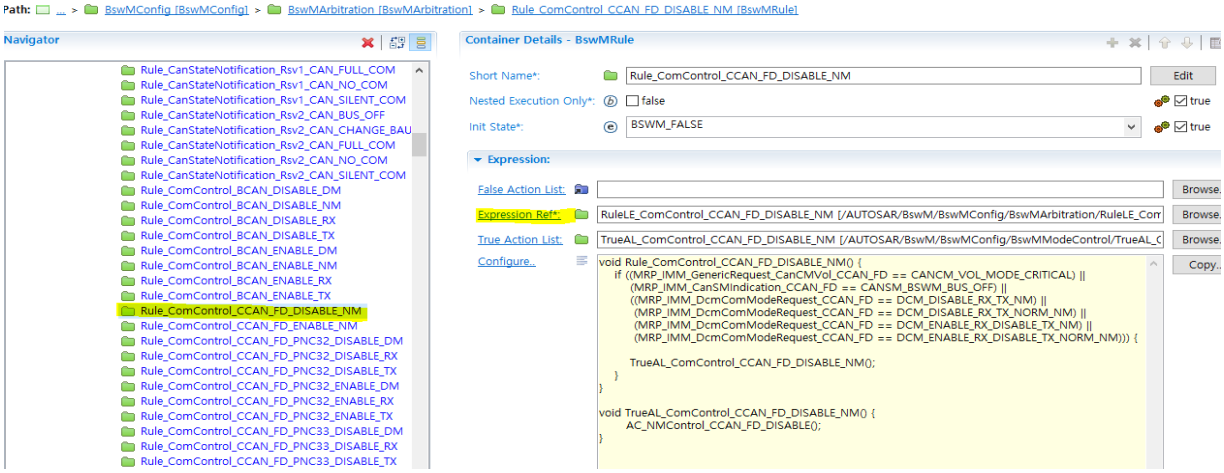
10.1 Added setting when applying CanNM 2.2.3.0 or later module (when using CanCM)

Regarding the problem of not entering Network Sleep when No Com is requested in the critical voltage state, provide manual setup guide as below (mobilgene 2022b or later version planned)

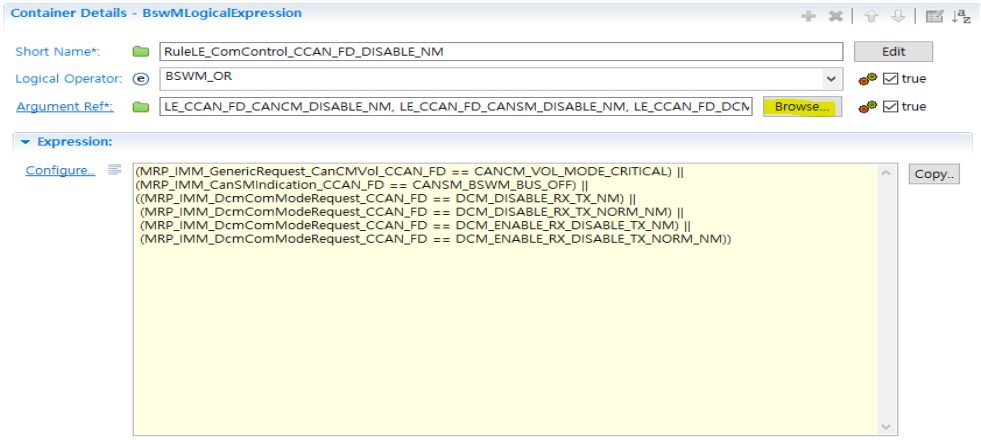
When using CanCM & applying CanNM version 2.2.3.0 or higher, it is necessary to apply the BswM Rule setting guide below for all channels using CanNM.

10.1.1 CanNm_DisableCommunication_Voltage

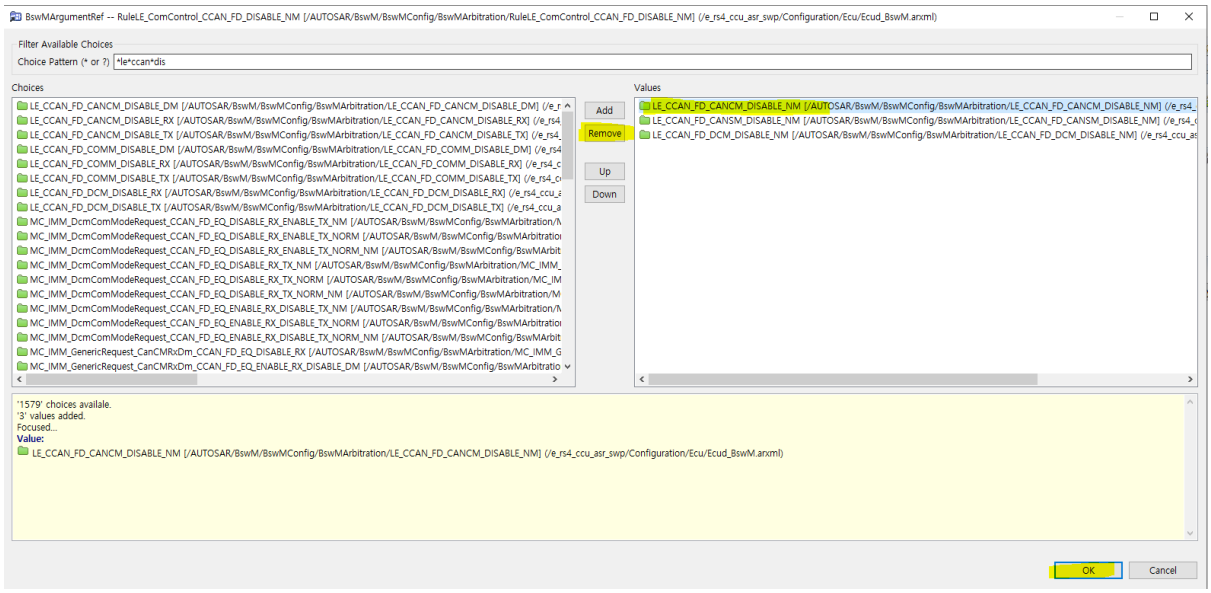
1) Click Expression Ref in Rule_ComControl_[CanNMChannel]_DISABLE_NM



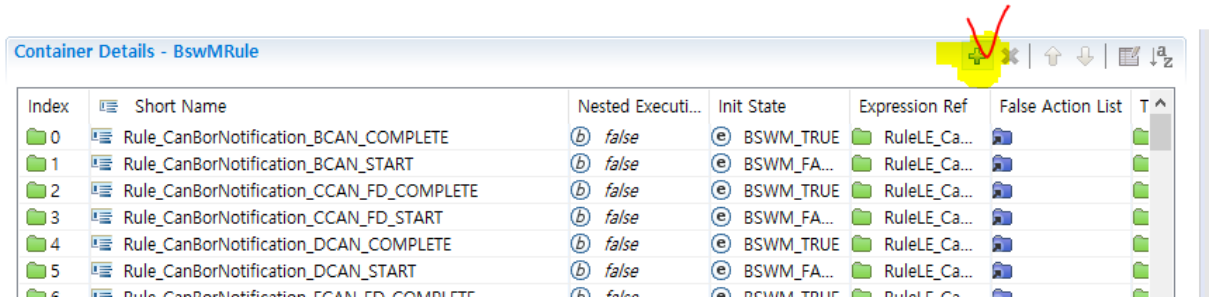
2) Click Browse



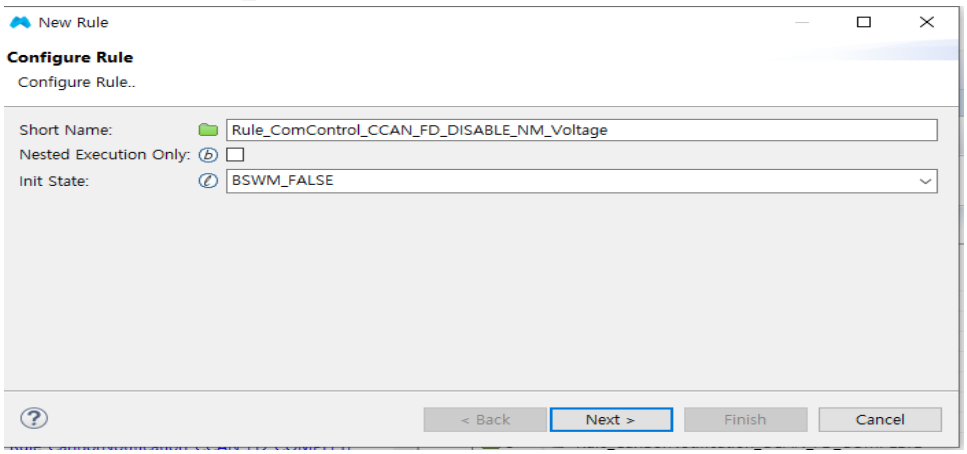
3) Click OK After remove LE_[CanNMChannel]_CANCM_DISABLE_NM



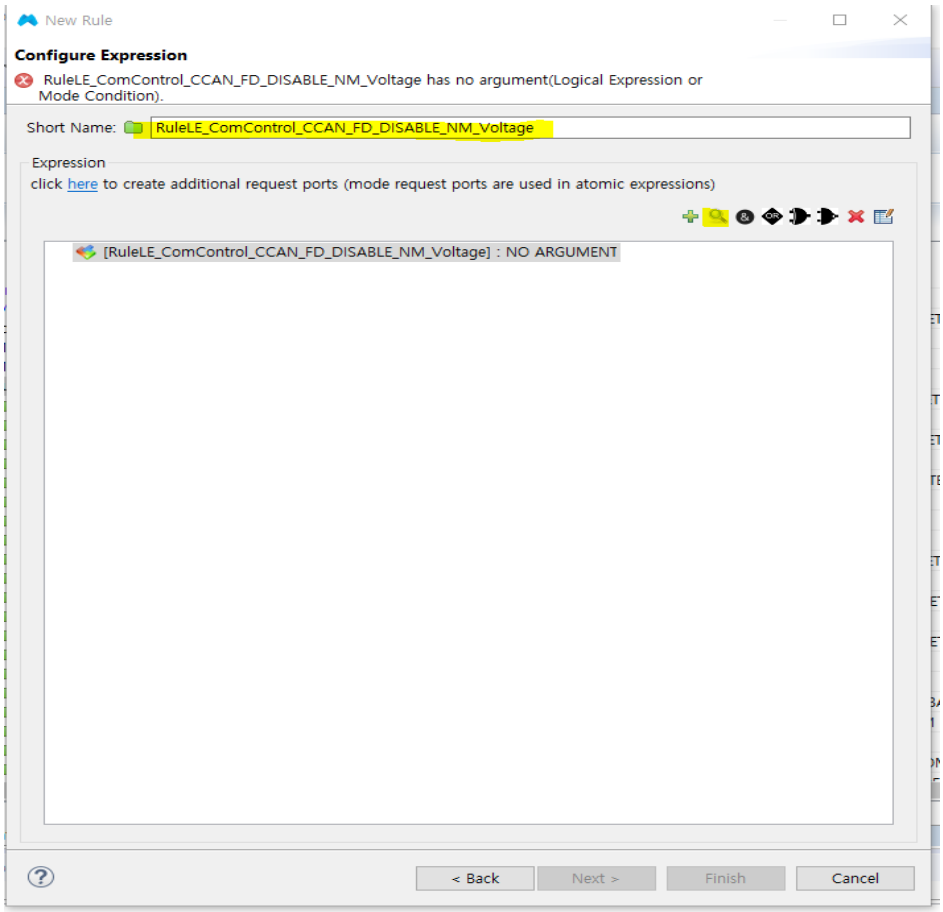
4) Add BswM Rule



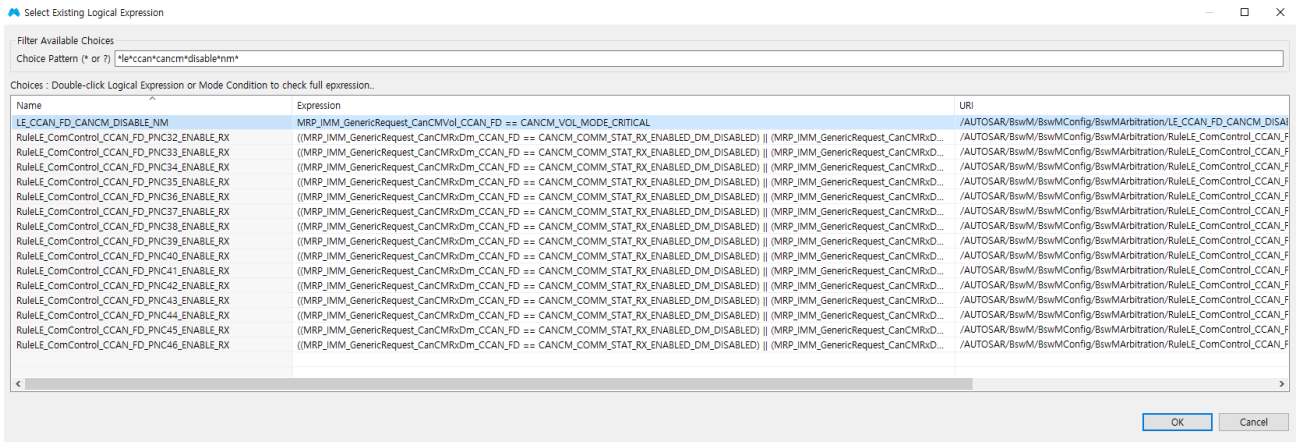
5) Rule_ComControl_[CanNMChannel]_DISABLE_NM_Voltage
Init State : BSWM_FALSE



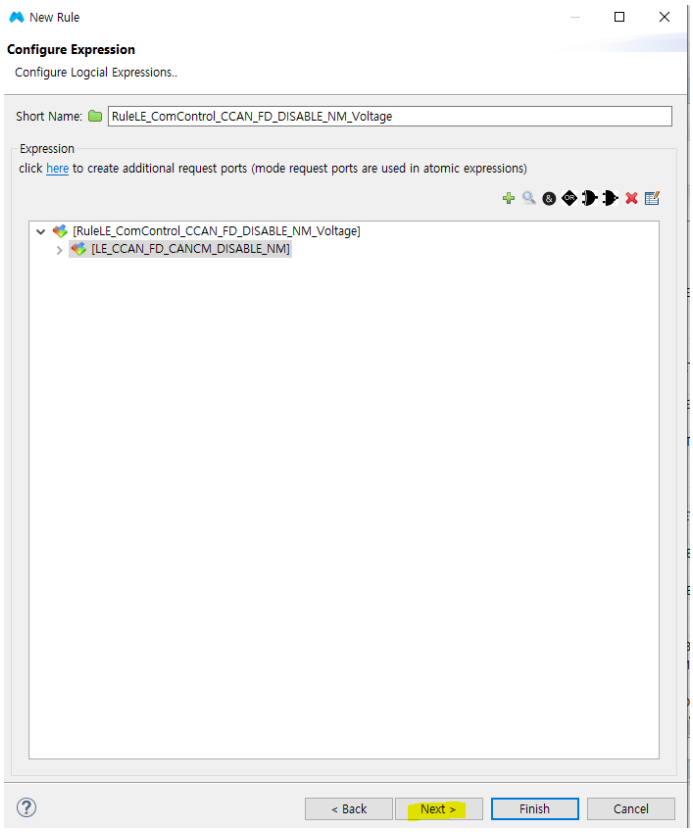
6) After Setting RuleLE_ComControl_[CanNMChannel]_DISABLE_NM_Voltage, Click Add Sub-Expression



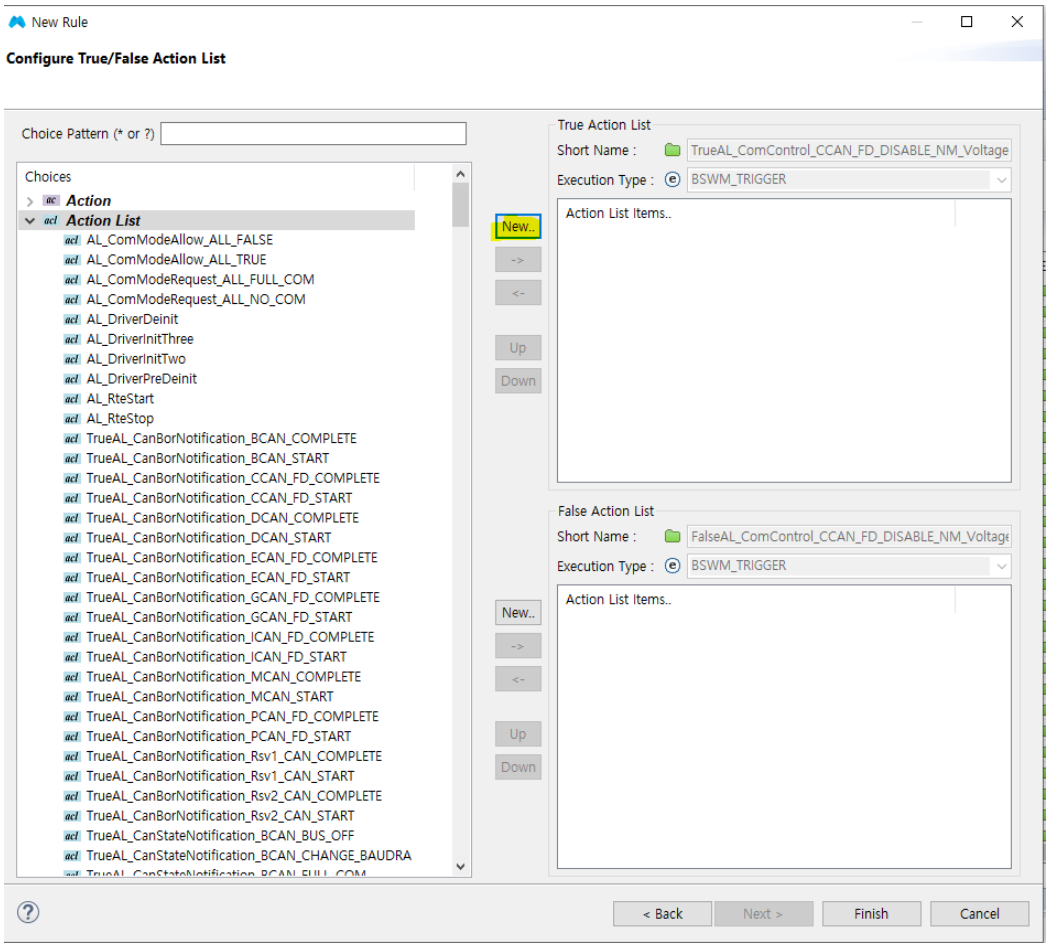
7) Set to LE_[CanNMChannel]_CANCM_DISABLE_NM



8) Click Next

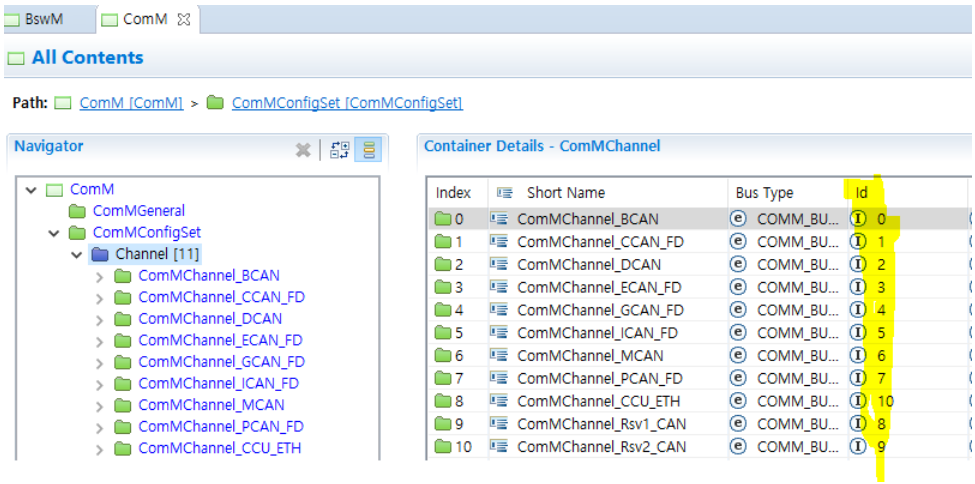

New Rule
Configure Expression
Configure Logcial Expressions..
Short Name: RuleLE_ComControl_CCAN_FD_DISABLE_NM_Voltage
Expression
click here to create additional request ports (mode request ports are used in atomic expressions)
[RuleLE_ComControl_CCAN_FD_DISABLE_NM_Voltage]
[LE_CCAN_FD_CANCM_DISABLE_NM]
< Back
Next >
Finish
Cancel

9) New.. => Action


New Rule
Configure True/False Action List
Choice Pattern (* or ?)
Choices
Action
Action List
AL_ComModeAllow_ALL_FALSE
AL_ComModeAllow_ALL_TRUE
AL_ComModeRequest_ALL_FULL_COM
AL_ComModeRequest_ALL_NO_COM
AL_DriverDeinit
AL_DriverInitThree
AL_DriverInitTwo
AL_DriverPreDeinit
AL_RteStart
AL_RteStop
TrueAL_CanBorNotification_BCAN_COMPLETE
TrueAL_CanBorNotification_BCAN_START
TrueAL_CanBorNotification_CCAN_FD_COMPLETE
TrueAL_CanBorNotification_CCAN_FD_START
TrueAL_CanBorNotification_DCAN_COMPLETE
TrueAL_CanBorNotification_DCAN_START
TrueAL_CanBorNotification_ECAN_FD_COMPLETE
TrueAL_CanBorNotification_ECAN_FD_START
TrueAL_CanBorNotification_GCAN_FD_COMPLETE
TrueAL_CanBorNotification_GCAN_FD_START
TrueAL_CanBorNotification_ICAN_FD_COMPLETE
TrueAL_CanBorNotification_ICAN_FD_START
TrueAL_CanBorNotification_MCAN_COMPLETE
TrueAL_CanBorNotification_MCAN_START
TrueAL_CanBorNotification_PCAN_FD_COMPLETE
TrueAL_CanBorNotification_PCAN_FD_START
TrueAL_CanBorNotification_Rsv1_CAN_COMPLETE
TrueAL_CanBorNotification_Rsv1_CAN_START
TrueAL_CanBorNotification_Rsv2_CAN_COMPLETE
TrueAL_CanBorNotification_Rsv2_CAN_START
TrueAL_CanStateNotification_BCAN_BUS_OFF
TrueAL_CanStateNotification_BCAN_CHANGE_BAUDRA
New..
->
<-
Up
Down
True Action List
Short Name : TrueAL_ComControl_CCAN_FD_DISABLE_NM_Voltage
Execution Type : BSWM_TRIGGER
Action List Items..
False Action List
Short Name : FalseAL_ComControl_CCAN_FD_DISABLE_NM_Voltage
Execution Type : BSWM_TRIGGER
Action List Items..
< Back
Next >
Finish
Cancel

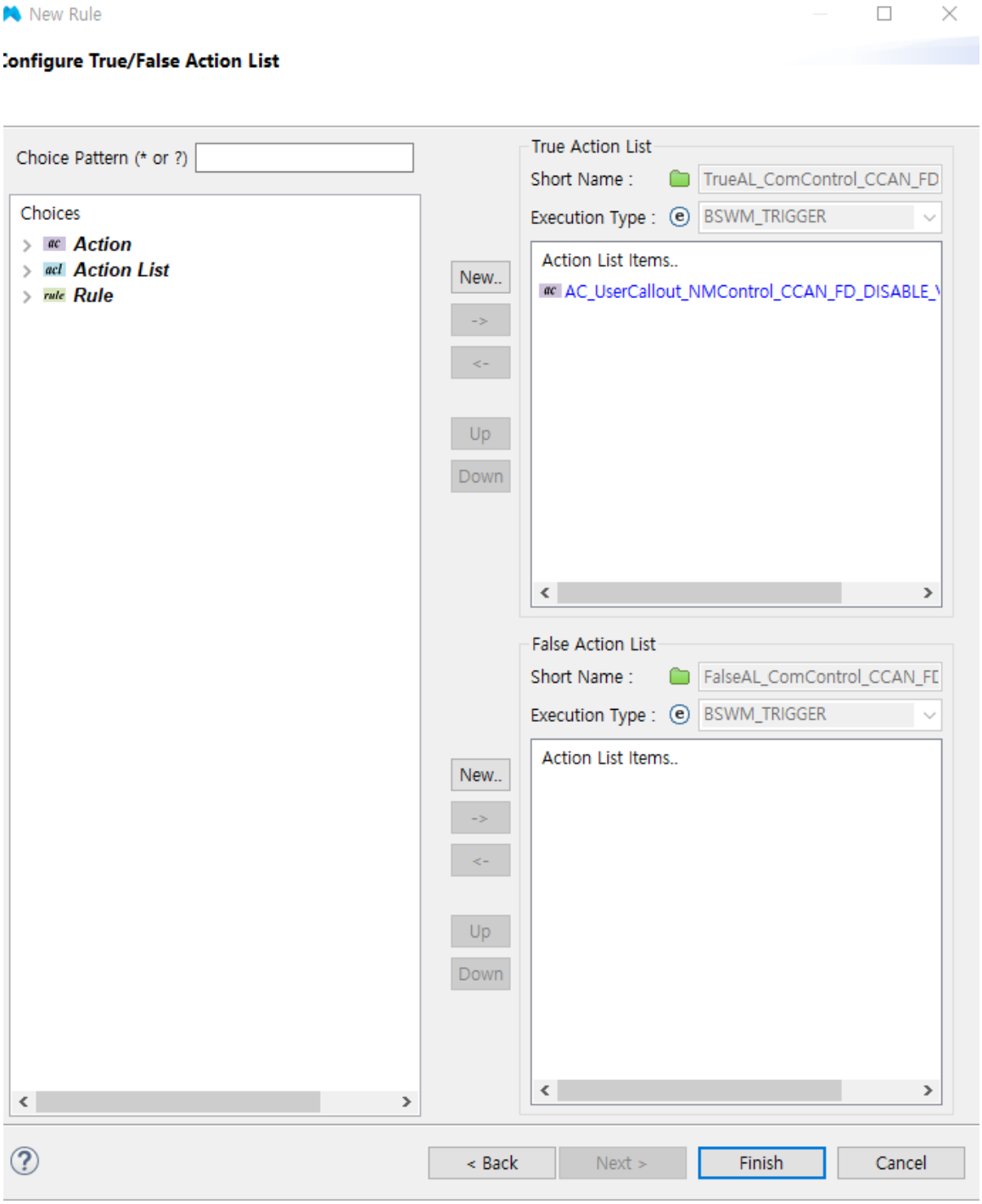
10)
Type: UserCallout
Short Name: AC_UserCallout_NMControl_[CanNMChannel]_DISABLE_Voltage
Function: CanNm_DisableCommunication_Voltage((NetworkHandleType) ComMChannelId)

- **ComMChannelId:** Enter the ComM Channel Id of the channel set in Ecud_ComM.arxml as shown below.



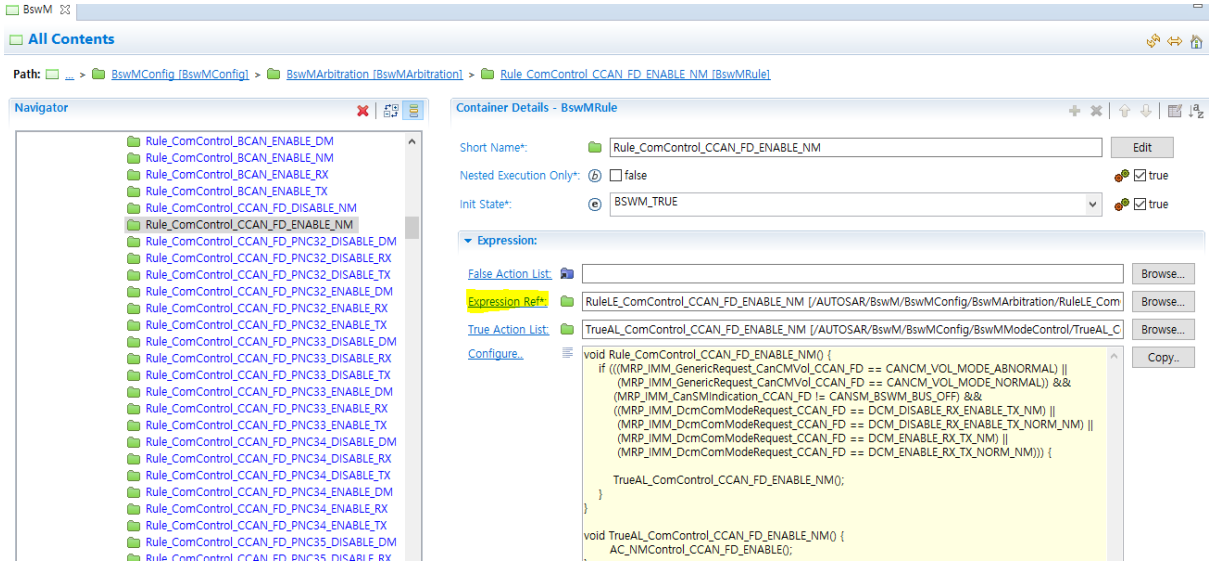
Ex) As above, ComM Channel Id of ComMChannel_CCAN_FD is 1, so set it to 1 as shown below.

11) Click Finish

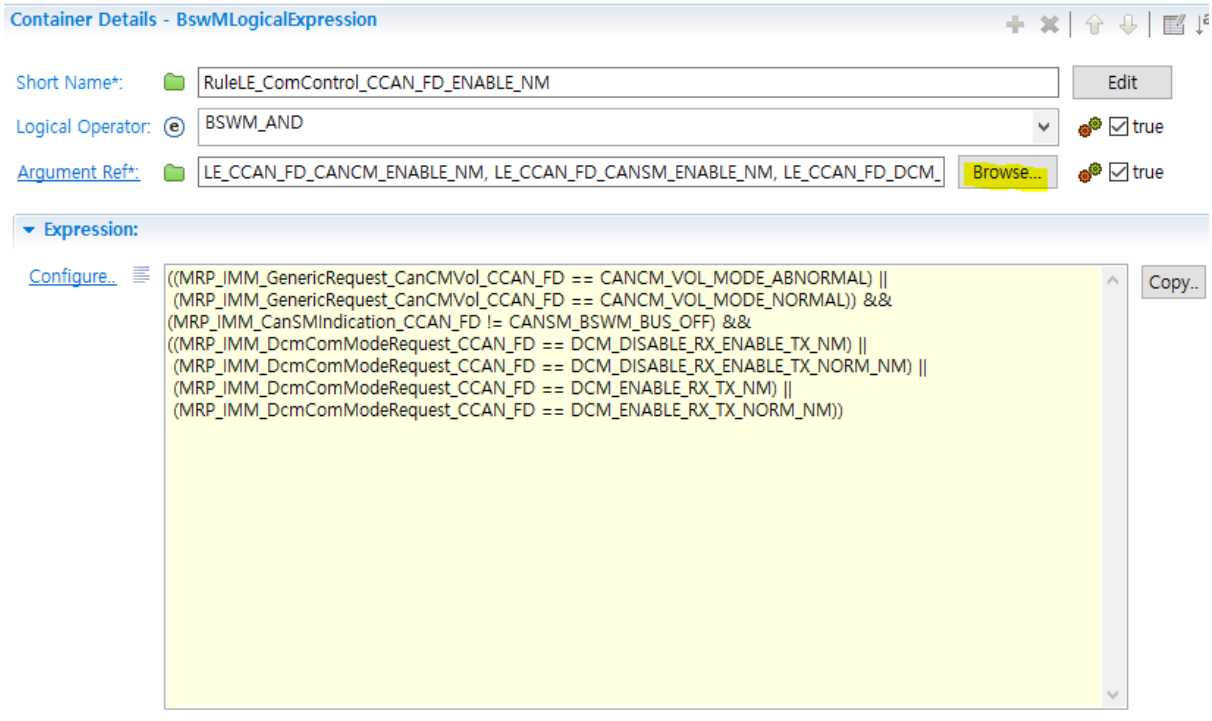


10.1.2 CanNm_EnableCommunication_Voltage

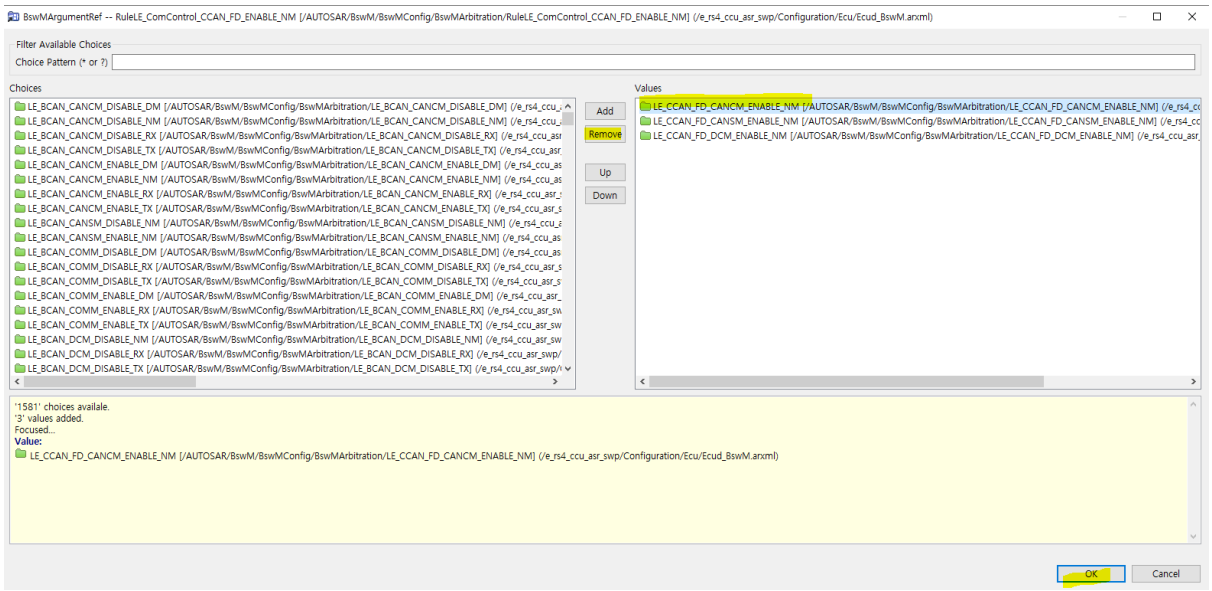
1) Click Expression Ref in Rule_ComControl_[CanNMChannel]_ENABLE_NM



2) Click Browse

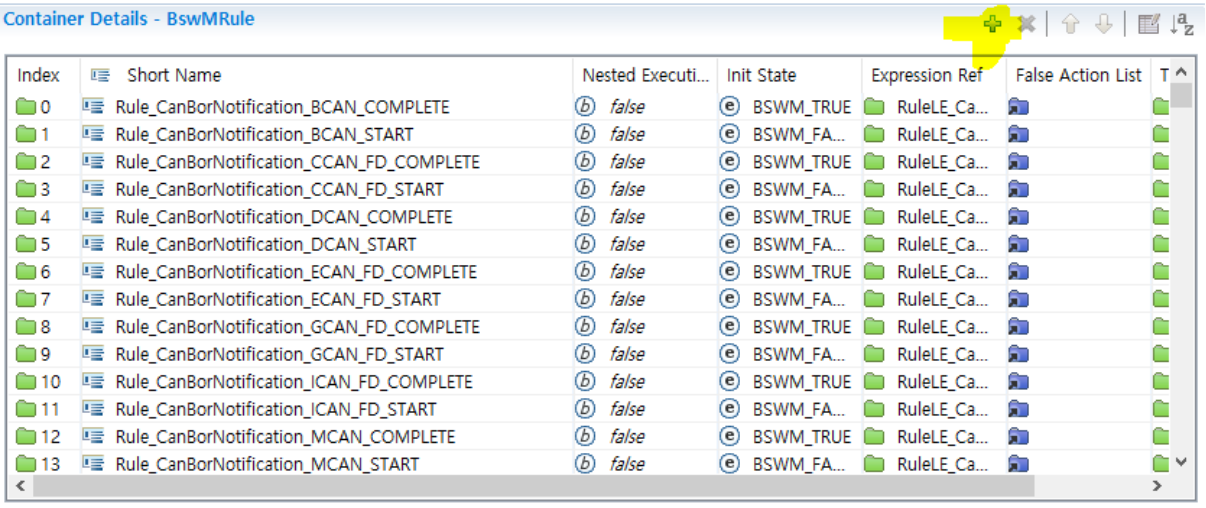


3) Click OK After remove LE_[CanNM 사용 Channel]_CANCM_ENABLE_NM

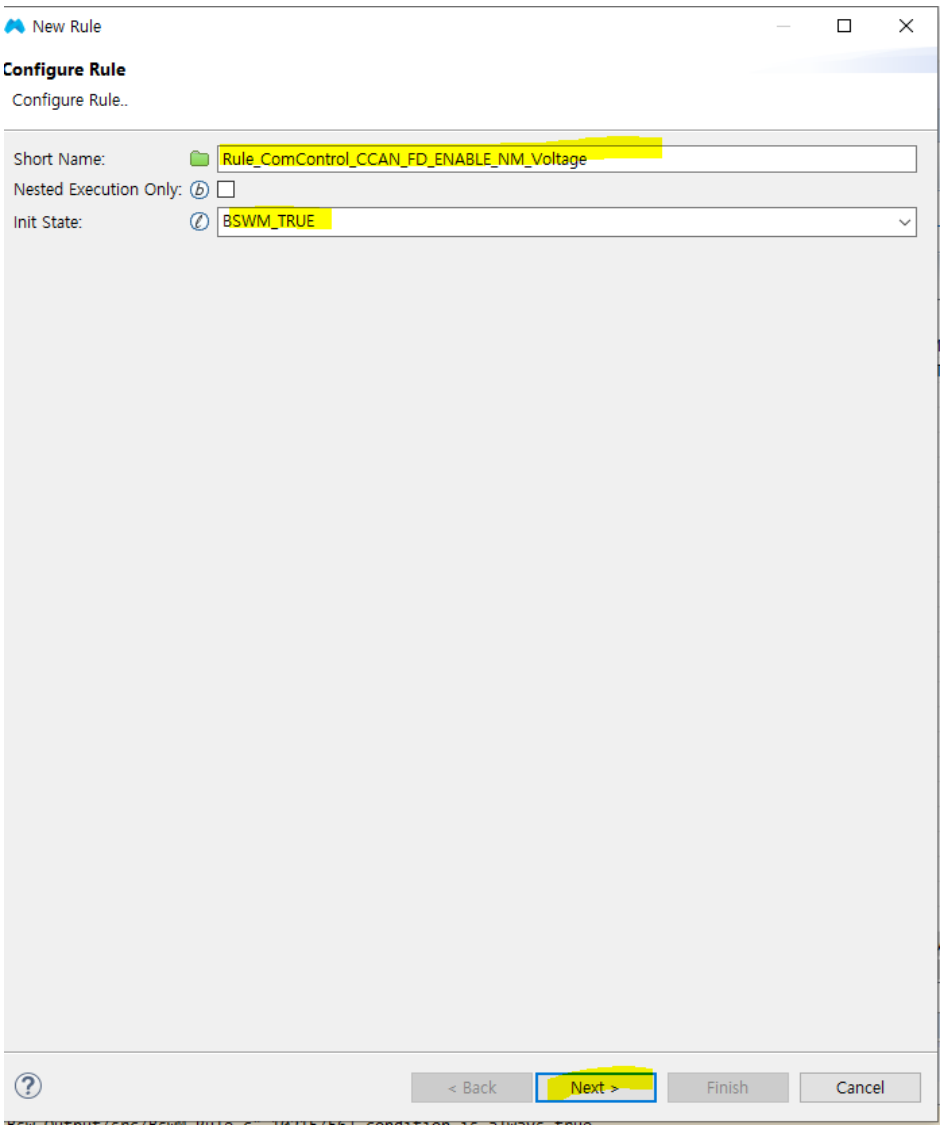


4) Add BswM Rule

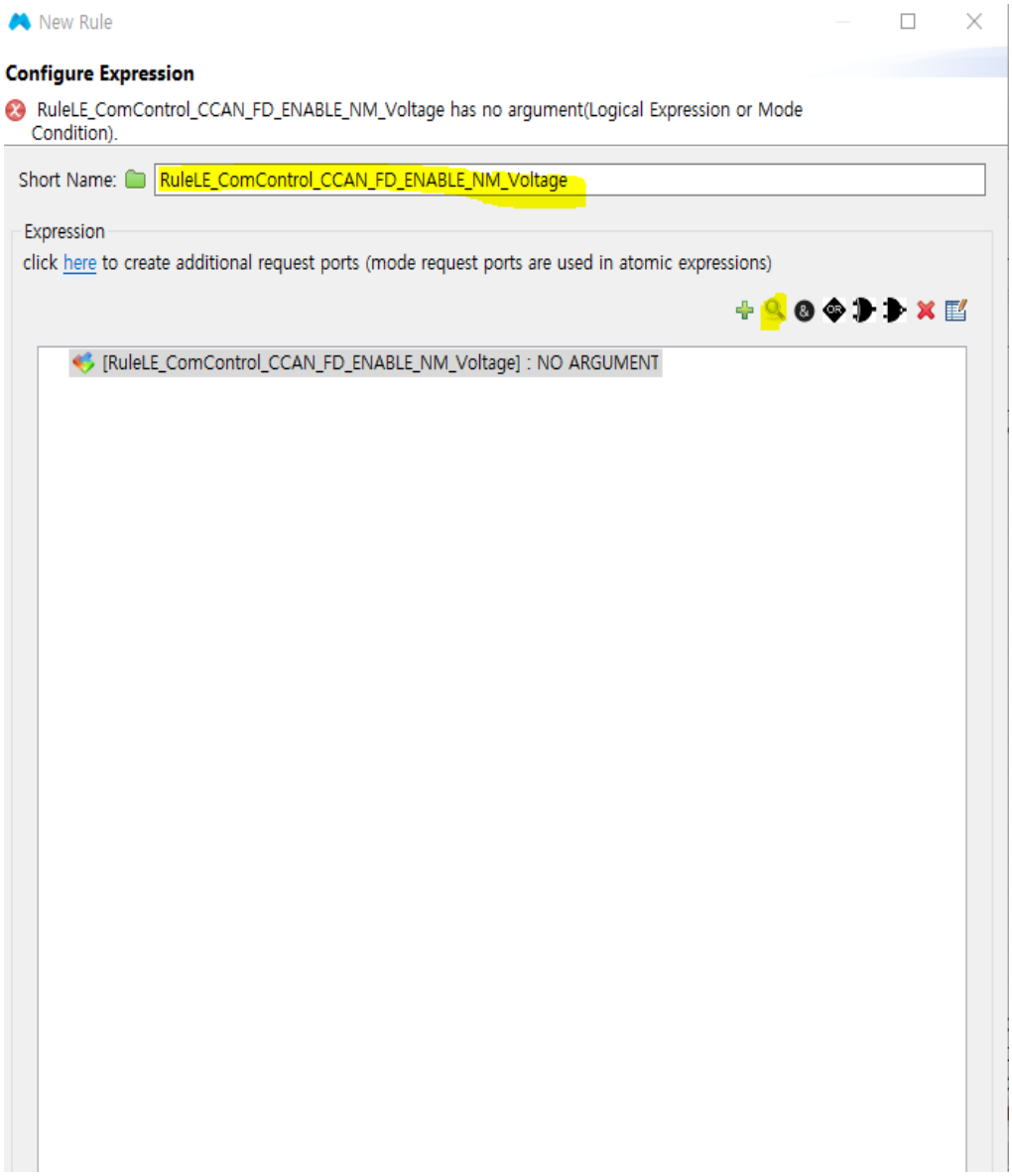
vMArbitration]



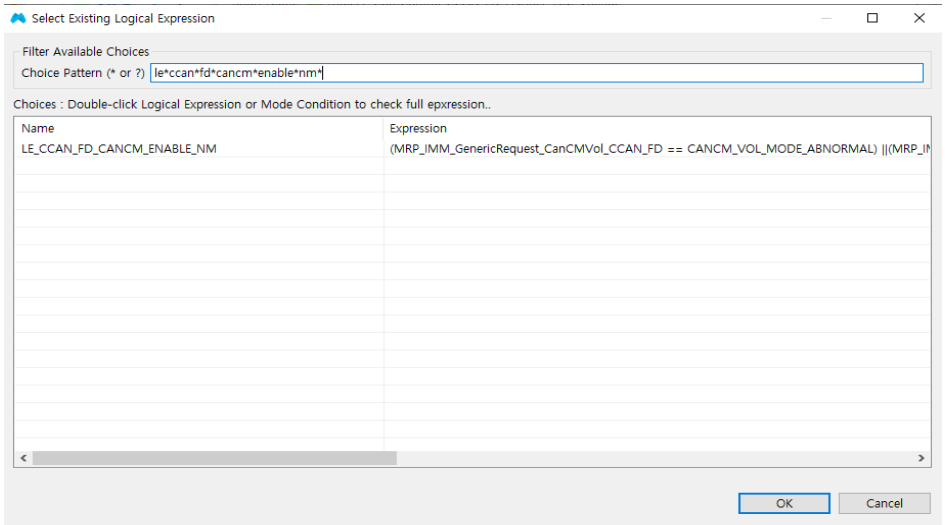
5) Rule_ComControl_[CanNMChannel]_ENABLE_NM_Voltage
Init State: BswM_TRUE



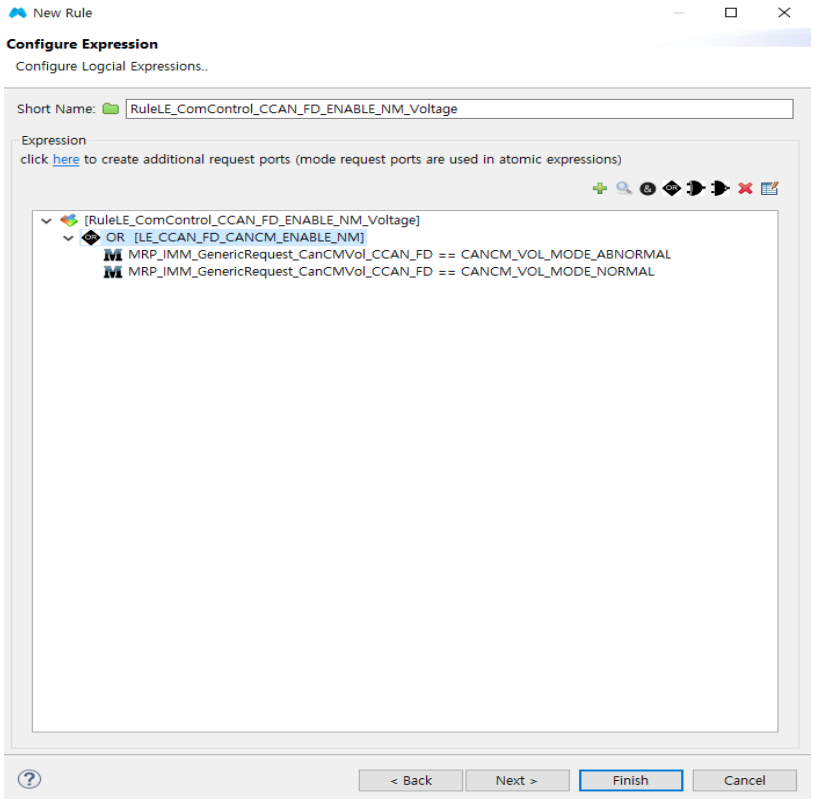
6) After setting RuleLE_ComControl_[Channel using CanNM]_ENABLE_NM_Voltage, click Add Sub-Expression



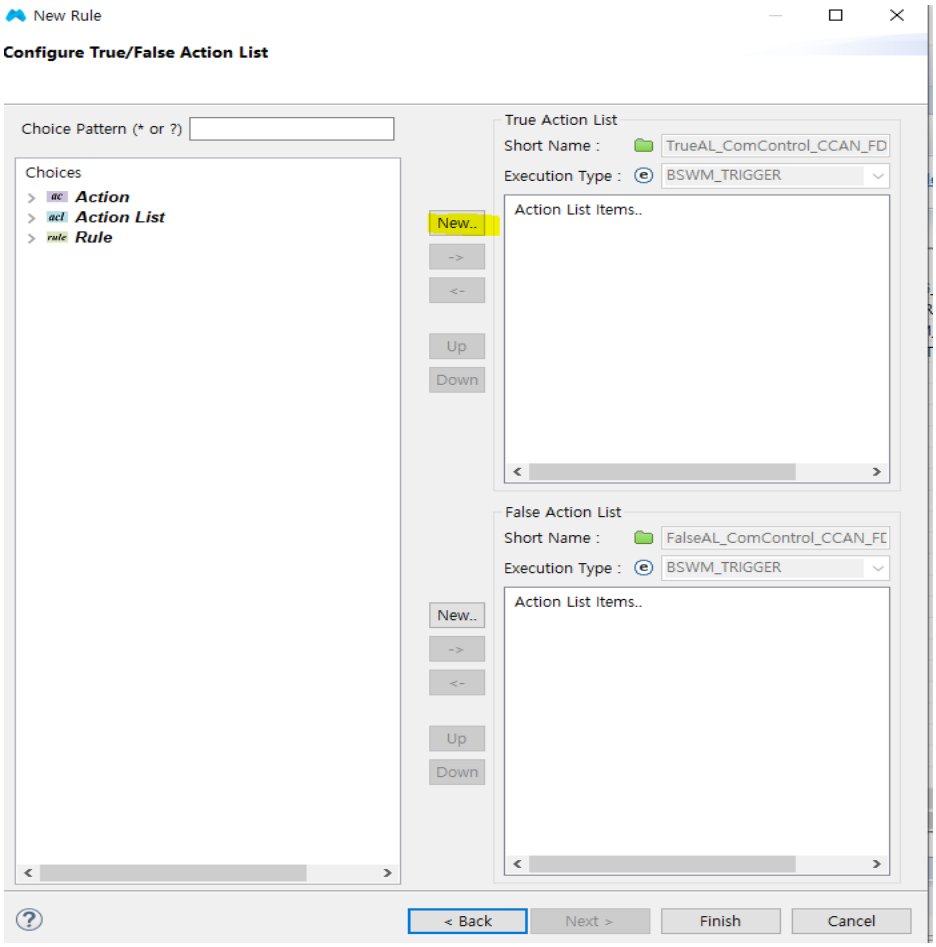
7) Click OK after LE_[CanNMChannel]_CANCM_ENABLE_NM select



8) After confirming that the settings are as follows, click Next

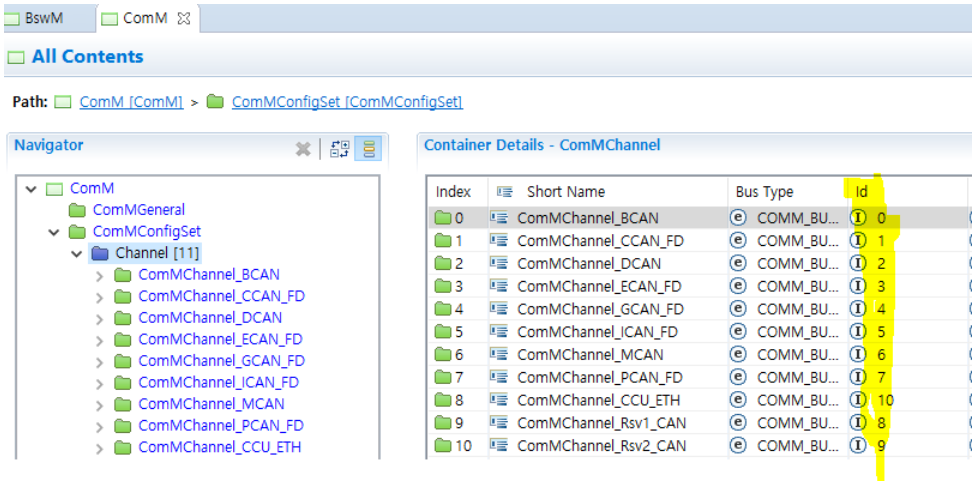


9) New => Action

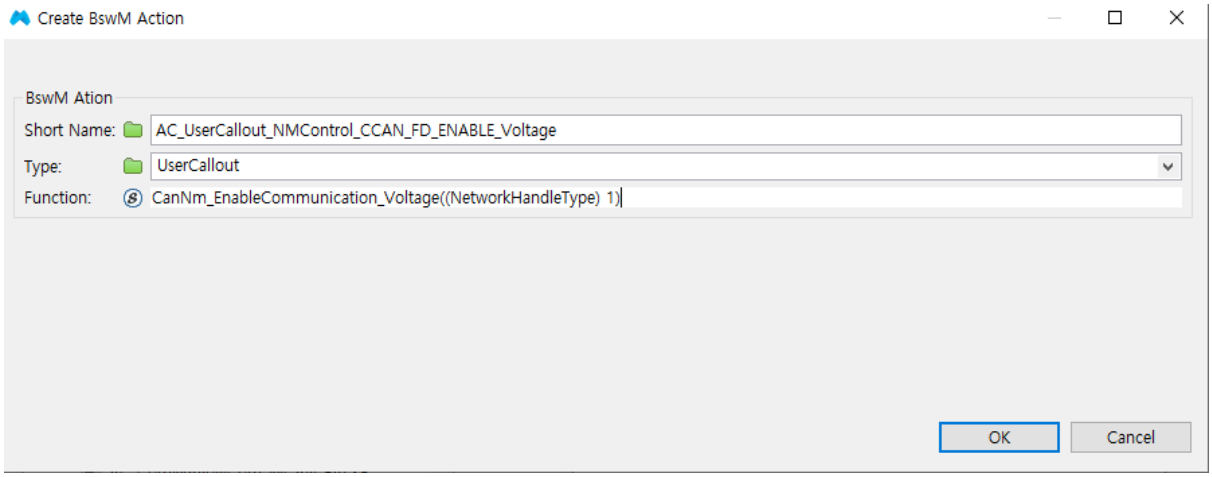


10) Type: UserCallout
Short Name: AC_UserCallout_NMControl_[CanNMChannel]_ENABLE_Voltage
Function: CanNm_EnableCommunication_Voltage((NetworkHandleType) **ComMChannelId**)

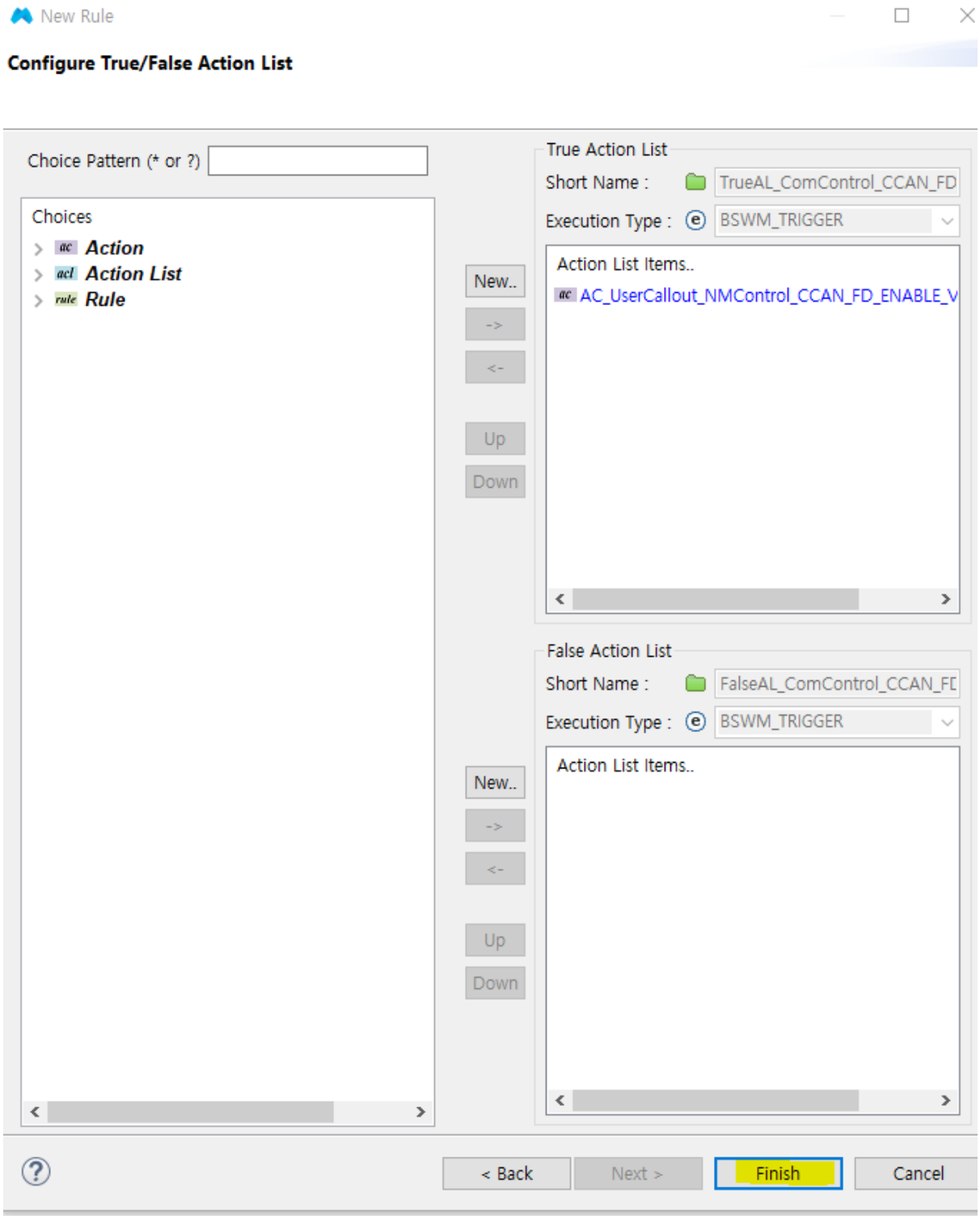
- **ComMChannelId:** Enter the ComM Channel Id of the channel set in Ecud_ComM.arxml as shown below.



Ex) As above, ComM Channel Id of ComMChannel_CCAN_FD is 1, so set it to 1 as shown below



11) Finish


New Rule
Configure True/False Action List
Choice Pattern (* or ?)
Choices
Action
Action List
Rule
New..
->
<-
Up
Down
True Action List
Short Name :
TrueAL_ComControl_CCAN_FD
Execution Type :
BSWM_TRIGGER
Action List Items..
AC_UserCallout_NMControl_CCAN_FD_ENABLE_V
False Action List
Short Name :
FalseAL_ComControl_CCAN_FD
Execution Type :
BSWM_TRIGGER
Action List Items..
< Back
Next >
Finish
Cancel

10.1.3 Checking the generated code

1) Rule_ComControl_[CanNMChannel]_DISABLE_NM_Voltage

```
FUNC(void, BSWM_CODE) Rule_ComControl_CCAN_FD_DISABLE_NM_Voltage(void)
{
  if ((BswM_GaaGenericCurrentState[13].ddRequestedState == CANCM_VOL_MODE_CRITICAL) &&
      (BswM_GaaGenericCurrentState[13].blModeValueStatus == BSWM_VALID))
  {
    if (BswM_GaaRuleEvaluation[203].ucRulePreviousResult != BSWM_TRUE)
    {
      SchM_Enter_BswM_RULEPREVRESULT_PROTECTION();
      BswM_GaaRuleEvaluation[203].ucRulePreviousResult = BSWM_TRUE;
      SchM_Exit_BswM_RULEPREVRESULT_PROTECTION();

      TrueAL_ComControl_CCAN_FD_DISABLE_NM_Voltage();
    }
  }
  else
FUNC(void, BSWM_CODE) TrueAL_ComControl_CCAN_FD_DISABLE_NM_Voltage(void)
{
  CanNm_DisableCommunication_Voltage((NetworkHandleType) 1);
}
```

2) Rule_ComControl_[CanNMChannel]_ENABLE_NM_Voltage

```
FUNC(void, BSWM_CODE) Rule_ComControl_CCAN_FD_ENABLE_NM_Voltage(void)
{
  if (((BswM_GaaGenericCurrentState[13].ddRequestedState == CANCM_VOL_MODE_ABNORMAL) &&
      (BswM_GaaGenericCurrentState[13].blModeValueStatus == BSWM_VALID)) ||
      ((BswM_GaaGenericCurrentState[13].ddRequestedState == CANCM_VOL_MODE_NORMAL) &&
      (BswM_GaaGenericCurrentState[13].blModeValueStatus == BSWM_VALID)))
  {
    if (BswM_GaaRuleEvaluation[35].ucRulePreviousResult != BSWM_TRUE)
    {
      SchM_Enter_BswM_RULEPREVRESULT_PROTECTION();
      BswM_GaaRuleEvaluation[35].ucRulePreviousResult = BSWM_TRUE;
      SchM_Exit_BswM_RULEPREVRESULT_PROTECTION();

      TrueAL_ComControl_CCAN_FD_ENABLE_NM_Voltage();
    }
  }
  else
  {
    SchM_Enter_BswM_RULEPREVRESULT_PROTECTION();
    BswM_GaaRuleEvaluation[35].ucRulePreviousResult = BSWM_FALSE;
    SchM_Exit_BswM_RULEPREVRESULT_PROTECTION();

  }

}

FUNC(void, BSWM_CODE) TrueAL_ComControl_CCAN_FD_ENABLE_NM_Voltage(void)
{
  CanNm_EnableCommunication_Voltage((NetworkHandleType) 1);
}
```