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## 1 Introduction and functional overview

This specification specifies the functionality, API and the configuration of the AUTOSAR Basic Software module SOME/IP TP.

The task of the SOME/IP TP module is to segment SOME/IP packets, which do not fit into one single UDP packet. On the reception side, it re-assembles the received SOME/IP segments.

## 2 Acronyms and Abbreviations

The glossary below includes acronyms and abbreviations relevant to the SOME/IP Transport Protocol module that are not included in the [1, AUTOSAR glossary].

Abbreviation / Acronym:	Description:
SOME/IP	Scalable service-Oriented MiddlewarE over IP

## 3 Related documentation

### 3.1 Input documents & related standards and norms

- [1] Glossary  
AUTOSAR\_FO\_TR\_Glossary
- [2] General Specification of Basic Software Modules  
AUTOSAR\_CP\_SWS\_BSWGeneral
- [3] General Requirements on Basic Software Modules  
AUTOSAR\_CP\_SRS\_BSWGeneral
- [4] Layered Software Architecture  
AUTOSAR\_CP\_EXP\_LayeredSoftwareArchitecture
- [5] Requirements on SOME/IP Protocol  
AUTOSAR\_FO\_RS\_SOMEIPProtocol
- [6] SOME/IP Protocol Specification  
AUTOSAR\_FO\_PRS\_SOMEIPProtocol
- [7] Specification of PDU Router  
AUTOSAR\_CP\_SWS\_PDURouter

### 3.2 Related specification

AUTOSAR provides a General Specification on Basic Software modules [2, SWS BSW General], which is also valid for SOME/IP Transport Protocol.

Thus, the specification SWS BSW General shall be considered as additional and required specification for SOME/IP Transport Protocol.

[1, AUTOSAR glossary] [2, SWS BSW General] [3, SRS General] [4, EXP Layered Software Architecture] [5, RS SOME/IP Protocol] [6, PRS SOME/IP Protocol] [7, SWS PDU Router]



## **4 Constraints and assumptions**

### **4.1 Limitations**

The SOME/IP TP is a simple protocol to segment SOME/IP messages. It does not implement retry mechanism nor does it reordering of received SOME/IP segments.

These limitations are intended to spare runtime and memory resources on receiver side. Nonetheless, this is a deviation from the AUTOSAR SOME/IP Protocol Specification (PRS\_SOMEIP\_00747 to PRS\_SOMEIP\_00754).

The rational for these limitations is the typical use-case which is "streaming" of large SOME/IP messages.

### **4.2 Applicability to car domains**

This module is applicable for SOME/IP communication.

## **5 Dependencies to other modules**

### **5.1 AUTOSAR PDU Router**

The SOME/IP TP module uses the PduR for both directions, the transmission path, and the reception path.

### **5.2 AUTOSAR Default Error Tracer**

In order to be able to report development errors, the SOME/IP TP module has to have access to the error hook of the Default Error Tracer.

## 6 Requirements Tracing

The following tables reference the requirements specified in [5] and links to the fulfillment of these. Please note that if column “Satisfied by” is empty for a specific requirement this means that this requirement is not fulfilled by this document.

Requirement	Description	Satisfied by
[RS_SOMEIP_00010]	SOME/IP protocol shall support different transport protocols underneath	[SWS_SomelpTp_00001] [SWS_SomelpTp_00002] [SWS_SomelpTp_00004] [SWS_SomelpTp_00005] [SWS_SomelpTp_00006] [SWS_SomelpTp_00008] [SWS_SomelpTp_00010] [SWS_SomelpTp_00011] [SWS_SomelpTp_00012] [SWS_SomelpTp_00013] [SWS_SomelpTp_00014] [SWS_SomelpTp_00015] [SWS_SomelpTp_00016] [SWS_SomelpTp_00017] [SWS_SomelpTp_00018] [SWS_SomelpTp_00019] [SWS_SomelpTp_00020] [SWS_SomelpTp_00021] [SWS_SomelpTp_00022] [SWS_SomelpTp_00023] [SWS_SomelpTp_00024] [SWS_SomelpTp_00025] [SWS_SomelpTp_00026] [SWS_SomelpTp_00027] [SWS_SomelpTp_00028] [SWS_SomelpTp_00029] [SWS_SomelpTp_00032] [SWS_SomelpTp_00033] [SWS_SomelpTp_00034] [SWS_SomelpTp_00035] [SWS_SomelpTp_00036] [SWS_SomelpTp_00037] [SWS_SomelpTp_00038] [SWS_SomelpTp_00039] [SWS_SomelpTp_00040] [SWS_SomelpTp_00041] [SWS_SomelpTp_00042] [SWS_SomelpTp_00045] [SWS_SomelpTp_00048] [SWS_SomelpTp_00049] [SWS_SomelpTp_00050] [SWS_SomelpTp_00051] [SWS_SomelpTp_00054] [SWS_SomelpTp_00062] [SWS_SomelpTp_00063] [SWS_SomelpTp_00064] [SWS_SomelpTp_00077] [SWS_SomelpTp_00078] [SWS_SomelpTp_00079] [SWS_SomelpTp_00080] [SWS_SomelpTp_00081] [SWS_SomelpTp_00082]
[RS_SOMEIP_00011]	SOME/IP protocol shall support messages of different lengths	[SWS_SomelpTp_00001] [SWS_SomelpTp_00002] [SWS_SomelpTp_00003] [SWS_SomelpTp_00004] [SWS_SomelpTp_00005] [SWS_SomelpTp_00006]
[RS_SOMEIP_00027]	SOME/IP protocol shall define the header layout of messages	[SWS_SomelpTp_00006] [SWS_SomelpTp_00009] [SWS_SomelpTp_00010] [SWS_SomelpTp_00011] [SWS_SomelpTp_00012] [SWS_SomelpTp_00013] [SWS_SomelpTp_00014] [SWS_SomelpTp_00015] [SWS_SomelpTp_00026] [SWS_SomelpTp_00077]
[RS_SOMEIP_00051]	SOME/IP protocol shall provide support for segmented transmission of large data	[SWS_SomelpTp_00002] [SWS_SomelpTp_00004] [SWS_SomelpTp_00005] [SWS_SomelpTp_00009] [SWS_SomelpTp_00012] [SWS_SomelpTp_00019] [SWS_SomelpTp_00023] [SWS_SomelpTp_00024] [SWS_SomelpTp_00025] [SWS_SomelpTp_00035] [SWS_SomelpTp_00041] [SWS_SomelpTp_00042] [SWS_SomelpTp_00048] [SWS_SomelpTp_00050] [SWS_SomelpTp_00051] [SWS_SomelpTp_00063] [SWS_SomelpTp_00064] [SWS_SomelpTp_00078]
[SRS_BSW_00301]	All AUTOSAR Basic Software Modules shall only import the necessary information	[SWS_SomelpTp_00043]
[SRS_BSW_00373]	The main processing function of each AUTOSAR Basic Software Module shall be named according the defined convention	[SWS_SomelpTp_00058] [SWS_SomelpTp_00069]





Requirement	Description	Satisfied by
[SRS_BSW_00384]	The Basic Software Module specifications shall specify at least in the description which other modules they require	[SWS_SomeIpTp_00060] [SWS_SomeIpTp_00061]
[SRS_BSW_00407]	Each BSW module shall provide a function to read out the version information of a dedicated module implementation	[SWS_SomeIpTp_00044] [SWS_SomeIpTp_00046]
[SRS_BSW_00411]	All AUTOSAR Basic Software Modules shall apply a naming rule for enabling/disabling the existence of the API	[SWS_SomeIpTp_00044] [SWS_SomeIpTp_00046]
[SRS_BSW_00425]	The BSW module description template shall provide means to model the defined trigger conditions of schedulable objects	[SWS_SomeIpTp_00058] [SWS_SomeIpTp_00059] [SWS_SomeIpTp_00069] [SWS_SomeIpTp_00070]
[SRS_BSW_00481]	Invalid configuration set selection errors shall follow a naming rule	[SWS_SomeIpTp_00052]

**Table 6.1: RequirementsTracing**

## 7 Functional specification

The task of the SOME/IP TP module is to segment SOME/IP packets, which do not fit into one single UDP packet. On the reception side, it assembles the received SOME/IP segments.

The SOME/IP TP module interacts with the PDU Router for both directions, the transmission and the reception path.

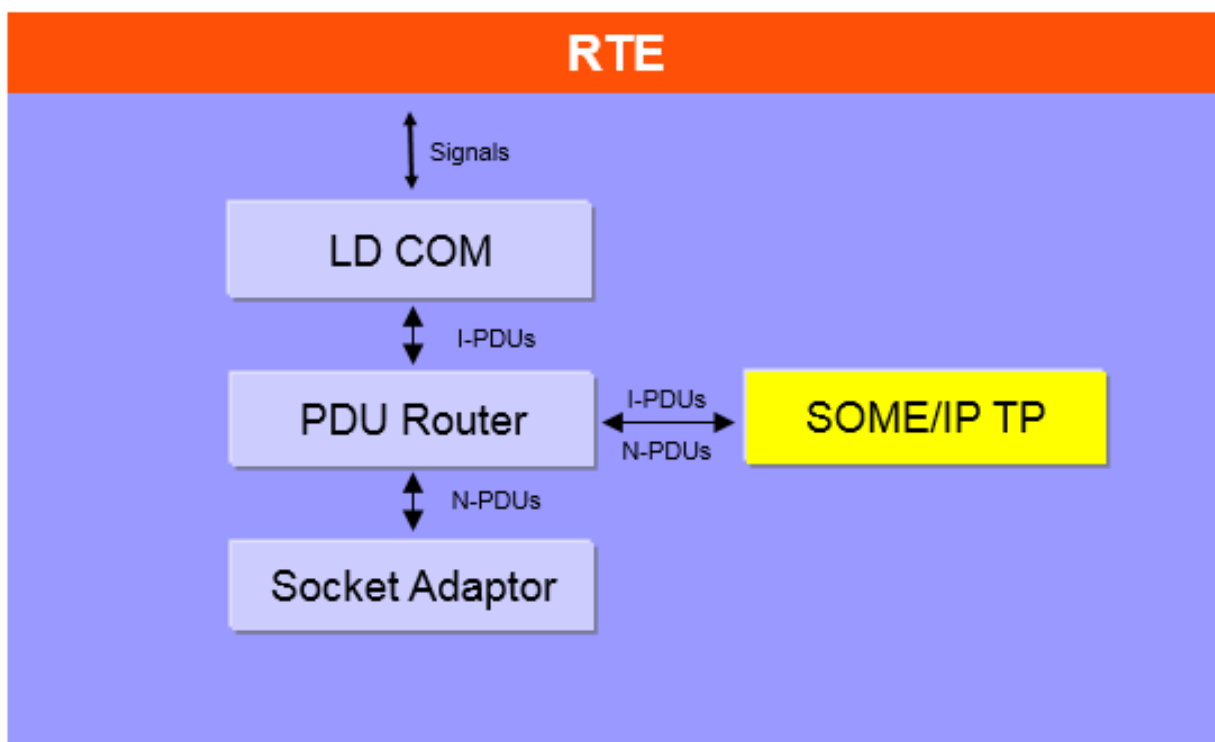


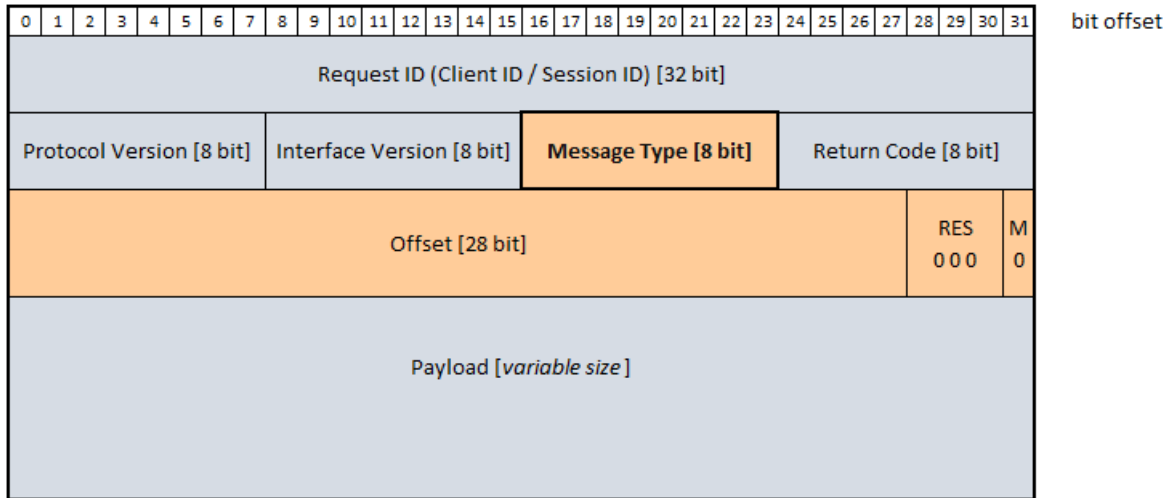
Figure 7.1: Location of the SOME/IP TP module

### 7.1 Overview of the SOME/IP header

This chapter describes the relevant parts of the SOME/IP header for the segmentation of SOME/IP messages.

The Message Type field of the SOME/IP header contains a bit, which marks the SOME/IP PDU as a segment of an original SOME/IP message. Every segmented SOME/IP message adds SOME/IP TP specific fields to the SOME/IP header.

These fields contain control information for the segmentation and the reassembly of original, large SOME/IP messages. How they are used is described in the following chapters.



**Figure 7.2: SOME/IP TP header**

**Note:** The Offset Field, the Reserved bits and the More Segment Flag are only present if the TP-Flag is set to '1'.

### 7.1.1 Message Type Field

The Message Type Field contains the TP-Flag, which marks this SOME/IP message as a SOME/IP segment of an original SOME/IP message.

	Message Type [8 bit]							
bit offset	16	17	18	19	20	21	22	23
Value	x	x	0/1	x	x	x	x	x
Name	ignore	ignore	TP-Flag	ignore	ignore	ignore	ignore	ignore

**Table 7.1: Location of the TP-Flag**

### 7.1.2 Offset Field

The Offset Field [28 bits] is located right after the Return Code field. It starts at bit offset 0, and ends at bit offset 27. The contained value increases after every transmitted/received segment according to the payload length of the previous transmitted/received SOME/IP segment.

The **Offset Field** contains the **Offset Value** in units of 16 bytes. (E.g.: If the Offset Field is set to 92, 1472 Payload bytes have been transmitted so far.) These two different terms are used in the remainder of this document.

**Note:** The payload length provided in the Offset Field does not include the bytes which are needed for the SOME/IP header.

### 7.1.3 Reserved Field

The Reserved Field [3 bits] follows the Offset Field. It starts at bit offset 28 and ends at bit offset 30. These three bits are reserved and set to 0.

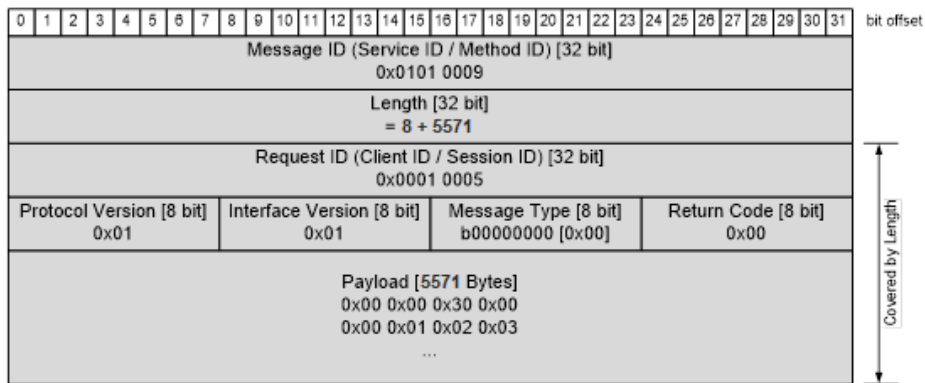
### 7.1.4 More Segments Flag

The More Segments Flag [1 bit] indicates whether another segmented SOME/IP PDU will follow.

### 7.1.5 Example

An original SOME/IP message of 5571 bytes payload has to be transmitted.

The Length field of this original SOME/IP message is set to 8 + 5571 bytes.



**Figure 7.3: Example: Header of Original SOME/IP message**

This original SOME/IP message will now be segmented into 5 consecutive SOME/IP segments. Every payload of these segments carries at most 1392 bytes in this example.

For these segments, the SOME/IP TP module adds additional TP fields (marked red). The Length field of the SOME/IP carries the overall length of the SOME/IP segment including 8 bytes for the Request ID, Protocol Version, Interface Version, Message Type and Return Code. Because of the added TP fields (4 bytes), this Length information is extended by 4 additional SOME/IP TP bytes.

The following table provides an overview of the relevant SOME/IP header settings for every SOME/IP segment:

	Length (Bytes)	Message Type [TP-Flag]	Offset Value	More Segment Flag
1st segment	8 + 4 + 1392 = 1404	TP-Flag = '1'	0	1





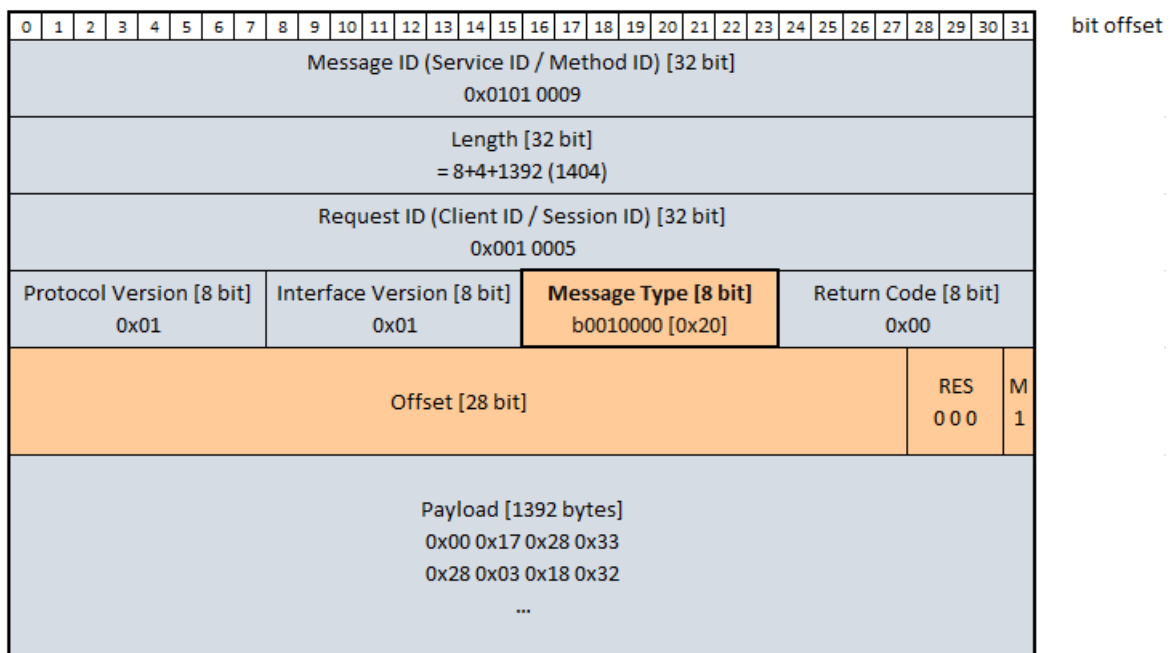
2nd segment	8 + 4 + 1392 = 1404	TP-Flag = '1'	87	1
3rd segment	8 + 4 + 1392 = 1404	TP-Flag = '1'	174	1
4th segment	8 + 4 + 1392 = 1404	TP-Flag = '1'	261	1
5th segment	8 + 4 + 312 = 324	TP-Flag = '1'	348	0

**Table 7.2: Example: Overview of relevant SOME/IP TP headers**

**Note:**Please be aware that the value provided within the Offset Field is given in units of 16 bytes, i.e.: The Offset Value of 87 correspond to 1392 bytes Payload.

The complete SOME/IP headers of the SOME/IP segments message will look like this in detail:

- The first 4 segments contain 1392 Payload bytes each with "More Segments Flag" set to '1':



**Figure 7.4: Example: Header of the SOME/IP segments**

- The last segment (i.e. #5) contains the remaining 312 Payload bytes of the original 5771 bytes payload. This last segment is marked with "More Segments flag" set to '0'.



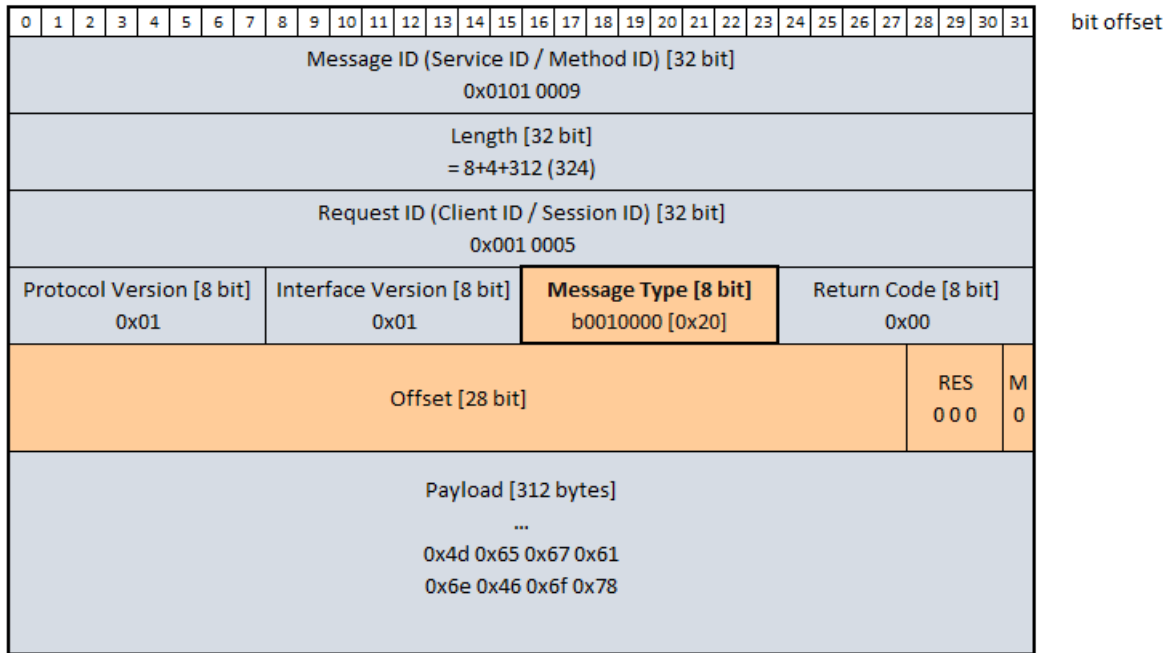


Figure 7.5: Example: Header of the last SOME/IP segment

## 7.2 Segmentation of SOME/IP messages (TX Path)

The following chapter describe the necessary activities of the SOME/IP TP module to segment SOME/IP messages.

### 7.2.1 Size of SOME/IP segments

**[SWS\_SomeIpTp\_00001]** [The SOME/IP TP module shall remember the PDU length separately for every PDU ID which is passed by the PduInfoPtr parameter of the SomeIpTp\_Transmit() call.] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00011](#))

**Note:**

The SOME/IP TP module needs this information to calculate the payload size, the Offset Value, and the More Segments Flag for the SOME/IP segments which are going to be transmitted.

**[SWS\_SomeIpTp\_00002]** [The amount of generated SOME/IP segments shall be as little as possible.] ([RS\\_SOMEIP\\_00011](#), [RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00051](#))

**Note:** This means that the SOME/IP TP module shall try to always use the maximum allowed segmentation size.

**[SWS\_SomelpTp\_00003]** [The size of every segmented SOME/IP message shall consist of the sum of 12 bytes of SOME/IP header, and the Payload bytes itself.] ([RS\\_SOMEIP\\_00011](#))

**[SWS\_SomelpTp\_00004]** [The SOME/IP TP module shall derive the maximum possible size of the segmented SOME/IP PDUs using the parameter SomelpTpTxNPdu Ref.] ([RS\\_SOMEIP\\_00011](#), [RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00051](#))

**[SWS\_SomelpTp\_00005]** [The SOME/IP TP module shall generate segmented SOME/IP PDUs not larger than the size derived from the parameter SomelpTpTxNPdu Ref.] ([RS\\_SOMEIP\\_00011](#), [RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00051](#))

**[SWS\_SomelpTp\_00006]** [Every payload of a segmented SOME/IP message except the last one has to be a multiple of 16 bytes.] ([RS\\_SOMEIP\\_00011](#), [RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

**Note:**

The last segment may consist of an odd payload or a payload which is not dividable by 16. The amount of the contained payload bytes are written into the Length field of the SOME/IP header.

**[SWS\_SomelpTp\_00007]** [The SOME/IP TP module shall buffer the pointer to the Meta-data for every PDU ID separately which is passed by the PduInfoPtr parameter of the API SomelpTp\_Transmit(), and forward this information when PduR\_SomelpTp\_Transmit() is called for each segment.] ()

## 7.2.2 Header of SOME/IP segments

Every generated SOME/IP header for each SOME/IP segment is set to the following values:

The following fields are received by the upper layer:

- Request ID [32 bit] - derived value, see SWS\_SomelpTp\_00007
- Protocol Version [8 bit] - derived value, see SWS\_SomelpTp\_00007
- Interface Version [8 bit] - derived value, see SWS\_SomelpTp\_00007
- Message Type [8 bit] - calculated value, see SWS\_SomelpTp\_00008
- Return Code [8 bit] - derived value, see SWS\_SomelpTp\_00007

The following fields are added by the SOME/IP TP module:

- Offset [28 bit] - calculated value, see SWS\_SomelpTp\_00011
- Reserved bits [3 bit] - statically set to '000', see SWS\_SomelpTp\_00012
- More Segment Flag [1 bit] - calculated value, see SWS\_SomelpTp\_00013

**[SWS\_SomelpTp\_00008]** [The SOME/IP TP module shall store the Request ID, Protocol Version, Interface Version, Message Type, and the Return Code of the SOME/IP header for every PDU ID separately which is returned by the first call of PduR\_SomeIpTpCopyTxData() triggered by the API call SomelpTp\_Transmit().] ([RS\\_SOMEIP\\_00010](#))

**Note:**

The SOME/IP header is contained in the first 8 bytes of the total length of the original SOME/IP PDU. The total length is provided via the API call SomelpTp\_Transmit().

**[SWS\_SomelpTp\_00009]** [If the provided SDU fits into one single PDU, the provided SOME/IP header shall be used with no modification.

If the provided SDU does not fit into one single SOME/IP PDU, the SOME/IP TP module shall set the TP-Flag of the Message Type to '1' for every SOME/IP segment which is going to be sent on the bus via the PduR.

All the other bits contained in the Message Type field shall stay untouched.] ([RS\\_SOMEIP\\_00027](#), [RS\\_SOMEIP\\_00051](#))

**[SWS\_SomelpTp\_00010]** [The SOME/IP TP module shall create and attach the Offset Field, the Reserved bits, and the More Segment Flag to every SOME/IP segment which is going to be sent on the bus.] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

**[SWS\_SomelpTp\_00011]** [The Offset Field of the first SOME/IP segment shall be set to '0'.] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

**[SWS\_SomelpTp\_00012]** [The SOME/IP TP module shall increase the value of the Offset Field for every successfully transmitted SOME/IP segment by the amount of bytes which have been transmitted by the previous SOME/IP segment divided by 16.] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#), [RS\\_SOMEIP\\_00051](#))

**[SWS\_SomelpTp\_00013]** [The SOME/IP TP module shall set the Reserved bits statically to '000' by the sender and shall be ignored by the receiver.] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

**[SWS\_SomelpTp\_00014]** [The SOME/IP TP module shall set the More Segment Flag to '1' except for the last SOME/IP segment.] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

**[SWS\_SomelpTp\_00015]** [The SOME/IP TP module shall set the More Segment Flag to '0' for the last SOME/IP segment.] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

### 7.2.3 Sending of SOME/IP segments

**[SWS\_SomelpTp\_00016]** [If the API SomelpTp\_Transmit() is called, the SOME/IP TP module shall check for an ongoing segmentation for the provided PDU ID.] ([RS\\_SOMEIP\\_00010](#))

**[SWS\_SomelpTp\_00017]** [If the API SomelpTp\_Transmit() is called while no segmentation is ongoing for this PDU ID, the SOME/IP TP module shall perform the following steps in the following order:

- Remember the provided PDU length (provided PduInfoPtr).
- Derive the PDU ID which shall be used for every segmented SOME/IP PDU (see SomelpTpTxNPduRef).
- Calculate the size of the SOME/IP for the first segment (considering header and payload)
- Call the API PduR\_SomelpTpTransmit() from SomelpTp\_MainFunctionTx() using the derived PDU ID and the calculated PDU size and set the SduDataPtr to NULL\_PTR.

](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00081]** [If the API SomelpTpTransmit() is called while no segmentation is ongoing for this PDU ID and if PduR\_SomelpTpTransmit() returns something different than E\_OK then SomelpTpTransmit() shall return E\_NOT\_OK.](RS\_SOMEIP\_00010)

**Note:**

No subsequent call to PduR\_SomelpTpTxConfirmation() shall take place since the transmission request is rejected before segmentation process started.

**[SWS\_SomelpTp\_00018]** [When the API SomelpTp\_TriggerTransmit() is called, create the header for the SOME/IP segment and call the API PduR\_SomelpTpCopyTxData() using the calculated payload for this segment, and set the parameter retry to NULL\_PTR.](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00019]** [The size for consecutive SOME/IP TP segments all but not the last, shall be derived by the maximum possible size of the segmented SOME/IP PDUs using the parameter SomelpTpTxNPduRef.](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomelpTp\_00078]** [The SOME/IP TP module shall verify that the available buffer returned by PduR\_SomelpTpCopyTxData() via availableDataPtr is larger (for all but the last segment) or equal (for the last segment) size of SOME/IP TP segments.](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomelpTp\_00020]** [

The SOME/IP TP module shall debounce subsequent calls of the API PduR\_SomelpTpTransmit() for the same PDU ID, using the parameter SomelpTpNPduSeparationTime.

It defines the time span between the call of SomelpTp\_TxConfirmation(), and the subsequent call of the API PduR\_SomelpTpTransmit(). If SomelpTpTxBurstSize is config-

ured to a value > 1 the SOME/IP TP module shall debounce for the same PDU ID only every SomelpTpTxBurstSize segments.

](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00021]** [If the last SOME/IP segment of the original SOME/IP PDU has been transmitted successfully (i.e. the call of SomelpTp\_TxConfirmation() with parameter success equals TRUE occurred for the last call of PduR\_SomelpTpCopyTxData()), the SOME/IP TP module shall

- Call the API PduR\_SomelpTpTxConfirmation().

](RS\_SOMEIP\_00010)

**Note:**

With the call of PduR\_SomelpTpTxConfirmation(), the segmentation process is finished.

#### 7.2.4 Interruption of the disassembly process

**[SWS\_SomelpTp\_00022]** [If the API SomelpTp\_Transmit() is called with a PDU ID which is currently used for an ongoing segmentation,

- E\_NOT\_OK shall be returned.
- The ongoing disassembly process for this PDU ID shall be canceled.
- The API PduR\_SomelpTpTxConfirmation() with result set to E\_NOT\_OK shall be called.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_DISASSEMBLY\_INTERRUPT.

](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00082]** [If PduR\_SomelpTpTransmit() returns something different than E\_OK during the process of ongoing segmentation.

- The ongoing disassembly process for this PDU ID shall be canceled.
- The API PduR\_SomelpTpTxConfirmation() with result set to E\_NOT\_OK shall be called.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_DISASSEMBLY\_INTERRUPT.

](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00023]** [If the API SomelpTp\_TxConfirmation() is called with parameter success set to FALSE,

- The disassembly process for this PDU ID shall be canceled.

- The API PduR\_SomeIpTpTxConfirmation() with result set to E\_NOT\_OK shall be called.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_DISASSEMBLY\_INTERRUPT.

](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomeIpTp\_00024]** [

In case the available buffer returned by PduR\_SomeIpTpCopyTxData() via available-DataPtr does not satisfied the following conditions

- larger or equal to 16 bytes,
- larger (for all but the last segment) or equal (for the last segment) size of SOME/IP TP segments,

the SOME/IP TP module shall:

- Cancel the disassembly process for this PDU ID .
- Call the API PduR\_SomeIpTpTxConfirmation() with result set to E\_NOT\_OK.
- Call the API Det\_ReportRuntimeError() with the runtime error code SOMEIPTP\_E\_DISASSEMBLY\_INTERRUPT.

](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomeIpTp\_00025]** [If an API PduR\_SomeIpTpCopyTxData() returns something else than BUFREQ\_OK,

- The disassembly process for this PDU ID shall be canceled.
- The API PduR\_SomeIpTpTxConfirmation() with result set to E\_NOT\_OK shall be called.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_DISASSEMBLY\_INTERRUPT.

](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

### 7.3 Assembly of received SOME/IP messages (RX path)

**[SWS\_SomeIpTp\_00031]** [If SomeIpTp\_RxIndication() is called with TP Flag set to '0', SOME/IP TP shall call PduR\_SomeIpTpStartOfReception, PduR\_SomeIpTpCopy RxData(), and PduR\_SomeIpTpRxIndication(), directly after each other providing the received indication.]()

**[SWS\_SomeIpTp\_00071]** [If SomeIpTp\_RxIndication() is called with

- TP Flag set to '1',

- Offset Field set to '0', and
- More Segment Flag set to '0',

SOME/IP TP shall call `PduR_SomeIpTpStartOfReception()`, `PduR_SomeIpTpCopyRxData()`, and `SomeIpTp_RxIndication()`, directly after each other providing the received indication.]()

**[SWS\_SomeIpTp\_00026]** [If the API `SomeIpTp_RxIndication()` is called, the SOME/IP TP module shall derive the following SOME/IP header information from the first 12 bytes of the received PDU:

- Request ID [32 bit]
- Protocol Version [8 bit]
- Interface Version [8 bit]
- Message Type [8 bit]
- Return Code [8 bit]
- Offset [28 bit]
- Reserved bits [3 bit]
- More Segment Flag [1 bit]

]([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

**[SWS\_SomeIpTp\_00077]** [If the TP flag is not set and no assembly session is active, only the following parameters shall be extracted :

- Request ID [32 bit]
- Protocol Version [8 bit]
- Interface Version [8 bit]
- Message Type [8 bit]
- Return Code [8 bit]

]([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00027](#))

**[SWS\_SomeIpTp\_00027]** [The SOME/IP TP module shall be able to store the value of the Offset Field for every PDU ID separately.]([RS\\_SOMEIP\\_00010](#))

**[SWS\_SomeIpTp\_00028]** [The SOME/IP TP module shall be able to store the number of Payload bytes for every PDU ID separately which has been passed by a call of `SomeIpTp_RxIndication()`.]([RS\\_SOMEIP\\_00010](#))

**[SWS\_SomeIpTp\_00029]** [The SOME/IP TP module shall store the status of the More Segment Flag for every PDU ID separately which is passed by a call of `SomeIpTp_RxIndication()`.]([RS\\_SOMEIP\\_00010](#))

**[SWS\_SomelpTp\_00030]** [The SOME/IP TP module shall buffer the pointer to the Meta-data for every PDU ID separately which is passed by the PduInfoPtr parameter of the API SomelpTp\_RxIndication(), and forward this information when PduR\_SomeIpTpStartOfReception is called.]()

### 7.3.1 SOME/IP segment received with Offset 0

**[SWS\_SomelpTp\_00032]** [If a SOME/IP segment is successfully received with Offset Field set to 0, the SOME/IP TP module shall store the values of the received SOME/IP header for each PDU ID separately. These values shall be used as reference values for the (expected) following consecutive receiving SOME/IP segments (i.e. with Offset Field set to > 0).] ([RS\\_SOMEIP\\_00010](#))

**[SWS\_SomelpTp\_00033]** [If a SOME/IP segment is successfully received with Offset Field set to 0, the SOME/IP TP module shall

- Start the Rx timeout time defined by SomelpTpRxTimeoutTime.
- Call the API PduR\_SomelpTpStartOfReception() with the PDU ID derived from the parameter SomelpTpRxSduRef and the TpSduLength set to '0'.

] ([RS\\_SOMEIP\\_00010](#))

#### Note:

TpSduLength set to '0' indicates "unknown message length" to the upper layers.

**[SWS\_SomelpTp\_00034]** [

If a SOME/IP segment is successfully received with Offset Field set to 0 and after the SOME/IP TP module has called the API PduR\_SomelpTpStartOfReception(), the SOME/IP TP module shall check the size returned via bufferSizePtr.

If the returned size is greater or equal to the sum of the received payload and the added SOME/IP header, the SOME/IP TP module shall call the API PduR\_SomelpTpCopyRxData() to pass the SOME/IP header (excluding the SOME/IP TP header) of the assembled SOME/IP message to the SOME/IP TP's upper layer. This shall include the following content:

- Request ID [32 bit]
- Protocol Version [8 bit]
- Interface Version [8 bit]
- Message Type [8 bit] - see [\[SWS\\_SomelpTp\\_00028\]](#)
- Return Code [8 bit]

] ([RS\\_SOMEIP\\_00010](#))

**[SWS\_SomelpTp\_00079]** [



After calling PduR\_SomelpTpCopyRxData() to pass the SOME/IP header (excluding the SOME/IP TP header) of the assembled SOME/IP message to the SOME/IP TP's upper layer (see [SWS\_SomelpTp\_00034]), the SOME/IP TP module shall call the API PduR\_SomelpTpCopyRxData() again, to provide the payload of the assembled SOME/IP message.

](RS\_SOMEIP\_00010)

**Note:** Sequential calls of PduR\_SomelpTpCopyRxData() avoid storing of the SOME/IP TP segment in the SOME/IP TP module and support a proper handling to strip off the SOME/IP TP header by skipping 4 bytes that include the Offset field, Reserved Field and the more Segment flag

**[SWS\_SomelpTp\_00035]** [The SOME/IP TP module shall set the TP-Flag contained in the Message Type back to '0' before the assembled SOME/IP header is passed to the upper layer.](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomelpTp\_00036]** [The SOME/IP TP module shall store the number of Payload bytes for every PDU ID separately which has been passed to the upper layer.](RS\_SOMEIP\_00010)

**Note:**

This information will be used to verify the Offset Value of the consecutive SOME/IP segments.

### 7.3.2 SOME/IP segment received with Offset > 0

**[SWS\_SomelpTp\_00037]** [If a SOME/IP segment is successfully received with Offset Field > 0, the SOME/IP TP module shall compare the received SOME/IP header fields with the values of the stored SOME/IP header fields which has been received with the first segment (i.e. Offset was set to 0):

- Request ID [32 bit]
- Protocol Version [8 bit]
- Interface Version [8 bit]
- Message Type [8 bit]
- Return Code [8 bit]

If these values match restart the SomelpTpRxTimeoutTime and continue with the assembly process.](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00038]** [The SOME/IP TP module shall store the number of Payload bytes for every PDU ID separately which has been passed to the upper layer.](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00039]** [The SOME/IP TP module shall compare the value of the Offset Field with the sum divided by 16 of copied Payload bytes since the first received SOME/IP segment (i.e. with Offset Field set to '0').

If this sum divided by 16 matches with the current Offset Value and if the bufferSize Ptr provided by the previous call of the API PduR\_SomelpTpCopyRxData() is greater or equal to the received payload, call the API PduR\_SomelpTpCopyRxData() with Sdu Length set to the received Payload bytes. ] ([RS\\_SOMEIP\\_00010](#))

**Note:**

In case of Offset Field value > 0, only the Payload bytes are provided to the upper layer (without any SOME/IP header fields)

**[SWS\_SomelpTp\_00040]** [If a SOME/IP segment is successfully received with the More Segment Flag set to '0', the SOME/IP TP module shall

- Cancel the Rx timeout time defined by SomelpTpRxTimeoutTime.
- Call the API PduR\_SomelpTpRxIndication() after it has copied the remaining received Payload bytes to the upper layer (as defined in SWS\_SomelpTp\_00033).

] ([RS\\_SOMEIP\\_00010](#))

### 7.3.3 Interruption of the assembly process

**[SWS\_SomelpTp\_00041]** [If the Rx timeout time defined by SomelpTpRxTimeout Time expires,

- The current assembly process shall be interrupted as defined by SWS\_SomelpTp\_00054.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_ASSEMBLY\_INTERRUPT.

] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00051](#))

**[SWS\_SomelpTp\_00042]** [If the API SomelpTp\_RxIndication() is called with the Offset Value is > 0 but no session is currently running,

- The received PDU shall be ignored
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_INCONSISTENT\_SEQUENCE.

] ([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00051](#))

**Note:** This check identifies that at least the first segment has not been received.

**[SWS\_SomelpTp\_00054]** [If the SOME/IP TP module interrupts the assembly process because of a detected error, the SOME/IP TP module shall

- Call the API PduR\_SomelpTpRxIndication() for this PDU ID with E\_NOT\_OK.

- The Rx timeout time defined by `SomelpTpRxTimeoutTime` shall be canceled (if still running) for this PDU ID.

](RS\_SOMEIP\_00010)

**Note:** The possible reasons for interruptions are listed below.

**[SWS\_SomelpTp\_00062]** [If the SOME/IP TP module detects an inconsistency of the received SOME/IP TP headers (i.e.: Request ID, Protocol Version, Interface Version, Message Type or Return Code are not equal for all received segments),

- The current assembly process shall be interrupted as defined by `SWS_SomelpTp_00054`.
- The API `Det_ReportRuntimeError()` shall be called with the runtime error code `SOMEIPTP_E_INCONSISTENT_HEADER`.

](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00045]** [If the API `SomelpTp_RxIndication()` is called and a session is currently active, the SOME/IP TP module shall check if the TP-Flag of the Message Type is set to '1'. If the TP-Flag is not set to '1',

- The current assembly process shall be interrupted as defined by `SWS_SomelpTp_00054`.
- The API `Det_ReportRuntimeError()` shall be called with the runtime error code `SOMEIPTP_E_MESSAGE_TYPE`.

](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00080] Header Inconsistency check before TP-Flag check** [

Before checking the TP-Flag of the Message, as a condition to interrupt the assembly process, (see [\[SWS\\_SomelpTp\\_00045\]](#)), the SOME/IP TP module shall check for inconsistencies of the received SOME/IP TP headers according to [\[SWS\\_SomelpTp\\_00062\]](#).](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00063]** [If the API `SomelpTp_RxIndication()` is called, the SOME/IP TP module shall check whether the received payload bytes are dividable by 16 in case the More Segment Flag is set to '1'.

If the received payload bytes are not dividable by 16 in this case,

- The current assembly process shall be interrupted as defined by `SWS_SomelpTp_00054`.
- The API `Det_ReportRuntimeError()` shall be called with the runtime error code `SOMEIPTP_E_ASSEMBLY_INTERRUPT`.

](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomelpTp\_00064]** [If the API `SomelpTp_RxIndication()` is called, the SOME/IP TP module shall check the value of the Offset Field. If the Offset Value in units of 16

bytes does not match to the sum of the received Payload bytes of the previous SOME/IP segments,

- The current assembly process shall be interrupted as defined by SWS\_SomelpTp\_00054.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_INCONSISTENT\_SEQUENCE.

](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomelpTp\_00048]** [If the API SomelpTp\_RxIndication() is called, the SOME/IP TP module shall check the value of the Offset Field. If the received Offset Value equals '0' while the received Payload bytes of the previous SOME/IP segments is greater than '0', the SOME/IP TP module shall perform the following steps in the following order:

- The current assembly process shall be interrupted as defined by SWS\_SomelpTp\_00054.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_INCONSISTENT\_SEQUENCE.
- Start the assembly process according to chapter 7.3.1 SOME/IP segment received with Offset 0

](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomelpTp\_00049]** [If the bufferSizePtr provided by the API PduR\_SomelpTp\_StartOfReception() or PduR\_SomelpTp\_CopyRxData() is smaller than the sum of the received and the added SOME/IP header (in case of the first segment) or the received payload (in case of any subsequent segment),

- The current assembly process shall be interrupted as defined by SWS\_SomelpTp\_00054.
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_ASSEMBLY\_INTERRUPT.

](RS\_SOMEIP\_00010)

**[SWS\_SomelpTp\_00050]** [If the API PduR\_SomelpTp\_CopyRxData() returns something else than BUFREQ\_OK,

- The assembly process for this PDU ID shall be interrupted as defined by SWS\_SomelpTp\_00054.
- .
- The API Det\_ReportRuntimeError() shall be called with the runtime error code SOMEIPTP\_E\_ASSEMBLY\_INTERRUPT.

](RS\_SOMEIP\_00010, RS\_SOMEIP\_00051)

**[SWS\_SomeIpTp\_00051]** If the API `PduR_SomeIpTpStartOfReception()` returns something else than `BUFREQ_OK`,

- The assembly process for this PDU ID shall be stopped.
- The API `Det_ReportRuntimeError()` shall be called with the runtime error code `SOMEIPTP_E_ASSEMBLY_INTERRUPT`.

]([RS\\_SOMEIP\\_00010](#), [RS\\_SOMEIP\\_00051](#))

## 7.4 Error Classification

Section 7.2 "Error Handling" of the document "General Specification of Basic Software Modules" [2, SWS BSW General] describes the error handling of the Basic Software in detail. Above all, it constitutes a classification scheme consisting of five error types which may occur in BSW modules.

Based on this foundation, the following section specifies particular errors arranged in the respective subsections below.

### 7.4.1 Development Errors

**[SWS\_SomeIpTp\_00052] Definiton of development errors in module SomeIpTp** [

Type of error	Related error code	Error value
SOME/IP TP module not initialized	SOMEIPTP_E_UNINIT	0x01
Null pointer has been passed as an argument	SOMEIPTP_E_PARAM_POINTER	0x02
Unknown parameter has been passed	SOMEIPTP_E_PARAM	0x03
Invalid configuration set selection	SOMEIPTP_E_INIT_FAILED	0x04

]([SRS\\_BSW\\_00481](#))

### 7.4.2 Runtime Errors

**[SWS\_SomeIpTp\_00065] Definiton of runtime errors in module SomeIpTp** [

Type of error	Related error code	Error value
The TP-Flag (of Message Type) was set to '0'	SOMEIPTP_E_MESSAGE_TYPE	0x04
Inconsistent subsequent segment received	SOMEIPTP_E_INCONSISTENT_SEQUENCE	0x05
Inconsistent header received	SOMEIPTP_E_INCONSISTENT_HEADER	0x06
Disassembly Interrupt due to the upper layer	SOMEIPTP_E_DISASSEMBLY_INTERRUPT	0x07
Assembly Interrupt due to the upper layer	SOMEIPTP_E_ASSEMBLY_INTERRUPT	0x08

]()

Note :- In reference to run-time error "SOMEIPTP\_E\_MESSAGE\_TYPE" no DET will be reported for unsegmented message and is passed to the upper layer without further handling.

### **7.4.3 Transient Faults**

There are no transient faults.

### **7.4.4 Production Errors**

There are no production errors.

### **7.4.5 Extended Production Errors**

There are no extended production errors.

## 8 API specification

### 8.1 Imported types

In this chapter all types included from the following modules are listed:

#### [SWS\_SomelpTp\_00043] Definition of imported datatypes of module SomelpTp [

<i>Module</i>	<i>Header File</i>	<i>Imported Type</i>
ComStack_Types	ComStack_Types.h	BufReq_ReturnType
	ComStack_Types.h	PdulType
	ComStack_Types.h	PdulInfoType
	ComStack_Types.h	PduLengthType
	ComStack_Types.h	RetryInfoType
	ComStack_Types.h	TpDataStateType
Std	Std_Types.h	Std_ReturnType
	Std_Types.h	Std_VersionInfoType

] ([SRS\\_BSW\\_00301](#))

### 8.2 Type definitions

#### [SWS\_SomelpTp\_91002] Definition of datatype SomelpTp\_ConfigType [

<b>Name</b>	SomelpTp_ConfigType	
<b>Kind</b>	Structure	
<b>Elements</b>	implementation specific	
	<b>Type</b>	–
	<b>Comment</b>	–
<b>Description</b>	This type shall contain at least all parameters that are post-build able according to chapter 10.	
<b>Available via</b>	SomelpTp.h	

]()

## 8.3 Function definitions

### 8.3.1 SomelpTp\_GetVersionInfo

[SWS\_SomelpTp\_00044] Definition of API function SomelpTp\_GetVersionInfo [

<b>Service Name</b>	SomelpTp_GetVersionInfo	
<b>Syntax</b>	<pre>void SomeIpTp_GetVersionInfo (     Std_VersionInfoType* VersionInfo )</pre>	
<b>Service ID [hex]</b>	0x01	
<b>Sync/Async</b>	Synchronous	
<b>Reentrancy</b>	Reentrant	
<b>Parameters (in)</b>	None	
<b>Parameters (inout)</b>	None	
<b>Parameters (out)</b>	VersionInfo	Pointer to where to store the version information of this module.
<b>Return value</b>	None	
<b>Description</b>	Returns the version information of this module.	
<b>Available via</b>	SomelpTp.h	

]([SRS\\_BSW\\_00407](#), [SRS\\_BSW\\_00411](#))

[SWS\_SomelpTp\_00066] [If the parameter SomelpTp\_VersionInfoPtr of the API SomelpTp\_GetVersionInfo() equals NULL\_PTR and if development error detection is enabled (i.e. SomelpTpDevErrorDetect is set to TRUE), the function SomelpTp\_GetVersionInfo, the API Det\_ReportError() shall be called with the development error code SOMEIPTP\_E\_PARAM\_POINTER.]()

### 8.3.2 SomelpTp\_Init

[SWS\_SomelpTp\_00046] Definition of API function SomelpTp\_Init [

<b>Service Name</b>	SomelpTp_Init	
<b>Syntax</b>	<pre>void SomeIpTp_Init (     const SomeIpTp_ConfigType* config )</pre>	
<b>Service ID [hex]</b>	0x02	
<b>Sync/Async</b>	Synchronous	
<b>Reentrancy</b>	Non Reentrant	
<b>Parameters (in)</b>	config	Base pointer to the configuration structure of the SOME/IP TP module.
<b>Parameters (inout)</b>	None	
<b>Parameters (out)</b>	None	
<b>Return value</b>	None	
<b>Description</b>	Initializes the SOME/IP TP module.	
<b>Available via</b>	SomelpTp.h	

]([SRS\\_BSW\\_00407](#), [SRS\\_BSW\\_00411](#)) **Note:**



The AUTOSAR ECU StateManager calls this SOME/IP TP API service with the address of the static configuration structure of the module in parameter SomelpTp\_Config Ptr.

### 8.3.3 SomelpTp\_Transmit

#### [SWS\_SomelpTp\_00047] Definition of API function SomelpTp\_Transmit [

<b>Service Name</b>	SomelpTp_Transmit	
<b>Syntax</b>	Std_ReturnType SomeIpTp_Transmit ( PduIdType TxPduId, const PduInfoType* PduInfoPtr )	
<b>Service ID [hex]</b>	0x49	
<b>Sync/Async</b>	Synchronous	
<b>Reentrancy</b>	Reentrant for different PduIds. Non reentrant for the same PduId.	
<b>Parameters (in)</b>	TxPduId	Identifier of the PDU to be transmitted
	PduInfoPtr	Length of and pointer to the PDU data and pointer to MetaData.
<b>Parameters (inout)</b>	None	
<b>Parameters (out)</b>	None	
<b>Return value</b>	Std_ReturnType	E_OK: Transmit request has been accepted. E_NOT_OK: Transmit request has not been accepted.
	<b>Description</b>	
<b>Description</b>		Requests transmission of a PDU.
<b>Available via</b>	SomelpTp.h	

]()

**[SWS\_SomelpTp\_00076]** [If SomelpTp\_Transmit() is called before the SOME/IP TP module has been initialized with a call of SomelpTp\_Init(), the AP shall return with E\_NOT\_OK and stop the new session.]()

**[SWS\_SomelpTp\_00073]** [If development error detection is enabled: SomelpTp\_Transmit() shall check that the service SomelpTp\_Init() was previously called. If the check fails, SomelpTp\_Transmit() shall raise the development error SOMEIPTP\_E\_UNINIT.]()

**[SWS\_SomelpTp\_00074]** [If parameter TxPduId of SomelpTp\_Transmit() has an invalid value and if development error detection is enabled (i.e. SomelpTpDevErrorDetect is set to TRUE), the API Det\_ReportError() shall be called with the development error code SOMEIPTP\_E\_PARAM.]()

**[SWS\_SomelpTp\_00075]** [If parameter PduInfoPtr of SomelpTp\_Transmit() equals NULL\_PTR and if development error detection is enabled (i.e. SomelpTpDevErrorDetect is set to TRUE), the API Det\_ReportError() shall be called with the development error code SOMEIPTP\_E\_PARAM\_POINTER.]()

## 8.4 Callback notifications

### 8.4.1 SomelpTp\_TriggerTransmit

**[SWS\_SomelpTp\_00053] Definition of callback function SomelpTp\_TriggerTransmit** [

<b>Service Name</b>	SomelpTp_TriggerTransmit	
<b>Syntax</b>	Std_ReturnType SomeIpTp_TriggerTransmit ( PduIdType TxPduId, PduInfoType* PduInfoPtr )	
<b>Service ID [hex]</b>	0x41	
<b>Sync/Async</b>	Synchronous	
<b>Reentrancy</b>	Reentrant for different PduIds. Non reentrant for the same PduId.	
<b>Parameters (in)</b>	TxPduId	ID of the SDU that is requested to be transmitted.
<b>Parameters (inout)</b>	PduInfoPtr	Contains a pointer to a buffer (SduDataPtr) to where the SDU data shall be copied, and the available buffer size in SduLength. On return, the service will indicate the length of the copied SDU data in SduLength.
<b>Parameters (out)</b>	None	
<b>Return value</b>	Std_ReturnType	E_OK: SDU has been copied and SduLength indicates the number of copied bytes. E_NOT_OK: No SDU data has been copied. PduInfoPtr must not be used since it may contain a NULL pointer or point to invalid data.
<b>Description</b>	Within this API, the upper layer module (called module) shall check whether the available data fits into the buffer size reported by PduInfoPtr->SduLength. If it fits, it shall copy its data into the buffer provided by PduInfoPtr->SduDataPtr and update the length of the actual copied data in PduInfoPtr->SduLength. If not, it returns E_NOT_OK without changing PduInfoPtr.	
<b>Available via</b>	SomelpTp.h	

]()

**[SWS\_SomelpTp\_00072]** [If development error detection is enabled: SomelpTp\_TriggerTransmit() shall check that the service SomelpTp\_Init() was previously called. If the check fails,

SomelpTp\_TriggerTransmit() shall raise the development error SOMEIPTP\_E\_UNINIT.]()

**[SWS\_SomelpTp\_00055]** [In case the given PduInfoPtr->SduLength is smaller than the computed size of the SOME/IP-TP segment (considering header and payload), SomelpTp\_TriggerTransmit() shall not copy any data and return E\_NOT\_OK.]()

## 8.4.2 SomelpTp\_RxIndication

### [SWS\_SomelpTp\_00056] Definition of callback function SomelpTp\_RxIndication

[

<b>Service Name</b>	SomelpTp_RxIndication	
<b>Syntax</b>	<pre>void SomeIpTp_RxIndication (     PduIdType RxPduId,     const PduInfoType* PduInfoPtr )</pre>	
<b>Service ID [hex]</b>	0x42	
<b>Sync/Async</b>	Synchronous	
<b>Reentrancy</b>	Reentrant for different PduIds. Non reentrant for the same PduId.	
<b>Parameters (in)</b>	RxPduId	ID of the received PDU.
	PduInfoPtr	Contains the length (SduLength) of the received PDU, a pointer to a buffer (SduDataPtr) containing the PDU, and the MetaData related to this PDU.
<b>Parameters (inout)</b>	None	
<b>Parameters (out)</b>	None	
<b>Return value</b>	None	
<b>Description</b>	Indication of a received PDU from a lower layer communication interface module.	
<b>Available via</b>	SomelpTp.h	

]()

**[SWS\_SomelpTp\_00057]** [If development error detection is enabled: SomelpTp\_RxIndication() shall check that the service SomelpTp\_Init() was previously called. If the check fails, SomelpTp\_RxIndication() shall raise the development error SOMEIPTP\_E\_UNINIT.]()

## 8.4.3 SomelpTp\_TxConfirmation

### [SWS\_SomelpTp\_91001] Definition of callback function SomelpTp\_TxConfirmation

[

<b>Service Name</b>	SomelpTp_TxConfirmation	
<b>Syntax</b>	<pre>void SomeIpTp_TxConfirmation (     PduIdType TxPduId,     Std_ReturnType result )</pre>	
<b>Service ID [hex]</b>	0x40	
<b>Sync/Async</b>	Synchronous	
<b>Reentrancy</b>	Reentrant for different PduIds. Non reentrant for the same PduId.	
<b>Parameters (in)</b>	TxPduId	ID of the PDU that has been transmitted.
	result	E_OK: The PDU was transmitted. E_NOT_OK: Transmission of the PDU failed.
<b>Parameters (inout)</b>	None	
<b>Parameters (out)</b>	None	
<b>Return value</b>	None	

▽



<b>Description</b>	The lower layer communication interface module confirms the transmission of a PDU, or the failure to transmit a PDU.
<b>Available via</b>	SomIpTp.h

]()

**[SWS\_SomIpTp\_00067]** [If development error detection is enabled: SomIpTp\_TxConfirmation() shall check that the service SomIpTp\_Init() was previously called. If the check fails, SomIpTp\_TxConfirmation() shall raise the development error SOMEIPTP\_E\_UNINIT.]()

## 8.5 Scheduled functions

### 8.5.1 SomIpTp\_MainFunctionTx

**[SWS\_SomIpTp\_00058]** Definition of scheduled function SomIpTp\_MainFunctionTx [

<b>Service Name</b>	SomIpTp_MainFunctionTx
<b>Syntax</b>	void SomeIpTp_MainFunctionTx ( void )
<b>Service ID [hex]</b>	0x03
<b>Description</b>	This function performs the processing of the AUTOSAR SOME/IP TP module's transmission activities.
<b>Available via</b>	SchM_SomIpTp.h

]([SRS\\_BSW\\_00373](#), [SRS\\_BSW\\_00425](#))

**[SWS\_SomIpTp\_00059]** [A call to SomIpTp\_MainFunctionTx() shall simply return if the AUTOSAR SOME/IP TP module was not previously initialized with a call to SomIpTp\_Init().]([SRS\\_BSW\\_00425](#))

### 8.5.2 SomIpTp\_MainFunctionRx

**[SWS\_SomIpTp\_00069]** Definition of scheduled function SomIpTp\_MainFunctionRx [

<b>Service Name</b>	SomIpTp_MainFunctionRx
<b>Syntax</b>	void SomeIpTp_MainFunctionRx ( void )
<b>Service ID [hex]</b>	0x04





<b>Description</b>	This function performs the processing of the AUTOSAR SOME/IP TP module's reception activities.
<b>Available via</b>	SchM_SomelpTp.h

|(SRS\_BSW\_00373, SRS\_BSW\_00425)

**[SWS\_SomelpTp\_00070]** [A call to SomelpTp\_MainFunctionRx() shall simply return if the AUTOSAR SOME/IP TP module was not previously initialized with a call to SomeIpTp\_Init().](SRS\_BSW\_00425)

## 8.6 Expected interfaces

In this chapter all external interfaces required from other modules are listed.

### 8.6.1 Mandatory Interfaces

This chapter defines all external interfaces which are required to fulfill the core functionality of the module.

**[SWS\_SomelpTp\_00060] Definition of mandatory interfaces in module SomelpTp** [

<b>API Function</b>	<b>Header File</b>	<b>Description</b>
Det_ReportRuntimeError	Det.h	Service to report runtime errors. If a callout has been configured then this callout shall be called.
PduR_SomelpTpCopyRxData	PduR_SomelpTp.h	This function is called to provide the received data of an I-PDU segment (N-PDU) to the upper layer. Each call to this function provides the next part of the I-PDU data. The size of the remaining buffer is written to the position indicated by bufferSizePtr.
PduR_SomelpTpCopyTxData	PduR_SomelpTp.h	This function is called to acquire the transmit data of an I-PDU segment (N-PDU). Each call to this function provides the next part of the I-PDU data unless retry->TpDataState is TP_DATARETRY. In this case the function restarts to copy the data beginning at the offset from the current position indicated by retry->TxTpDataCnt. The size of the remaining data is written to the position indicated by availableDataPtr.
PduR_SomelpTpRxIndication	PduR_SomelpTp.h	Called after an I-PDU has been received via the TP API, the result indicates whether the transmission was successful or not.
PduR_SomelpTpStartOfReception	PduR_SomelpTp.h	This function is called at the start of receiving an N-SDU. The N-SDU might be fragmented into multiple N-PDUs (FF with one or more following CFs) or might consist of a single N-PDU (SF). The service shall provide the currently available maximum buffer size when invoked with TpSduLength equal to 0.
PduR_SomelpTpTransmit	PduR_SomelpTp.h	Requests transmission of a PDU.





<i>API Function</i>	<i>Header File</i>	<i>Description</i>
PduR_SomelpTpTxConfirmation	PduR_SomelpTp.h	This function is called after the I-PDU has been transmitted on its network, the result indicates whether the transmission was successful or not.

]([SRS\\_BSW\\_00384](#))

## 8.6.2 Optional Interfaces

This chapter defines all external interfaces which are required to fulfill an optional functionality of the module.

### [SWS\_SomelpTp\_00061] Definition of optional interfaces in module SomelpTp [

<i>API Function</i>	<i>Header File</i>	<i>Description</i>
Det_ReportError	Det.h	Service to report development errors.

]([SRS\\_BSW\\_00384](#))

## 8.6.3 Configurable interfaces

N/A

## 9 Sequence diagrams

### 9.1 Reception

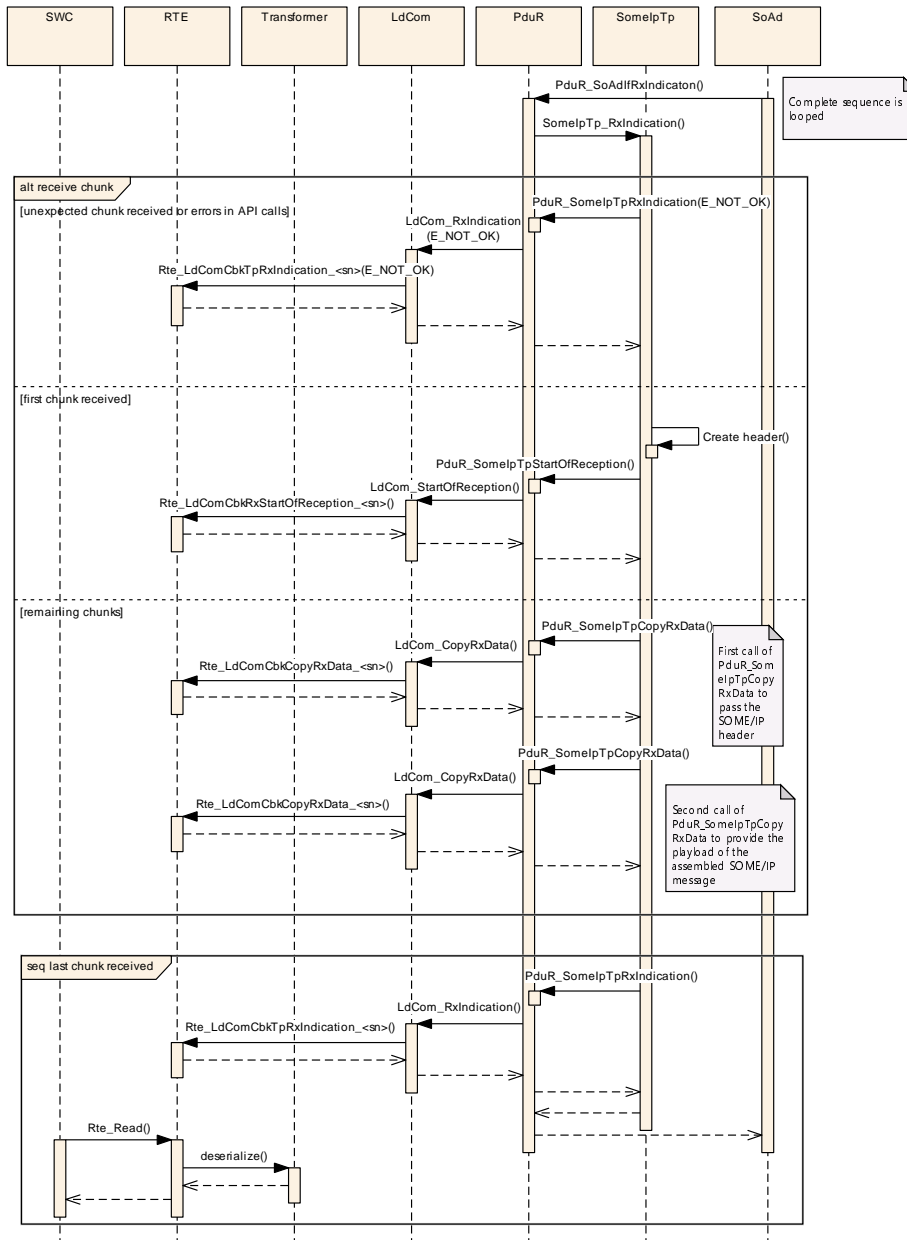
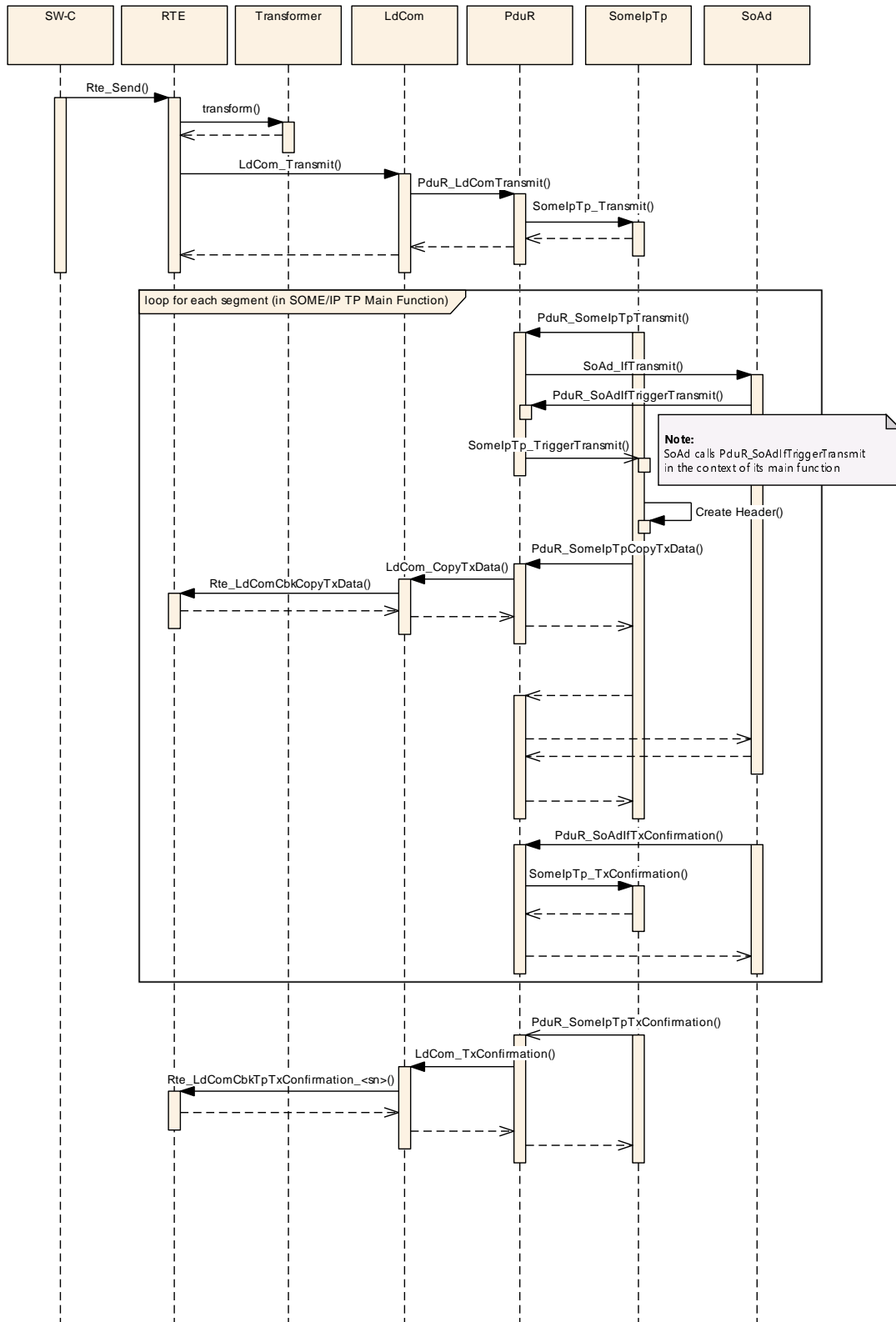


Figure 9.1: Reception of SOME/IP segments

### 9.2 Transmission

Sequence 9.2 depicts a sequence where the call to `PduR_SomelpTpTransmit()` for the first segment according to `SWS_SomelpTp_00017` is deferred to the `SomelpTp_MainFunction()`.



**Figure 9.2: Transmission of SOME/IP segments**



## 10 Configuration specification

In general, this chapter defines configuration parameters and their clustering into containers. In order to support the specification Chapter 10.1 describes fundamentals. It also specifies a template (table) you shall use for the parameter specification. We intend to leave Chapter 10.1 in the specification to guarantee comprehension.

Chapter 10.2 specifies the structure (containers) and the parameters of the module SOME/IP TP.

Chapter 10.3 specifies published information of the module SOME/IP TP.

### 10.1 How to read this chapter

For details refer to the chapter 10.1 “Introduction to configuration specification” in SWS\_BSWGeneral.

### 10.2 Containers and configuration parameters

The following chapters summarize all configuration parameters. The detailed meanings of the parameters describe Chapter 7 and Chapter 8.

#### 10.2.1 SomelpTp

<b>SWS Item</b>	[ECUC_SomelpTp_00001]
<b>Module Name</b>	SomelpTp
<b>Description</b>	Configuration of the SomelpTp module.
<b>Post-Build Variant Support</b>	true
<b>Supported Config Variants</b>	VARIANT-LINK-TIME, VARIANT-POST-BUILD, VARIANT-PRE-COMPILE

Included Containers		
Container Name	Multiplicity	Scope / Dependency
<a href="#">SomelpTpChannel</a>	1..*	This container contains the configuration parameters of the SomelpTp channel.
<a href="#">SomelpTpGeneral</a>	1	This container contains the general configuration parameters of the SomelpTp module.

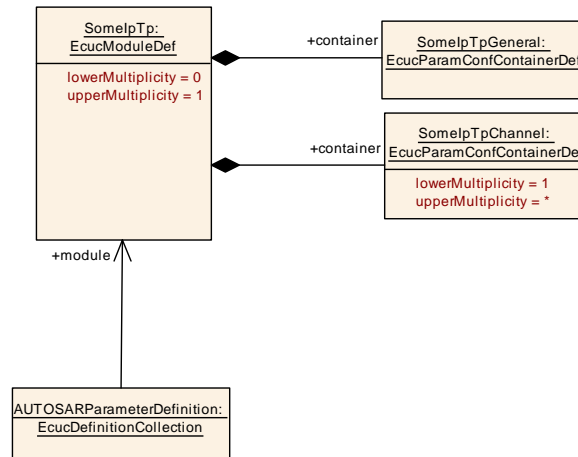


Figure 10.1

### 10.2.2 SomelpTpGeneral

SWS Item	[ECUC_SomelpTp_00002]
Container Name	SomelpTpGeneral
Parent Container	<a href="#">SomelpTp</a>
Description	This container contains the general configuration parameters of the SomelpTp module.
Configuration Parameters	

SWS Item	[ECUC_SomelpTp_00004]		
Parameter Name	SomelpTpDevErrorDetect		
Parent Container	<a href="#">SomelpTpGeneral</a>		
Description	Switches the Development Error Detection and Notification ON or OFF.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	-		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	-	
	Post-build time	-	
Scope / Dependency	scope: local		

SWS Item	[ECUC_SomelpTp_00021]
Parameter Name	SomelpTpRxMainFunctionPeriod
Parent Container	<a href="#">SomelpTpGeneral</a>
Description	This parameter defines the cycle time in seconds of the periodic call of the SomelpTp_MainFunctionRx.
Multiplicity	1
Type	EcucFloatParamDef
Range	]0 .. INF[
Default value	-





<b>Post-Build Variant Value</b>	false		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	All Variants
	<b>Link time</b>	–	
	<b>Post-build time</b>	–	
<b>Scope / Dependency</b>	scope: local		

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00005]</b>		
<b>Parameter Name</b>	SomelpTpTxMainFunctionPeriod		
<b>Parent Container</b>	<a href="#">SomelpTpGeneral</a>		
<b>Description</b>	This parameter defines the cycle time in seconds of the periodic call of the SomelpTp_MainFunctionTx.		
<b>Multiplicity</b>	1		
<b>Type</b>	EcucFloatParamDef		
<b>Range</b>	]0 .. INF[		
<b>Default value</b>	–		
<b>Post-Build Variant Value</b>	false		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	All Variants
	<b>Link time</b>	–	
	<b>Post-build time</b>	–	
<b>Scope / Dependency</b>	scope: local		

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00019]</b>		
<b>Parameter Name</b>	SomelpTpVersionInfoApi		
<b>Parent Container</b>	<a href="#">SomelpTpGeneral</a>		
<b>Description</b>	Activates the SomelpTp_GetVersionInfo() API. TRUE: Enables the SomelpTp_GetVersionInfo() API. FALSE: SomelpTp_GetVersionInfo() API is not included.		
<b>Multiplicity</b>	1		
<b>Type</b>	EcucBooleanParamDef		
<b>Default value</b>	false		
<b>Post-Build Variant Value</b>	false		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	All Variants
	<b>Link time</b>	–	
	<b>Post-build time</b>	–	
<b>Scope / Dependency</b>	scope: local		

<b>No Included Containers</b>
-------------------------------

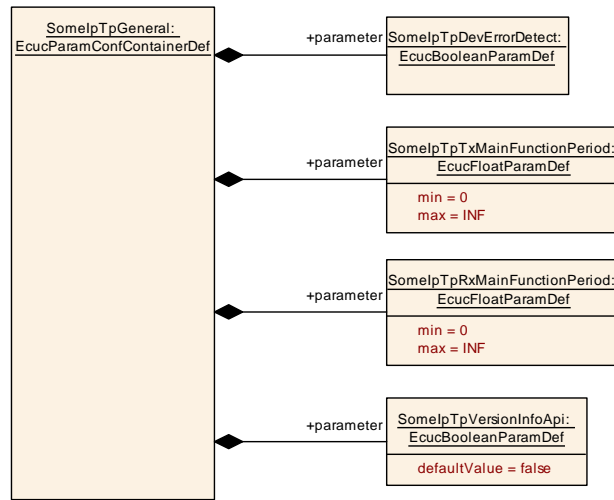


Figure 10.2

### 10.2.3 SomelpTpChannel

SWS Item	[ECUC_SomelpTp_00003]		
Container Name	SomelpTpChannel		
Parent Container	<a href="#">SomelpTp</a>		
Description	This container contains the configuration parameters of the SomelpTp channel.		
Post-Build Variant Multiplicity	true		
Multiplicity Configuration Class	Pre-compile time	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Configuration Parameters			

SWS Item	[ECUC_SomelpTp_00006]		
Parameter Name	SomelpTpNPduSeparationTime		
Parent Container	<a href="#">SomelpTpChannel</a>		
Description	Sets the duration of the minimum time in seconds the SomelpTp module shall wait between the transmissions of N-PDUs.		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	-		
Post-Build Variant Value	true		
Value Configuration Class	Pre-compile time	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00023]</b>		
<b>Parameter Name</b>	SomelpTpRxTimeoutTime		
<b>Parent Container</b>	<a href="#">SomelpTpChannel</a>		
<b>Description</b>	Timer to monitor the successful reception. It is started when the first NPdu is received, restarted after reception of intermediate NPdus, and is stopped when the last NPdu has been received. The value shall be calculated as follows: (SomelpTpRxTimeoutTime = SomelpTpNPduSeparationTime + budget), where the time budget compensates intermediary hops and jitters within the ECU implementation.		
<b>Multiplicity</b>	1		
<b>Type</b>	EcucFloatParamDef		
<b>Range</b>	]0 .. INF[		
<b>Default value</b>	-		
<b>Post-Build Variant Value</b>	true		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Scope / Dependency</b>	scope: local		

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00024]</b>		
<b>Parameter Name</b>	SomelpTpTxBurstSize		
<b>Parent Container</b>	<a href="#">SomelpTpChannel</a>		
<b>Description</b>	Specifies the number of segments SomelpTp shall transmit without applying the SomelpTpNPduSeparationTime.		
<b>Multiplicity</b>	0..1		
<b>Type</b>	EcucIntegerParamDef		
<b>Range</b>	1 .. 18446744073709551615		
<b>Default value</b>	1		
<b>Post-Build Variant Multiplicity</b>	true		
<b>Post-Build Variant Value</b>	true		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Scope / Dependency</b>	scope: local		

<b>Included Containers</b>		
<b>Container Name</b>	<b>Multiplicity</b>	<b>Scope / Dependency</b>
<a href="#">SomelpTpRxNSdu</a>	0..*	The following parameters needs to be configured for each N-SDU which has to be passed as one assembled RxPdu to the upper layer.
<a href="#">SomelpTpTxNSdu</a>	0..*	The following parameters needs to be configured for each N-SDU that the SomelpTp module transmits via the SomelpTp Channel.

## 10.2.4 SomelpTpRxNSdu

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00008]</b>		
<b>Container Name</b>	SomelpTpRxNSdu		
<b>Parent Container</b>	<a href="#">SomelpTpChannel</a>		
<b>Description</b>	The following parameters needs to be configured for each N-SDU which has to be passed as one assembled RxPdu to the upper layer.		
<b>Post-Build Variant Multiplicity</b>	true		
<b>Multiplicity Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Configuration Parameters</b>			

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00010]</b>		
<b>Parameter Name</b>	SomelpTpRxSduRef		
<b>Parent Container</b>	<a href="#">SomelpTpRxNSdu</a>		
<b>Description</b>	Reference to a Pdu in the COM-Stack that represents the assembled RxPdu which is passed via the PduR to the upper layer.		
<b>Multiplicity</b>	1		
<b>Type</b>	Reference to Pdu		
<b>Post-Build Variant Value</b>	true		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Scope / Dependency</b>			

<b>Included Containers</b>		
<b>Container Name</b>	<b>Multiplicity</b>	<b>Scope / Dependency</b>
<a href="#">SomelpTpRxNPdu</a>	1	This container contains the configuration parameters of the NPdu that is received from a lower layer

## 10.2.5 SomelpTpRxNPdu

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00011]</b>		
<b>Container Name</b>	SomelpTpRxNPdu		
<b>Parent Container</b>	<a href="#">SomelpTpRxNSdu</a>		
<b>Description</b>	This container contains the configuration parameters of the NPdu that is received from a lower layer		
<b>Configuration Parameters</b>			

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00013]</b>		
<b>Parameter Name</b>	SomelpTpRxNPduHandleId		
<b>Parent Container</b>	<a href="#">SomelpTpRxNPdu</a>		
<b>Description</b>	This parameter defines the handle ID that is used by the PduR when calling SomelpTp_RxIndication.		





<b>Multiplicity</b>	1		
<b>Type</b>	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
<b>Range</b>	0 .. 65535		
<b>Default value</b>	-		
<b>Post-Build Variant Value</b>	false		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	All Variants
	<b>Link time</b>	-	
	<b>Post-build time</b>	-	
<b>Scope / Dependency</b>	scope: ECU withAuto = true		

<b>SWS Item</b>	[ECUC_SomelpTp_00012]		
<b>Parameter Name</b>	SomelpTpRxNPduRef		
<b>Parent Container</b>	<a href="#">SomelpTpRxNPdu</a>		
<b>Description</b>	Reference to a global Pdu that is used to harmonize HandleIDs in the COM-Stack.		
<b>Multiplicity</b>	1		
<b>Type</b>	Reference to Pdu		
<b>Post-Build Variant Value</b>	true		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Scope / Dependency</b>			

No Included Containers

## 10.2.6 SomelpTpTxNSdu

<b>SWS Item</b>	[ECUC_SomelpTp_00009]		
<b>Container Name</b>	SomelpTpTxNSdu		
<b>Parent Container</b>	<a href="#">SomelpTpChannel</a>		
<b>Description</b>	The following parameters needs to be configured for each N-SDU that the SomelpTp module transmits via the SomelpTpChannel.		
<b>Post-Build Variant Multiplicity</b>	true		
<b>Multiplicity Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Configuration Parameters</b>			

<b>SWS Item</b>	[ECUC_SomelpTp_00020]		
<b>Parameter Name</b>	SomelpTpTxNSduHandleId		
<b>Parent Container</b>	<a href="#">SomelpTpTxNSdu</a>		
<b>Description</b>	This parameter defines the handle ID of the NSdu that represents the original TxSdu which is segmented and passed via the PduR to the lower layer. This handle ID is used by PduR when calling SomelpTp_Transmit.		





<b>Multiplicity</b>	1		
<b>Type</b>	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
<b>Range</b>	0 .. 65535		
<b>Default value</b>	-		
<b>Post-Build Variant Value</b>	false		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	All Variants
	<b>Link time</b>	-	
	<b>Post-build time</b>	-	
<b>Scope / Dependency</b>	scope: ECU withAuto = true		

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00015]</b>		
<b>Parameter Name</b>	SomelpTpTxNSduRef		
<b>Parent Container</b>	<a href="#">SomelpTpTxNSdu</a>		
<b>Description</b>	Reference to a global Pdu in the COM-Stack that represents the original TxSdu which is segmented and passed via the PduR to the lower layer.		
<b>Multiplicity</b>	1		
<b>Type</b>	Reference to Pdu		
<b>Post-Build Variant Value</b>	true		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Scope / Dependency</b>			

Included Containers		
Container Name	Multiplicity	Scope / Dependency
<a href="#">SomelpTpTxNPdu</a>	1	This container contains the configuration parameters of the segmented Tx NPdus that are transmitted to a lower layer.

## 10.2.7 SomelpTpTxNPdu

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00016]</b>	
<b>Container Name</b>	SomelpTpTxNPdu	
<b>Parent Container</b>	<a href="#">SomelpTpTxNSdu</a>	
<b>Description</b>	This container contains the configuration parameters of the segmented Tx NPdus that are transmitted to a lower layer.	
<b>Configuration Parameters</b>		

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00017]</b>	
<b>Parameter Name</b>	SomelpTpTxNPduHandleId	
<b>Parent Container</b>	<a href="#">SomelpTpTxNPdu</a>	
<b>Description</b>	This parameter defines the handle ID that is used by PduR when calling SomelpTp_TriggerTransmit.	
<b>Multiplicity</b>	1	
<b>Type</b>	EcucIntegerParamDef (Symbolic Name generated for this parameter)	







<b>Range</b>	0 .. 65535		
<b>Default value</b>	–		
<b>Post-Build Variant Value</b>	false		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	All Variants
	<b>Link time</b>	–	
	<b>Post-build time</b>	–	
<b>Scope / Dependency</b>	scope: ECU withAuto = true		

<b>SWS Item</b>	<b>[ECUC_SomelpTp_00018]</b>		
<b>Parameter Name</b>	SomelpTpTxNPduRef		
<b>Parent Container</b>	<a href="#">SomelpTpTxNPdu</a>		
<b>Description</b>	Reference to a global Pdu that is used to harmonize HandleIDs in the COM-Stack.		
<b>Multiplicity</b>	1		
<b>Type</b>	Reference to Pdu		
<b>Post-Build Variant Value</b>	true		
<b>Value Configuration Class</b>	<b>Pre-compile time</b>	X	VARIANT-PRE-COMPILE
	<b>Link time</b>	X	VARIANT-LINK-TIME
	<b>Post-build time</b>	X	VARIANT-POST-BUILD
<b>Scope / Dependency</b>			

No Included Containers

### 10.3 Published Information

For details refer to the chapter 10.3 “Published Information” in SWS\_BSWGeneral.

## A Change history of AUTOSAR traceable items

Please note that the lists in this chapter also include traceable items that have been removed from the specification in a later version. These items do not appear as hyperlinks in the document.

### A.1 Traceable item history of this document according to AUTOSAR Release R23-11

#### A.1.1 Added Specification Items in R23-11

[\[SWS\\_SomeIpTp\\_00081\]](#) [\[SWS\\_SomeIpTp\\_00082\]](#)

#### A.1.2 Changed Specification Items in R23-11

[\[SWS\\_SomeIpTp\\_00017\]](#) [\[SWS\\_SomeIpTp\\_00052\]](#)

#### A.1.3 Deleted Specification Items in R23-11

none