8.4.3.2.6 Internet service

Internet service is an optional value added service (VAS). This subclause provides some details of the parameters necessary to implement this service.

[V2G20-1362] The EVCC and the SECC shall implement the ServiceParameterList for internet service as defined in Table 212.

NOTE 1 This subclause simply provides some of the parameters necessary for implementing this service. It is up to the SA/CSO and OEM to define the security mechanisms necessary to secure this service.

Table 212 — ServiceParameterList for internet service

ParameterSetID (unsignedshort)	ParameterName = Protocol	ParameterName = Port	Description
0			Reserved by ISO.
1	stringValue = ftp	intValue = 20	Service to use internet access using FTP protocol via port 20.
2	stringValue = ftp	intValue = 21	Service to use internet access using FTP protocol via port 21.
3	stringValue = http	intValue = 80	Service to use internet access using HTTP protocol via port 80.
4	stringValue = https	intValue = 443	Service to use internet access using HTTPS protocol via port 443.
5 – 65535	service name according to IANA Service & Port Registry	port number according to IANA Service & Port Registry	Additional protocol port combinations which are supported by the SECC for internet access.

[V2G20-430] If the SECC supports additional protocol / port combinations beyond the definitions in Table 212, it shall use the service names and the assigned port numbers according according to IANA Service & Port Registry (i.e. the service name defined in IANA Service & Port Registry is transmitted as the "Protocol" and the port number defined in IANA Service & Port Registry is transmitted as "Port").

NOTE 2 It is assumed if an IANA Service & Port Registry defined service name and port number combination is applicable for both transport protocols, TCP and UDP, the SECC supports connections on TCP or UDP or on both for the respective combination.

8.4.3.2.7 Parking status service

Parking status is a VAS, applied in case that the EV is approaching a parking lot or leaving from it. It requires wireless communication for the reason that both use cases cannot have charging cable be connected. This use case covers separate sessions between parking status and charging with a couple of hours.

As for vehicle check in, one of main two objects is notification the completion of EV locating to EVSE and another is measured position exchange in order to help the EV locate the collect position.

Locating policy has two type variations, one is EV lead, measuring by EV with some of optical or other type of sensors, only inform the result to the EVSE. Another is EVSE lead, measuring by EVSE with similar

way as EV lead. This case requires communication session exchange measured position in form of difference from target.

Also locating control within an EV has two varieties, one is manual driving by customer with indication of difference information from target position, and another is auto parking function. Target position consists of device position within a parking lot and install offset within vehicle frame. Vehicle frame is defined as enveloping square to vehicle outline. These values are exchanged as ones of service parameter lists. Usually these requires calibration with registration to EVSEs in advance.

As for vehicle check out, main object is to inform EVSE of EV departure and vacant parking lot. It seems to be considered necessary for the EVSE detect vacation of EV without dedicated devices for it. Recently such devices have become more popular, so that this service is confirmed by them in some cases.

[V2G20-1365] The EVCC and the SECC shall implement the ServiceParameterList for parking status as defined in Table 213.

Table 213 — Configuration parameters for parking status

ParameterName	ParameterType	Values	Description
IntendedService	intValue	1: VehicleCheckIn 2: VehicleCheckOut	intended service during parking status session
ParkingStatusType	intValue	1: Auto/Internal 2: Auto/External 3: Manual/Internal 4: Manual/External	Type parking status; Auto: auto parking Manual: manual parking Internal: information exchange inside ISO 15118 External: information exchange outside ISO 15118

[V2G20-2136] If the EVCC and the SECC agree to select "VehicleCheckIn" with setting value of 1 to "IntendedService", "VehicleCheckIn" request and response shall apply to selected "ParkingStatusService" as unique type of message exchange set.

[V2G20-2137] If the EVCC and the SECC agree to select "VehicleCheckOut" with setting value of 2 to "IntendedService", "VehicleCheckOut" request and response shall apply to selected "ParkingStatusService" as unique type of message exchange set.

8.5 V2G communication timing

8.5.1 Overview

This subclause describes the timing and error handling for the V2G communication session with EXI encoded messages of V2GTP payload type in the range of 0x8001 up to 0x81FF. The error handling is based on timers enabling the EVCC and the SECC to monitor the V2G message exchange. For the detection of missing or delayed messages the EVCC and the SECC use predefined timeout values as error criteria. Whenever a timer is equal or larger than the related timeout the related error handling is processed.

The monitoring of a V2G communication message exchange is based on two timer categories:

- message timer: monitors the exchange of a request message and the corresponding response message (request-response-pair);
- sequence timer: monitors the exchange of multiple request-response-pairs.

8.5.2 Common

To enable error handling for a V2G communication session setup the EVCC monitors the time between reception of SECC discovery response, SessionSetupRes and PowerDeliveryRes, respectively. This allows the EVCC to decide about a successful or failed charging session after the defined timeouts.

The monitoring of a V2G communication session is based on the following timing concepts:

- message timing: monitors the timing between the request and the response of a Request-Response-Pair. This allows, for example, the EVCC application to initiate the error handling if no response is sent;
- sequence timing: monitors the timing of subsequent request-response-pairs. This allows, for example, the SECC application to initiate the error handling if an expected next request message was not sent;
- ongoing timing: monitors the timing in case of sending a request-response-pair repeatedly based on the parameter EVSEProcessing equal to "Ongoing". This allows, for example, the EVCC to initiate the error handling in case the SECC exceeds the processing time;
- communication setup timing: monitors the time from the moment of an established data link until the session setup message. It allows deciding if the communication setup was successful within a defined time.

The timers are compared to predefined time values as decision criterion. The EVCC and the SECC distinguish between two categories:

- timeout: if the specified time is exceeded the related error handling is initiated;
- performance time: if the specified time is exceeded the performance requirement is not fulfilled.

NOTE 1 While exceeding a timeout always causes an error handling, the performance time does not necessarily cause error handling if not defined differently by requirements. Depending on the system behavior (e.g. transmission time) no error can occur if the corresponding communication partner does not detect a timeout but the probability for causing a timeout is high.

NOTE 2 Timeouts are observed at the application layer where they are also enforced (according to requirement [V2G20-1966] for example). It is important for each sending party to keep in mind that all processing (e.g. TLS encryption) and transmission delays between both application layer sides will be part of the observed timing on the receiving side. See Figure 212 for a detailed illustration.

NOTE 3 This document supports PLC and WiFi communication. Both technologies come with different average and worst case latencies as well as congestion and retransmissions characteristics. For example, in WiFi networks real world round trip latencies can reach up to 25 ms to 100 ms or even more. As mentioned before it is important that those latencies are taken into account when deciding on the implementation of a message timing strategy in the application layer of the sending side. The timing requirements of Table 215 have been defined with the assumption that round-trip end-to-end transmission delays will never exceed 250 ms.

8.5.3 DC service

The monitoring of a DC V2G communication session includes the following timing concepts:

- DC_CableCheck timing: The monitoring of the cable check is carried out by the EV using the V2G_EVCC_DC_CableCheck_Timer. It is started when the EV requests the EVSE to start the Cable Check, and ends when the EVSE has finished the cable check, or when the V2G_EVCC_DC_CableCheck_Timer expires;
- DC_PreCharge timing: The monitoring of the pre charge is carried out by the EV using the V2G_EVCC_DC_PreCharge_Timer. It is started when the EV starts the pre charging by sending the first DC_PreChargeReq message, and ends when the pre charging has finished, indicated by the EV determining that the EVSE output voltage, as measured inside the EV, has sufficiently been adjusted to the EV RESS voltage, or when the V2G_EVCC_DC_PreCharge_Timer expires.

8.5.4 Message sequence and communication session

8.5.4.1 Common

Message timers, sequence timers, timeouts, and performance times are defined for EVCC and SECC separately and are summarized in Table 214. Timeouts and performance times are parameterized for messages separately to describe different processing times. Table 215 defines the common values for each V2G message type.

[V2G20-434] The EVCC shall implement the EVCC specific timeouts and performance times defined in Table 214 and Table 215.

[V2G20-435] The SECC shall implement the SECC specific timeouts and performance times defined in Table 214 and Table 215.

Table 214 — Common EVCC and SECC timers, timeouts, performance times

Name	Type	Applicable for	
		EVCC	SECC
V2G_EVCC_Msg_Timer	Message timer in the EVCC	x	
V2G_SECC_Msg_Timer	Message timer in the SECC		x
V2G_EVCC_Sequence_Timer	Sequence timer in the EVCC	x	
V2G_SECC_Sequence_Timer	Sequence timer in the SECC		x
V2G_EVCC_Ongoing_Timer	Ongoing timer in the EVCC	x	
V2G_SECC_Ongoing_Timer	Ongoing timer in the SECC		x
V2G_EVCC_Msg_Timeout (MessageType)	Timeout for the message timer The value is defined depending on the parameter MessageType as defined in Table 215.	x	
V2G_SECC_Msg_Performance_Time (MessageType)	Performance time for the message timer The value is defined depending on the parameter MessageType as defined in Table 215.		x
V2G_EVCC_Sequence_Performance_Time	Performance time for the sequence timer as defined in Table 215.	x	
V2G_SECC_Sequence_Timeout	Timeout for the sequence timer as defined in Table 215.		x
V2G_EVCC_Ongoing_Timeout	Timeout for ongoing timer	x	
V2G_SECC_Ongoing_Performance_Time	Performance time for ongoing timer		x

Table 215 — Common EVCC and SECC message sequence and session timing parameter values

Name	MessageType	Value [s]
V2G_EVCC_Msg_Timeout(MessageType)	SupportedAppProtocolReq	2
	SessionSetupReq	2
	VehicleCheckInReq	2

Name	MessageType	Value [s]
	VehicleCheckOutReq	2
	AuthorizationSetupReq	2
	AuthorizationReq	2
	CertificateInstallationReq	5
	ServiceDiscoveryReq	2
	ServiceDetailReq	5
	ServiceSelectionReq	2
	ChargeParameterDiscoveryReq	2
	ScheduleExchangeReq	2
	PowerDeliveryReq	2
	MeteringConfirmationReq	2
	SessionStopReq	2
V2G_SECC_Msg_Performance_Time(MessageType)	SupportedAppProtocolRes	1,5
	SessionSetupRes	1,5
	VehicleCheckInRes	1,5
	VehicleCheckOutRes	1,5
	AuthorizationSetupRes	1,5
	AuthorizationRes	1,5
	CertificateInstallationRes	4,5
	ServiceDiscoveryRes	1,5
	ServiceDetailRes	4,5
	ServiceSelectionRes	1,5
	ChargeParameterDiscoveryRes	1,5
	ScheduleExchangeRes	1,5
	PowerDeliveryRes	1,5
	MeteringConfirmationRes	1,5
	SessionStopRes	1,5
V2G_EVCC_Sequence_Performance_Time	(all other messages)	40
V2G_SECC_Sequence_Timeout	(all other messages)	60
V2G_EVCC_Ongoing_Timeout	Response messages with parameter EVSEProcessing equal to "Ongoing"	60
V2G_SECC_Ongoing_Timeout	Request messages with parameter EVProcessing equal to "Ongoing"	60

Name	MessageType	Value [s]
V2G_EVCC_Ongoing_Performance_Time	Request messages with parameter EVProcessing equal to "Ongoing"	55
V2G_SECC_Ongoing_Performance_Time	Response messages with parameter EVSEProcessing equal to "Ongoing"	55

Figure 212 illustrates how the common message timers, sequence timers, timeouts, and performance times are applied in the EVCC and the SECC.

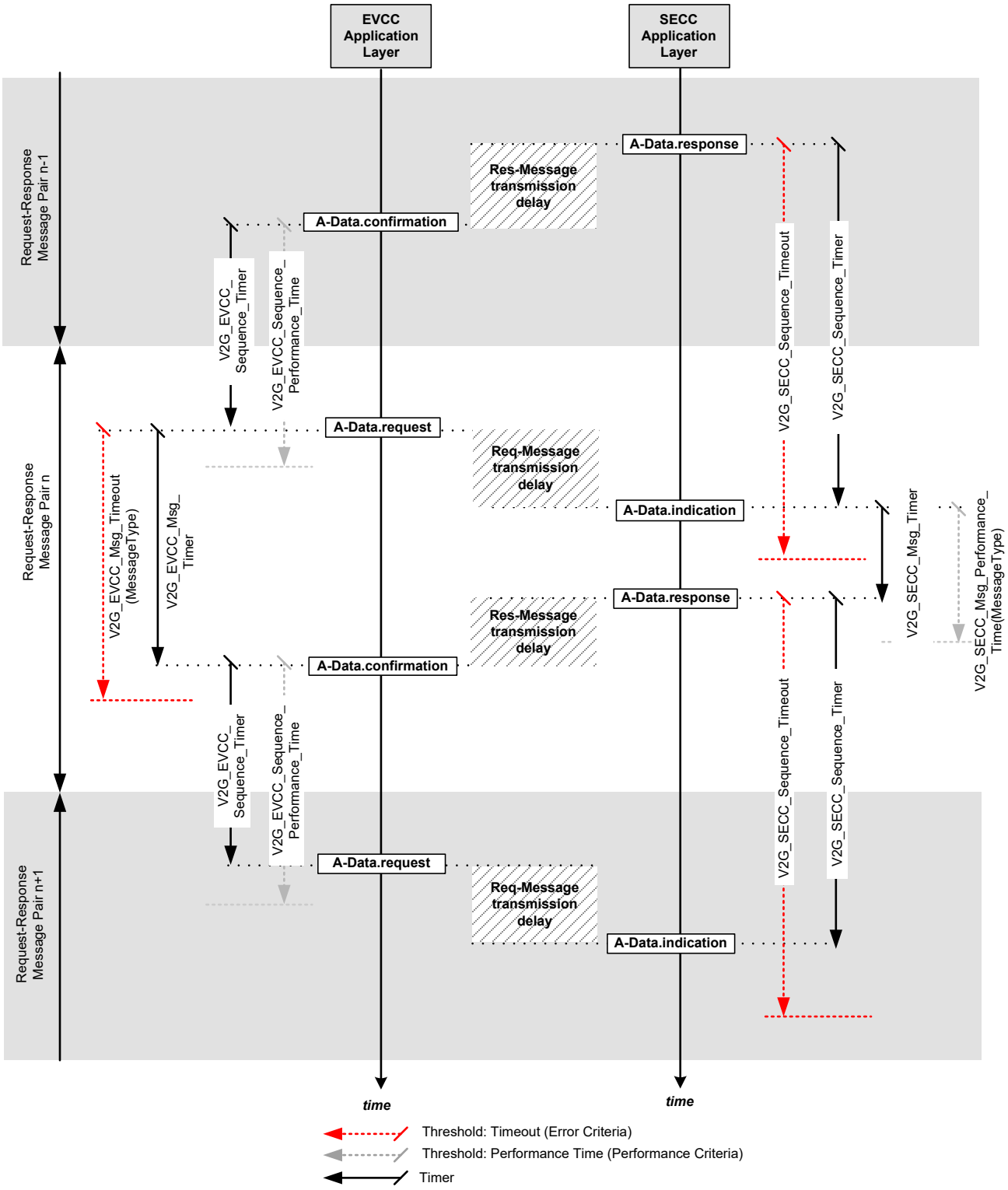

Figure 212 — Message sequence and session timing

8.5.4.1.1 EVCC timing for request-response message pairs

[V2G20-436] The EVCC shall set the timeout V2G_EVCC_Msg_Timeout depending on the value MessageType as defined in Table 215, reset the V2G_EVCC_Msg_Timer and start monitoring the V2G_EVCC_Msg_Timer when it sends a request message.

NOTE 1 In this document sending a request message is described by A-Data.request.

[V2G20-437] The EVCC shall wait for the response message corresponding to the request message sent before.

[V2G20-438] The EVCC shall stop waiting for the response message and stop monitoring the V2G_EVCC_Msg_Timer when V2G_EVCC_Msg_Timer is equal or larger than V2G_EVCC_Msg_Timeout(MessageType) and no response message was received. It shall then apply the error handling as defined in 8.6.

NOTE 2 In this document receiving a response message is described by A-DATA.confirmation.

[V2G20-439] The EVCC shall stop waiting for the response message and stop monitoring the V2G_EVCC_Msg_Timer when V2G_EVCC_Msg_Timer is smaller than V2G_EVCC_Msg_Timeout(MessageType) and it received a response message. It shall then process the response message as defined in 8.6.

NOTE 3 In this document receiving a response message is described by A-Data.confirmation.

[V2G20-440] The EVCC shall ignore any message that is not a valid response message.

8.5.4.1.2 SECC timing for response-request message sequence

[V2G20-441] The SECC shall set the timeout V2G_SECC_Sequence_Timeout to the value as defined in Table 215, reset the V2G_SECC_Sequence_Timer and start monitoring the V2G_SECC_Sequence_Timer when it sends a response message.

NOTE 4 In this document sending a response message is described by A-Data.response.

[V2G20-442] The SECC shall wait for a request message.

[V2G20-443] The SECC shall stop waiting for a request message and stop monitoring the V2G_SECC_Sequence_Timer when V2G_SECC_Sequence_Timer is equal or larger than V2G_SECC_Sequence_Timeout and no request message was received. It shall then stop the V2G communication session.

NOTE 5 In this document receiving a request message is described by A-Data.indication. A-Data.indication (A_Msg="message name") signalizes the successful reception of a valid request message for the V2G message that is given by A_Msg where "Valid message" means that all mandatory elements are filled in so that it can be deserialized.

[V2G20-444] The SECC shall stop waiting for a request message and stop monitoring the V2G_SECC_Sequence_Timer when V2G_SECC_Sequence_Timer is smaller than V2G_SECC_Sequence_Timeout and it received a request message. It shall then process the response message as defined in 8.6.

NOTE 6 In this document receiving a request message is described by A-Data.indication.

[V2G20-445] The SECC shall ignore any message that is not a valid request message.

8.5.4.2 AC specific message sequence and session timing

[V2G20-1499] The EVCC shall implement the EVCC specific AC timeouts and performance times defined in Table 216.

[V2G20-1500] The SECC shall implement the SECC specific AC timeouts and performance times defined in Table 216.

Table 216 — AC EVCC and SECC timeouts and performance times

Name	MessageType	Value [s]
V2G_EVCC_Msg_Timeout(MessageType)	AC_ChargeLoopReq	0,5
V2G_SECC_Msg_Performance_Time(MessageType)	AC_ChargeLoopReq	0,25
V2G_EVCC_Sequence_Performance_Time	AC_ChargeLoopReq	0,25
V2G_SECC_Sequence_Timeout	AC_ChargeLoopRes	0,5

8.5.4.3 DC specific message sequence and session timing

[V2G20-1501] The EVCC shall implement the EVCC specific DC timeouts and performance times defined in Table 217.

[V2G20-1502] The SECC shall implement the SECC specific DC timeouts and performance times defined in Table 217.

Table 217 — DC EVCC and SECC timeouts and performance times

Name	MessageType	Value [s]
V2G_EVCC_Msg_Timeout(MessageType)	DC_CableCheckReq	2
	DC_PreChargeReq	2
	DC_ChargeLoopReq	0.5
	DC_WeldingDetectionReq	2
V2G_SECC_Msg_Performance_Time(MessageType)	DC_CableCheckReq	1,5
	DC_PreChargeReq	1,5
	DC_ChargeLoopReq	0,25
	DC_WeldingDetectionReq	1,5
V2G_EVCC_Sequence_Performance_Time	DC_ChargeLoopReq	0,25
V2G_SECC_Sequence_Timeout	DC_ChargeLoopRes	0,5

8.5.4.4 WPT specific message sequence and session timing

[V2G20-5069] The EVCC shall implement the EVCC specific WPT timeouts and performance times defined in Table 218.

[V2G20-5070] The SECC shall implement the SECC specific WPT timeouts and performance times defined in Table 218.

Table 218 — WPT EVCC and SECC timeouts and performance times

Name	MessageType	Value [s]
V2G_EVCC_Msg_Timeout(MessageType)	WPT_FinePositioningSetupReq	2
	WPT_FinePositioningReq	2
	WPT_PairingReq	2
	WPT_AlignmentCheckReq	2

	WPT_ChargeLoopReq	0,5
V2G_SECC_Msg_Performance_Time(MessageType)	WPT_FinePositioningSetupReq	1,5
	WPT_FinePositioningReq	1,5
	WPT_PairingReq	1,5
	WPT_AlignmentCheckReq	1,5
	WPT_ChargeLoopReq	0,25
V2G_EVCC_Sequence_Performance_Time	WPT_ChargeLoopReq	0,25
V2G_SECC_Sequence_Timeout	WPT_ChargeLoopRes	0,5

8.5.4.5 ACDP specific message sequence and session timing

[V2G20-4020] The EVCC shall implement the EVCC specific ACDP timeouts and performance times defined in Table 219.

[V2G20-4021] The SECC shall implement the SECC specific ACDP timeouts and performance times defined in Table 219.

Table 219 — ACDP EVCC and SECC timeouts and performance times

Name	MessageType	Value [s]
V2G_EVCC_Msg_Timeout(MessageType)	ACDP_VehiclePositioningReq	2
	ACDP_ConnectReq	2
	ACDP_DisconnectReq	2
	ACDP_SystemStatusReq	2
V2G_SECC_Msg_Performance_Time(MessageType)	ACDP_VehiclePositioningReq	1,5
	ACDP_ConnectReq	1,5
	ACDP_DisconnectReq	1,5
	ACDP_SystemStatusReq	1,5

8.5.5 Session setup and ready to charge

8.5.5.1 Common

Timing parameters applicable to the common communication session setup and ready to charge time defined in this document are shown in Table 220. Table 221 defines the values for the related common performance times and the timeouts.

Table 220 — Common EVCC and SECC V2G communication session setup timing parameters

Parameter name	Definition	Implementation	
		EVCC	SECC
V2G_EVCC_CommunicationSetup_Timer	Communication setup timer in the EVCC	x	
V2G_SECC_CommunicationSetup_Timer	Communication setup timer in the SVCC		x

Parameter name	Definition	Implementation	
		EVCC	SECC
V2G_EVCC_CommunicationSetup_Timeout	Timeout for the communication setup timer as defined in Table 221.	x	
V2G_SECC_CommunicationSetup_Performance_Time	Performance time for the communication setup timer as defined in Table 221.		x

[V2G20-605] The EVCC and SECC shall implement the timing parameter values defined in Table 221.

Table 221 — Common EVCC and SECC message sequence and session timing parameter values

Parameter name	Value [s]	Implementation	
		EVCC	SECC
V2G_SECC_CommunicationSetup_Performance_Time	18		x
V2G_EVCC_CommunicationSetup_Timeout	20	x	

Figure 213 illustrates how the timing parameters defined in Table 220 are applied.