

DIN EN 16454:2024-03 (E)

Intelligent transport systems - ESafety - ECall end to end conformance testing

Contents		Page
European foreword		9
Introduction		10
1 Scope.....		11
2 Normative references.....		11
3 Terms and definitions.....		12
4 Symbols and abbreviations		18
5 Conformance.....		20
5.1 General.....		20
5.2 General conditions		20
6 General overview of the eCall transaction for pan-European eCall.....		20
7 How to use this document.....		25
7.1 Layout and procedures		25
7.2 System under test		26
7.3 Accelerated test procedures		27
7.4 Accelerated test procedures for IVSs.....		27
7.4.1 Accelerated test procedures for all types of PE eCall IVS		27
7.4.2 Additional accelerated test procedures for PE eCall only IVS		29
7.5 Accelerated test procedures for MNOs.....		29
7.6 Accelerated test procedures for PSAPs - PE eCall		30
7.7 Accelerated test procedures for PSAPs - TPS-eCall		31
7.8 Accelerated test procedures for TPSPs.....		31
8 Requirements.....		31
8.1 Requirements - General objectives.....		31
8.1.1 State transitions		31
8.1.2 Classification of testing.....		41
8.1.3 CTP naming conventions.....		43
8.1.4 CTP <stage> naming convention for IVS conformance tests		44
8.2 CTP structure.....		44
8.3 eCall timers		47
9 Conformance test requirements for in-vehicle user equipment and systems (IVS)...		47
9.1 Conformance test requirements for in-vehicle user equipment and systems for Pan European eCall		47
9.2 Test objectives and purposes		47
9.3 Classification of testing and referenced tests for in-vehicle user equipment for Pan European eCall IVS.....		47
9.3.1 Taxonomy of testing		47
9.3.2 Referenced tests		48
9.4 State transition conformance tests for in-vehicle equipment and system to comply to Standards for pan European eCall		48
9.4.1 Conformance requirement.....		48
9.4.2 Use case test objectives by stage		48
9.4.3 CTP 1.1.0.1 Conformance to ETSI TS 102 936-1 and ETSI TS 102 936-2 - PE eCall IVS		52

9.4.4	CTP 1.1.0.2	Test for conformance to valid SIM/USIM - PE eCall IVS	53
9.4.5	CTP 1.1.0.3	Automatic eCall triggering does not occur when ignition OFF - PE eCall IVS.....	54
9.4.6	CTP 1.1.1.1	Power on and self test - PE eCall IVS.....	55
9.4.7	CTP 1.1.2.1	eCall automatically activated - PE eCall IVS	56
9.4.8	CTP 1.1.2.2	Automatically triggered eCall in progress was not disconnected upon a new eCall trigger - PE eCall IVS	57
9.4.9	CTP 1.1.2.3	Post-side-crash performance of automatic trigger - PE eCall IVS	58
9.4.10	CTP 1.1.2.4	Post-frontal-crash performance of automatic trigger - PE eCall IVS....	59
9.4.11	CTP 1.1.2.5	Performance of automatic trigger - different crash types - PE eCall IVS	60
9.4.12	CTP 1.1.3.1	eCall manually activated - PE eCall IVS.....	61
9.4.13	CTP 1.1.3.2	Manually triggered eCall in progress was not disconnected upon a new eCall trigger - PE eCall IVS.....	62
9.4.14	CTP 1.1.4.1	Test eCall activated - PE eCall IVS	63
9.4.15	CTP 1.1.5.1	Network registration - PE eCall IVS.....	64
9.4.16	CTP 1.1.5.2	Manual termination of eCall by vehicle occupants not allowed (automatically triggered eCall) - PE eCall IVS	65
9.4.17	CTP 1.1.5.3.1	Manual termination of eCall by vehicle occupants not allowed (manually triggered eCall) - PE eCall IVS	66
9.4.18	CTP 1.1.5.3.2	Manual termination of eCall by vehicle occupants allowed (manually triggered eCall) - PE eCall IVS.....	67
9.4.19	CTP 1.1.5.4	Automatically triggered eCall in progress was not disconnected when ignition is switched to OFF - PE eCall IVS	68
9.4.20	CTP 1.1.5.5	Manually triggered eCall in progress was not disconnected when ignition is switched to OFF - PE eCall IVS	69
9.4.21	CTP 1.1.5.6	Priority over conflicting communication - PE eCall IVS.....	70
9.4.22	CTP 1.1.6.1	Mute IVS and vehicle audio - PE eCall IVS	71
9.4.23	CTP 1.1.7.1	Set-up TS12 call with eCall identifier (flag) set to 'automatic' - PE eCall IVS.....	72
9.4.24	CTP 1.1.8.1	Set-up TS12 call with eCall identifier (flag) set to 'manual' - PE eCall IVS	73
9.4.25	CTP 1.1.9.1	Set-up TS11 call to test number - PE eCall IVS.....	74
9.4.26	CTP 1.1.10.1	eCall is attempted when no networks are available (limited service condition) - PE eCall IVS	75
9.4.27	CTP 1.1.10.2	Re-dial attempt completed within 2 minutes after eCall is dropped - PE eCall IVS.....	76
9.4.28	CTP 1.1.10.3	Duration of eCall Initiation signal - PE eCall IVS.....	77
9.4.29	CTP 1.1.10.5	Test eCall is not attempted in limited service condition - PE eCall IVS	78
9.4.30	CTP 1.1.11.1	Send MSD with indicator set to 'Automatically Initiated eCall' (AleC) - PE eCall IVS.....	79
9.4.31	CTP 1.1.12.1	Send MSD with indicator set to 'Manually Initiated eCall' (MleC) - PE eCall IVS.....	80
9.4.32	CTP 1.1.13.1	Send MSD with indicator set to 'Test Call' - PE eCall IVS	81
9.4.33	CTP 1.1.14.1	Verify MSD transfer - PE eCall IVS	82
9.4.34	CTP 1.1.14.2	Un-mute IVS audio when AL-ACK received - PE eCall IVS.....	83
9.4.35	CTP 1.1.15.1	Establish voice link to PSAP - PE eCall IVS	84
9.4.36	CTP 1.1.15.2	MSD transfer request while eCall conversation in progress - PE eCall IVS.....	85
9.4.37	CTP 1.1.15.3	eCall continuation when SEND MSD request not received (timer T5 expired) - PE eCall IVS.....	86

9.4.38	CTP 1.1.15.4	Call continuation when AL-ACK not received (timer T6 expired) - PE eCall IVS.....	87
9.4.39	CTP 1.1.15.5	MSD is transferred continuously until timer T7 expires and IVS reconnects loudspeaker and microphone on its expiry - PE eCall IVS	88
9.4.40	CTP 1.1.16.1	Clear down call automatically - PE eCall IVS	89
9.4.41	CTP 1.1.16.2	IVS clears down the eCall upon timer T2 expiry - PE eCall IVS	90
9.4.42	CTP 1.1.16.3	IVS registers recent eCalls - PE eCall IVS.....	91
9.4.43	CTP 1.1.17.1	Call-back allowed and able to be answered by IVS - PE eCall IVS	92
9.4.44	CTP 1.1.17.2	Call-back answered by IVS in the event of abnormal termination - PE eCall IVS.....	93
9.4.45	CTP 1.1.17.3	MSD transfer occurs upon PSAP request during call-back - PE eCall IVS	94
9.4.46	CTP 1.1.17.4	Remain registered for ≥ 1 hr - PE eCall IVS.....	95
9.4.47	CTP 1.1.18.1	Compliance with MSD version 3 - PE eCall IVS.....	96
9.5		State transition test scripts for in-vehicle equipment and system to comply to Standards for pan European eCall - additional tests for eCall only systems	98
9.5.1		General.....	98
9.5.2	CTP 1.1.1.2	IVS does not perform registration after power-up - PE eCall only IVS	100
9.5.3	CTP1.1.10.4	Verify that PLMN registration procedure is executed upon initiating an eCall - PE eCall only IVS.....	101
9.5.4	CTP 1.1.17.5	Remain registered for ≥ 1 hr ≤ 12 hr - PE eCall only IVS.....	102
9.6		State transition conformance test requirements for in-vehicle user equipment for eCall TPS-IVS via a third party service provider.....	103
9.6.1		General.....	103
9.6.2		Test objectives and purposes	103
9.6.3		Taxonomy of testing and referenced tests.....	103
9.6.4		Taxonomy of testing	103
9.7		Use case conformance tests for in-vehicle equipment and system to comply to Standards for third party service provider eCall	103
9.7.1		Conformance requirement.....	103
9.7.2		Use case test objectives by stage	103
9.8		State transition test scripts for TPS in-vehicle equipment and system to comply to Standards for third party services supported eCall	106
9.8.1		General.....	106
9.8.2	CTP 1.2.0	Pre operation - TPS-IVS.....	107
9.8.3	CTP 1.2.1	Power on self test - TPS-IVS.....	109
9.8.4	CTP 1.2.2	Automatically activate eCall - TPS-IVS	110
9.8.5	CTP 1.2.3	Manually activate eCall - TPS-IVS	118
9.8.6	CTP 1.2.4	Stop conflicting communication - TPS-IVS	122
9.8.7	CTP 1.2.5	Establish voice link to TPSP - TPS-IVS.....	123
9.8.8	CTP 1.2.6	Send IVS dataset to TPSP - TPS-IVS	127
9.8.9	CTP 1.2.7.1	Establish direct bidirectional audio link between occupants and PSAP - TPS-IVS.....	132
9.8.10	CTP 1.2.8.1	No reconnect after termination - TPS-IVS.....	133
9.8.11	CTP 1.2.9	Allow call-cack into vehicle - TPS-IVS	134
10		Conformance tests for mobile network operators	138
10.1		Test objectives and purposes	138
10.1.1		General.....	138
10.1.2		Default assumptions.....	138
10.2		Taxonomy of testing and referenced tests.....	138
10.3		Use case conformance tests for mobile network operator systems to comply to Standards for pan European eCall.....	138

10.3.1	Conformance requirement.....	138
10.3.2	Use case test objectives by stage.....	138
10.4	State transition test scripts for mobile network operators to demonstrate compliance with Pan European eCall Standards.....	139
10.4.1	General	139
10.4.2	CTP 2.0.1 Keep SIMs/USIMs alive even though not in regular operation - MNO.....	141
10.4.3	CTP 2.0.2 MNO supports general eCall relevant requirements - MNO.....	142
10.4.4	CTP 2.0.3 Decommission SIM/USIM - MNO.....	143
10.4.5	CTP 2.0.4 Support eCall Flag - MNO.....	144
10.4.6	CTP 2.1.1 Accept registration - Home network - MNO.....	144
10.4.7	CTP 2.1.2 Accept registration - Roaming - MNO	145
10.4.8	CTP 2.2.1.1 Receive TS12 voice call (automatically initiated) - MNO.....	146
10.4.9	CTP 2.2.1.2 Route call to 'most appropriate' PSAP - MNO.....	147
10.4.10	CTP 2.2.1.3 Provide TS12 data/caller ID - MNO.....	148
10.4.11	CTP 2.2.2.1 Receive TS12 voice call (manual initiated) - MNO.....	149
10.4.12	CTP 2.2.3.1 Test for receiving test eCall (TS11)	149
10.4.13	CTP 2.2.3.2 Route call to non-emergency number - MNO	149
10.4.14	CTP 2.2.3.3 Provide TS11 data - MNO	150
10.4.15	CTP 2.3.1 Call in progress - MNO	150
10.4.16	CTP 2.4.1 Call clear-down - MNO.....	151
10.4.17	CTP 2.5.1 Support call-back - MNO	152
10.4.18	CTP 2.6.1 Maintain registration for 1-12 hours - MNO	152
10.4.19	CTP 2.7.1 Maintain call records - MNO.....	152
10.5	Use case conformance tests for mobile network operator systems to comply to Standards for TPS-eCall.....	153
10.5.1	Conformance requirement.....	153
10.5.2	Use case test objectives by stage.....	153
10.6	State transition test scripts for mobile network operators to demonstrate compliance with TPS-eCall Standards.....	153
10.6.1	CTP 2.11.1 MNO supports general TPS-eCall relevant requirements.....	153
10.6.2	CTP 2.11.2 Support call-back - MNO.....	153
11	Conformance tests for PSAP systems.....	154
11.1	Test objectives and purposes.....	154
11.2	Taxonomy of testing and referenced tests.....	154
11.2.1	Taxonomy of testing	154
11.2.2	Referenced tests.....	154
11.3	Use case conformance tests for PSAP systems to comply to Standards for pan European eCall.....	154
11.3.1	Conformance requirement.....	154
11.3.2	Use case test objectives by stage.....	154
11.4	State transition conformance tests for PSAPs - PE eCall.....	155
11.4.1	General	155
11.4.2	CTP 3.1.0.1 Provide MNOs with appropriate routing data - Member State/ PSAP PE eCall	157
11.4.3	CTP 3.1.0.2 Maintain map geo-information - PSAP PE eCall.....	158
11.4.4	CTP 3.1.1.1 Receive automatically initiated eCall - PSAP PE eCall	159
11.4.5	CTP 3.1.1.2 Receive manually initiated eCall - PSAP PE eCall.....	160
11.4.6	CTP 3.1.2 Receive TS12 data - Caller ID and location - PSAP PE eCall.....	161
11.4.7	CTP 3.1.3.1 Recognise eCall and route to in-band modem - PSAP PE eCall.....	162
11.4.8	CTP 3.1.3.2 PSAP equipment failure - PSAP PE eCall	163
11.4.9	CTP 3.1.3.3 PSAP modem failure before link layer ACK is sent PSAP PE eCall	163

11.4.10	CTP 3.1.4	eCall received at in-band modem - PSAP PE eCall	163
11.4.11	CTP 3.1.5.1	Validate initiation signal - PSAP PE eCall.....	164
11.4.12	CTP 3.1.5.2	Route to operator after timer T4 expiration - PSAP PE eCall	165
11.4.13	CTP 3.1.6.1	Request MSD after reception of initiation signal - PSAP PE eCall	166
11.4.14	CTP 3.1.6.2	Request MSD immediately - PSAP PE eCall.....	167
11.4.15	CTP 3.1.7.1	Receive MSD - PSAP PE eCall.....	168
11.4.16	CTP 3.1.7.2	Verify status bit in AL-ACK upon positive ACK- PSAP PE eCall...	169
11.4.17	CTP 3.1.7.3	Verify MSD transfer upon timer T8 expiration - PSAP PE eCall..	169
11.4.18	CTP 3.1.7.4	Verify transfer of corrupted MSD - PSAP PE eCall.....	170
11.4.19	CTP 3.1.7.5	Verify PSAP behaviour when MSD format check fails - PSAP PE eCall	171
11.4.20	CTP 3.1.7.6	Verify PSAP behaviour when MSD contains unknown optional additional data set - PSAP PE eCall	172
11.4.21	CTP 3.1.7.7	Verify PSAP behaviour when MSD contains ASN.1 extended data-elements - PSAP PE eCall	173
11.4.22	CTP 3.1.7.8	Verify PSAP behaviour when MSD contains ASN.1 extended data-values - PSAP PE eCall.....	174
11.4.23	CTP 3.1.7.9	Compliance with MSD version 2 - PSAP PE eCall	175
11.4.24	CTP 3.1.7.10	Compliance with MSD version 3 - PSAP PE eCall	177
11.4.25	CTP 3.1.8	ACK - PSAP PE eCall	178
11.4.26	CTP 3.1.9	Route voice and MSD to operator - PSAP PE eCall.....	178
11.4.27	CTP 3.1.10	Display TS12 data and MSD to operator - PSAP PE eCall.....	179
11.4.28	CTP 3.1.11	Decode VIN - PSAP PE eCall	180
11.4.29	CTP 3.1.12	Talk to vehicle occupants - PSAP PE eCall	181
11.4.30	CTP 3.1.13	Request new MSD before call clear-down - PSAP PE eCall	182
11.4.31	CTP 3.1.14.1	Call clear-down - PSAP PE eCall.....	183
11.4.32	CTP 3.1.14.2	Verify status bit in AL-ACK upon clear-down - PSAP PE eCall	184
11.4.33	CTP 3.1.15	Call-back to vehicle - PSAP PE eCall	185
11.4.34	CTP 3.1.16	Request new/updated MSD after call clear-down - PSAP PE eCall	186
11.5		State transition conformance tests for PSAPs - TPS-eCall	187
11.5.1		General.....	187
11.5.2	CTP 3.2.0.1	TPSP - PSAP agreement - PSAP TPS eCall.....	188
11.5.3	CTP 3.2.0.2	Provide areas of responsibility and contact numbers to approved TPSPs -PSAP TPS-eCall.....	189
11.5.4	CTP 3.2.0.3	Agreement on necessary language support - PSAP TPS eCall.....	191
11.5.5	CTP 3.2.0.4	Agree electronic data connection and provide details to approved TPSPs - PSAP TPS eCall.....	192
11.5.6	CTP 3.2.0.5	Provide PSAP data addresses and security access to approved TPSPs - PSAP TPS eCall	194
11.5.7	CTP 3.2.1	Receive eCall notification from TPSP (not TS12) - PSAP TPS eCall	195
11.5.8	CTP 3.2.2	Route call to operator - PSAP TPS eCall.....	196
11.5.9	CTP 3.2.3	Connection, TSD transmission, display relevant information to PSAP operator - PSAP TPS-eCall.....	197
11.5.10	CTP 3.2.4	PSAP Operator: Talk with TPSP operator and receive relevant information - PSAP TPS eCall.....	199
11.5.11	CTP 3.2.5	Talk to vehicle occupants - PSAP TPS-eCall.....	200
11.5.12	CTP 3.2.6	Request new TSD before call clear-down - PSAP TPS-eCall.....	201
11.5.13	CTP 3.2.7	Inform TPSP that call can be ended - PSAP TPS eCall	202
11.5.14	CTP 3.2.8	Call clear-down with TPSP - PSAP TPS-eCall.....	203
11.5.15	CTP 3.2.9	Call-back to TPSP - PSAP TPS-eCall.....	204
11.5.16	CTP 3.2.10	Call-back to vehicle - PSAP TPS eCall	205

11.5.17	CTP 3.2.11	Call cleardown with vehicle - PSAP TPS eCall	206
12		State transition conformance tests for TPS-eCall	207
12.1		Related specifications and conformance requirements.....	207
12.2		TPSP general tests (applicable to both TPS-eCall responder and TPS-eCall notifier)	207
12.2.1		General	207
12.2.2	CTP 4.0.1	Agree service level agreement and/or Standard ways of working with PSAPs - TPSP	209
12.2.3	CTP 4.0.2	Receive PSAP areas of responsibility and contact numbers - TPSP	210
12.2.4	CTP 4.0.3	Agree necessary language support - TPSP	211
12.2.5	CTP 4.0.4	Agree electronic data connection details with PSAPs - TPSP	213
12.2.6	CTP 4.0.5	Evidence quality procedures - TPSP.....	214
12.2.7	CTP 4.0.6	Verify automatic call distribution (ACD) system - TPSP	217
12.2.8	CTP 4.0.7	Check link from MNO - TPSP	218
12.2.9	CTP 4.0.8	Deal with transmission failures - TPSP	219
12.2.10	CTP 4.0.9	Update GIS - TPSP.....	220
12.2.11	CTP 4.0.10	Protection of privacy - TPSP	221
12.3		TPS-eCall responder tests - TPS-R	222
12.3.1		General	222
12.3.2	CTP 4.1.1	Receive TPS-eCall from vehicle - TPS-R.....	223
12.3.3	CTP 4.1.2	Process incoming call - TPS-R.....	226
12.3.4	CTP 4.1.3	Talk with vehicle occupants and receive relevant information - TPS-R	228
12.3.5	CTP 4.1.4	Trigger PSAP notification - TPS-R	231
12.3.6	CTP 4.1.5	Make voice connection between vehicle and PSAP if required - TPS-R	231
12.3.7	CTP 4.1.6	Confirmation received from PSAP that call with vehicle can be ended - TPS-R.....	232
12.3.8	CTP 4.1.7	Call cleardown with vehicle - TPS-R.....	233
12.3.9	CTP 4.1.8	Call-back to vehicle - TPS-R	234
12.4		TPS-eCall notifier tests - TPS-N.....	235
12.4.1		General	235
12.4.2	CTP 4.2.1	Emergency situation likely to require assistance - TPS-N.....	236
12.4.3	CTP 4.2.2	Establish contact with PSAP - TPS-N.....	236
12.4.4	CTP 4.2.3	Talk with PSAP operator and notify relevant information - TPS-N	241
12.4.5	CTP 4.2.4	Establish voice link between PSAP and vehicle occupants if required by PSAP - TPS-N.....	243
12.4.6	CTP 4.2.5	Respond to electronic data update request - TPS-N	245
12.4.7	CTP 4.2.6	PSAP informs that call can be ended - TPS-N	245
12.4.8	CTP 4.2.7	Call cleardown to PSAP - TPS-N.....	245
12.4.9	CTP 4.2.9	Call-back from PSAP - TPS-N	245
13		Marking, labelling and packaging.....	246
14		Declaration of patents and intellectual property	246
		Annex A Void.....	247
		Annex B Void.....	248
		Annex C Void	249
		Annex D Void	250
		Annex E Void.....	251
		Annex F (informative) MSD examples for special PSAP tests.....	252
		Bibliography.....	264