

Regulation No. XXX

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF I EMERGENCY CALL DEVICES (AECD) II VEHICLES WITH REGARD TO THE INSTALLATION OF AN AECD OF AN APPROVED TYPE III VEHICLES WITH REGARD TO THEIR AECS

Contents

Preliminary comments from the Secretary of GRSG informal group on AECS

1. This document was produced by the informal group Secretary as a **working document**, for serving as a basis for discussions within the GRSG informal group on AECS. It is expected to evolve and improve along the discussions that will take place during the meetings of the informal group.
2. This document is an attempt to show the status of the discussions after the 7th meeting of the informal group. **The changes compared to AECS-02-02-Rev.2 (status after 6th meeting) are indicated in bold and strikethrough characters.**
3. For clarity, the proposal from RUS per document AECS-01-05 is not present in the document. This does not prevail the recognition of the RUS position by the informal group.
4. Basis of the document is AECS-02-02-r2 (Secretary), **AECS-07-02 (RUS)**, **AECS-07-03 (OICA)**, **AECS-07-08 (CLEPA)**, **AECS-07-10 (European Commission)** and **AECS-07-13 (GSA)**.
5. The document reflects the main agreements and pending items of the informal group:
 - a. Main agreements:
 - i. Scope:
 1. Regulation to focus on “red” components (see document WP29-164-31)
 2. Exclusion of the vehicles not in the scope of UN R94 and R95 and not fitted with an automatic triggering system
 - ii. AECD (device) main test conditions
 - iii. Emergency call assessment limited to checking of hardware fitment
 - iv. Warning signal
 - v. Power supply in post-crash conditions
 - b. Main pending items
 - i. AECD sled test (resistance to vehicle impact)
 - ii. Homologation procedure according to OICA proposal AECS-05-04
 - iii. GNSS provisions: full deletion vs. “if fitted” requirements for complete set of the 3 existing GNSS. This document endorses the option of “if fitted” requirements.
6. The document includes some proposals still under discussions as e.g. the OICA proposed three test procedures. This does not prevail the decision of the informal group with regard to these proposals.

1. Scope

- 1.1. This Regulation applies to:
- (a) Part I: the AECDs which are intended to be fitted to vehicles of categories M1 and N1¹;
 - (b) Part II: the installation on vehicles of categories M1 and N1¹ of AECDs which have been approved to Part I of this regulation.
 - (c) Part III: vehicles of categories M1 and N1¹ with regard to their AECS or equipped with an AECD which has not been separately approved according to Part I of this Regulation.
- 1.2. ~~Unless otherwise prescribed in this regulation, it does not apply to connectivity and communication to the mobile communication networks and the operation of PSAP.~~
- It does not apply to:**
- (a) **Communication module and communication antenna functionality, unless otherwise prescribed in this Regulation;**
 - (b) **The mechanism and logic of data transmission, data exchange protocol, operation modes and conditions of transitions between such modes, performance of the test call and test data transfer, response to protocol commands received from infrastructure and network registration logic;**
 - (c) **Privacy, data protection and personal data processing.**
- 1.3. Vehicles in the scope of neither Regulation No. 94 nor Regulation No. 95 and not fitted with an automatic triggering system shall be excluded from the scope of this regulation.
- 1.4. **At the request of the applicant, this regulation may apply to GNSS connectivity. However, if the applicant opts to request approval to AECD/AECS without the GNSS connectivity assessment and approval sections, the Contracting Parties applying this regulation shall have the freedom to nationally assess and approve GNSS connectivity.**
- 1.5. **Vehicles of the following categories shall be excluded from the scope of this regulation:**
- **Armoured vehicles¹**
 - **M1 vehicles with a GVM > 3.5t**

Part I: EMERGENCY CALL DEVICES (AECD)

2. Definitions

For the purposes of this Regulation:

- 2.1 “AECD (*Accident Emergency Call Device*)” ~~means a device that at least:~~
- ~~generates a communication toward emergency services if a vehicle suffers a serious road accident and provides two-way voice communication; and~~

¹ As defined in Section 2 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) (document TRANS/WP.29/78/Rev.2) – www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html.

- ~~has the ability to provide the vehicle location using signals from (an) existing external navigation system(s).~~

means a unit or a set of units to control AECS, including the functions;

- **receiving the triggering signal,**
- **receiving the signal from AECS control, if fitted,**
- **providing the vehicle location,**
- **sending the data, and**
- **allowing bidirectional audio signals for voice communication**

2.2 “Global Navigation Satellite System receiver” (“GNSS receiver”) means a component of an AECD designed to determine time, the coordinates and direction of the vehicle using signals from global navigation satellite systems; the GNSS receiver can be included in the AECD or in another external control unit, as long as the AECD ensure its ability to provide the vehicle location in case of an event.

2.3 “Satellite-Based Augmentation System” (SBAS) is a system ensuring the correction of local errors of GNSS systems due to interferences via a network of ground-based stations. (ex: EGNOS, WASS, QZSS)

2.4 “Communications module” means a component of an AECD designed for voice communication and to transmit data about an accident using terrestrial mobile telephone communications networks;

2.5 “User interface” means a component or function of an AECD designed to allow the user to interact with the device, including by receiving visual information, obtaining visual information and introducing control commands;

2.6 “Control module” means a component of an AECD designed to ensure the combined functioning of all components of the AECD;

2.7 “Type of AECD” means devices that do not differ in such essential respects as:

- (a) The manufacturer's trade name or mark;
- (b) Their construction;

(c) Dimensions, structure and materials of the attachments and supports.

2.8 “Data exchange protocol” means the set of rules and agreements that define the content, format, time parameters, sequence and error checks in messages exchanged between an AECD and the devices of Public Service Answering Party (PSAP).

2.9 “Public/Private Safety Answering Point (PSAP)” means ~~a call center responsible for answering calls to an emergency telephone call. It can be of two types~~

- ~~Public Safety Answering Point managed by the public services of a Contracting Party to the 58 Agreement;~~
- ~~Private Safety Answering Point managed by a private company.~~

a physical location where emergency calls are first received under the responsibility of a public authority or a private organization recognized by the national government / responsible authorities.

3. Application for approval of an AECD

3.1 The application for approval of a type of AECD shall be submitted by the holder of the trade name or mark or by his duly accredited representative.

3.2 A model of the information document is given in Annex 1.

- 3.3 For each type of AECD, the application shall be accompanied by samples of complete sets of AECDs in sufficient quantities for the tests prescribed by this regulation. Additional specimens may be called for at the request of the technical service responsible for conducting the test.

4. Markings of an AECD

- 4.1 The samples of AECD submitted for approval shall bear the trade name or mark of the manufacturer. This marking shall figure at least on the unit or units containing the navigation system receiver and communications module. It shall be clearly legible and be indelible.
- 4.2 The unit or units containing the navigation system receiver and communications module shall possess a space large enough to accommodate the approval mark. This space shall be shown on the drawings referred to in Annex 1.

5. Approval

- 5.1 If the samples submitted for approval meet the requirements of paragraph 6 of this Regulation, approval of the pertinent type of AECD shall be granted.
- 5.2 An approval number shall be assigned to each type approved. The first two digits (at present 00) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another type of AECD.
- 5.3 Notice of approval or of refusal, or of extension or withdrawal of approval, or of production definitively discontinued of a type of AECD pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in annex 3 to this Regulation.
- 5.4 There shall be affixed, conspicuously and in the space referred to in paragraph 4.2 above, to every AECD conforming to a type approved under this Regulation, in addition to the mark prescribed in paragraph 4.1., an international approval mark conforming to the model given in annex 5, consisting of:
- 5.4.1 A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;²
- 5.4.2 The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 5.4.1.
- 5.5 The approval mark shall be clearly legible and be indelible.

6. General requirements

6.0. Base function and operation principles

The AECD shall send data and establish voice connection with the PSAP.

If the sending of data failed then the AECD shall retry sending the data.

If the AECD has successfully sent the data and then loses the voice connection, it shall try to re-establish voice connection.

In case it was not possible to establish voice connection and/or send data using mobile communication networks, the AECD shall store the data in

- non-volatile memory and attempt re-transmission of the data and to establish a voice connection.**
- 6.1. [The effectiveness of AECD shall not be adversely affected by magnetic or electrical fields. This requirement shall be met by ensuring compliance with Regulation No. 10.05]
- 6.2. ~~Reception and processing of navigation signals~~ **Position determination**
AECD shall be able to determine its position.
If AECD is fitted with GNSS receiver supporting at least three GNSS including GLONASS, Galileo and GPS, and is capable of reception and processing of SBAS signals, then AECD shall comply with the requirements of 6.2.1-6.2.5, and AECD compliance with respect to positioning capabilities shall be demonstrated by performing test methods described in Annex 5: Test methods for the navigation module.
- 6.2.1 **Horizontal position error under open sky conditions and speed up to [140] km/h shall not exceed 15 m for 95% of the measurements done.**
- 6.2.2 **Horizontal position error in urban canyon conditions and speed up to [140] km/h shall not exceed 40 m for 95% of the measurements done.**
- 6.2.3 **Sensitivity at receiver input shall be:**
- **acquisition - at least minus 144 dBm**
 - **tracking: at least minus 155 dBm**
 - **reacquisition - at least minus 150 dBm**
- 6.2.4 **Time to first fix shall not exceed**
- **60 sec for signal level down to minus 130 dBm**
 - **300 sec for signal level down to minus 140 dBm**
- 6.2.5 **Re-acquisition time after block out of 60 sec at signal level down to minus 130 dBm shall not exceed 20 sec.**
- 6.2.6. **If AECD is not fitted with GNSS receiver supporting at least three GNSS including GLONASS, Galileo and GPS, and capable of reception and processing of SBAS signals, then AECD shall comply with the Contracting Party national regulation requirements.**
- 6.2.7. The testing procedures in Annex 5 can be performed either on the AECD unit including post processing ability or directly on the GNSS chipset receiver being a part of the AECD.
- 6.3 Mean of access to mobile networks
- The AECD shall be fitted with an embedded hardware allowing registration/authentication on and access to the mobile network
- AECD requirements in regard of its communications module are excluded from the scope of this regulation.**
- 6.4 Base function and operation principles
- The AECD shall send data and establish voice connection with the PSAP.
- If the sending of data failed then the AECD shall retry sending the data.
- If the AECD has successfully sent the data and then loses the voice connection, it shall try to reestablish voice connection.
- In case it was not possible to establish voice connection and/or send data using mobile communication networks, the AECD shall store the data in non-volatile memory and attempt re-transmission of the data and to establish a voice connection.

~~[Whenever, a third party emergency system is installed in the vehicle compliant with regional or national standards for private Ecall [e.g. for EU CEN 16102:2011 standard “Operating requirements for third party support” (TPS Ecall)], the driver has the free choice to use this system. It has to be ensured that there is only one system active at a time”].~~

6.5. AECD information and warning signal

~~The following provisions are applicable if the AECD warning signal verification is not part of the installation approval of an AECD in a vehicle per Part II of this regulation.~~

If the applicant for approval so requests, the AECD warning signal verification may be part of the approval of a type of AECD. In this case the following provisions shall apply.

6.5.1. Information shall be provided regarding the status of the connection when the AECD is automatically or manually activated.

6.5.2. A warning signal shall be provided ~~to the driver~~ when the AECD is not functioning properly. **Visual indication of the AECD malfunction shall be displayed at all times while ignition is turned on or the vehicle master control switch is activated (whatever applicable).**

6.5.3. ~~AECD Control~~

~~If the emergency call control assessment is not part of the AECD approval per Part II of this regulation, the emergency call control assessment shall be conducted according to the procedure let down in Annex XXX, paragraph XXX~~

Instead of providing information or warning signal, AECD may provide the electric signal to other vehicle components, e.g. instrument panel, which enable to provide information or warning signal.

6.6. Power supply

The AECD shall be able to operate [autonomously] for a period of first not less than 5 minutes in voice communication (definition to be added – Qualcomm future email) mode followed by 60 minutes in call-back (definition to be added) mode and finally not less than 5 minutes in voice communication mode.

This capability is tested in following conditions:

- battery has to be fully charged at the time the test begins, at the discretion of the applicant;
- Ambient air temperature: $(25 \pm 10)^{\circ}\text{C}$

6.7 Resistance to impact

The AECD shall remain operational after impact. This shall be demonstrated according to Annex 4, **or verifications described in ww after the collision described in yy or zz .**

6.8. Hands-free audio performance

The AECD shall be capable of processing audio signals in such a way that, being installed in a vehicle, it is able to provide sufficient voice intelligibility for near and far listeners according to [Annex XXX] [P.Emergency ITU-T Recommendation]

8. **Modification and extension of approval of the type of AECD**
9. **Conformity of production**
10. **Penalties for non-conformity of production**
11. **Production definitively discontinued**
12. **Names and addresses of technical services responsible for conducting approval tests, and of administrative departments**

Part II VEHICLES WITH REGARD TO THE INSTALLATION OF AN AECD OF AN APPROVED TYPE

12. Definitions

For the purposes of this Regulation:

- 12.1. “*Type of vehicle*” with regard to its AECD means vehicles that do not differ in such essential respects as:
 - (a) Their manufacturer's ~~trade name or mark~~;
 - (b) the type of their AECD
 - (c) vehicle features which significantly influence the performances of the AECD
- 12.2. “*Safe Zone*” means the zone limited by the safe zone borders and in which a fixed AECD is assumed to be safe from impact deterioration, **excluding the glazing.**
- 12.3. “*Safe Zone borders*” means the limits of the safe zone and are defined by
 - In X direction: Between two z-y planes coinciding with front axle and rear axle
 - In Y direction: Between the two z-x planes crossing the outer surface of the driver's seat and crossing the outer surface of the outermost front passenger's seat.
- 12.4. “*Total permissible laden mass*” means the vehicle technically permissible maximum mass stated by the manufacturer.
- 12.5. “*R point*” means a reference point defined for each seat by the manufacturer in relation to the vehicle's structure, as indicated in Annex 6 to Regulation No.94
- 12.6. “*Triggering signal*” means a logic signal that requests MSD transmission.
- 12.7. “**MSD**” means a set of data as defined in Annex 9
- 12.8. “**AECS**” (Accident Emergency Call System) means an AECD when installed in a vehicle.
- 12.9. “*Multi-task display*” means a display on which more than one message can be shown simultaneously.

13. Application for approval of a vehicle type equipped with an AECD which has been approved to Part I of this regulation

- 13.1 The application for approval of a vehicle type equipped with an AECD shall be submitted by the holder of the trade name or mark or by his duly accredited representative.
- 13.2 A model of the information document is given in **Annex 2**.
- 13.3 For each vehicle type equipped with an AECD, the application shall be accompanied by samples of complete sets of vehicles in sufficient quantities for the tests prescribed by this regulation. Additional specimens may be called for at the request of the technical service responsible for conducting the test.

14. Approval

- 14.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraph 15. below, approval of that vehicle type shall be granted.

Before granting approval for a vehicle type with regard to the installation of an AECD approved to Part I of this Regulation, the competent authority shall ensure that the verifications not being part of the Part I approval are included in the Part II approval.

Approval for a vehicle type with regard to the installation of an AECD may ~~be~~ **shall** be granted according to one of the approval procedures **I and II** ~~let~~ **set** ~~down~~ **described** in Table 1.

Approval to a vehicle type with regard to the installation of an AECD may be granted also according to approval procedure III described in table 1 ^{2/}:

Approval procedure	HMI	Triggering signal emission	Resistance to impact	GNSS and mobile communication
Procedure I	Paragraph 15.2. Paragraph 15.3.	Paragraph 16.1.1. Paragraph 16.1.2.	Paragraph 16.2.1. Paragraph 16.2.2.	Paragraph 16.3.1. Paragraph 16.3.2. Paragraph 16.3.3.
Procedure II				Paragraph 16.3.1. Paragraph 16.3.2.
Procedure III		Paragraph 16.1.3.	Paragraph 16.2.3.	Paragraph 16.3.1. Paragraph 16.3.2. Paragraph 16.3.3.

Approval procedure	HMI	GNSS functionality	Resistance to impact	Triggering signal emission	AECS functionality
Procedure I	Paragraph 15.2. Paragraph 15.3.	Paragraph 16.2.1. Paragraph 16.2.2. Paragraph 16.2.3.	Paragraph 16.3.1. Paragraph 16.3.2.	Paragraph 16.4.1. Paragraph 16.4.2.	Paragraph 16.5.
Procedure II		Paragraph 16.2.1. Paragraph 16.2.2.			
Procedure III^{2/}		Paragraph 16.2.1. Paragraph 16.2.2. Paragraph 16.2.3.	Paragraph 16.3.3.	Paragraph 16.4.3.	

Table 1: approval procedures

^{2/} Procedure III shall only apply to:

- **the extension of type approvals to this Regulation, or**
- **vehicles already approved to Regulations Nos.94 or 95 prior the entry into force of this regulation**

- 14.2. An approval number shall be assigned to each type approved. The first two digits (at present 00) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another type of vehicle.
- 14.3. Notice of approval or of refusal, or of extension or withdrawal of approval, or of production definitively discontinued of a type of vehicle pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in annex 3 to this Regulation.
- 14.4. There shall be affixed, conspicuously and in the space referred to in paragraph 14.2 above, to every vehicle conforming to a type approved under this Regulation, in addition to the mark prescribed in paragraph 4.1., an international approval mark conforming to the model given in annex 5, consisting of:
- 14.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;
- 14.4.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 14.4.1.
- 14.5. The approval mark shall be clearly legible and be indelible.

15. Requirements

- 15.1. General
- 15.1.1. The AECD installed in the vehicle shall be of a type approved under Part I of this Regulation.
- 15.1.2. The AECD shall be connected to the vehicle's on-board electrical network, so that the AECD functions in all the required modes, and the backup battery (if fitted) is charged.
- 15.1.3. The installation of the AECD shall be such to obtain **reception of the GNSS signal and access to a mobile telephone communication network.**
- ~~Localisation accuracy as defined in paragraph 6.2. (Reception and processing of navigation signals)~~
 - ~~Access to mobile networks as defined in paragraph 6.3. (Mean of access to mobile networks)~~
- The applicant shall provide the relevant information with regard to the mobile network and GNSS to which the AECS is intended.**
- 15.1.4. Vehicles of category M1 shall be subject to the following:
- 15.1.4.1. Vehicles of category M1 with a total permissible laden mass less or equal to 2,5 tons and R-point height at or below 700 mm:
- ~~15.1.4.1.1. paragraphs 16.1.1. and 16.1.2., or paragraph 16.1.3~~
- ~~15.1.4.1.2. paragraphs 16.2.1. and 16.2.2., or paragraph 16.2.3.~~
- ~~15.1.4.1.3. paragraph 16.3.~~
- 15.1.4.1.1. paragraphs 16.4.1. and 16.4.2., or paragraph 16.4.3**
- 15.1.4.1.2. paragraphs 16.3.1. and 16.3.2., or paragraph 16.3.3.**
- 15.1.4.1.3. paragraph 16.2.**

- 15.1.4.2. Vehicles of category M1 with a total permissible laden mass less or equal to 2,5 tons and R-point height above 700 mm:
- ~~15.1.4.2.1. paragraph 16.1.1. or frontal impact provisions of paragraph 16.1.3.~~
- ~~15.1.4.2.2. paragraph 16.2.1. or frontal impact provisions of paragraph 16.2.3.~~
- ~~15.1.4.2.3. paragraph 16.3.~~
- 15.1.4.2.1. paragraph 16.4.1. or frontal impact provisions of paragraph 16.4.3.**
- 15.1.4.2.2. paragraph 16.3.1. or frontal impact provisions of paragraph 16.3.3.**
- 15.1.4.2.3. paragraph 16.2.**
- 15.1.4.3. Vehicles of category M1 with a total permissible laden mass above 2,5 tons and R-point height less or equal to 700 mm:
- ~~15.1.4.3.1. paragraph 16.1.2. or side impact provisions of paragraph 16.1.3.~~
- ~~15.1.4.3.2. paragraph 16.2.2. or side impact provisions of paragraph 16.2.3.~~
- ~~15.1.4.3.3. paragraph 16.3.~~
- 15.1.4.3.1. paragraph 16.4.2. or side impact provisions of paragraph 16.4.3.**
- 15.1.4.3.2. paragraph 16.3.2. or side impact provisions of paragraph 16.3.3.**
- 15.1.4.3.3. paragraph 16.2.**
- 15.1.4.4. Vehicles of category M1 with a total permissible laden mass above 2,5 tons and R-point height above 700 mm: paragraphs ~~16.1.3.~~ **16.4.4.**, ~~16.2.3.~~ and ~~16.3.~~ **16.2.**
- 15.1.5. Vehicles of category N1 shall be subject to the following:
- 15.1.5.1. Vehicles of category N1 with a R-point height at or below 700 mm:
- ~~15.1.5.1.1. paragraph 16.1.2. or side impact provisions of paragraph 16.1.3.~~
- ~~15.1.5.1.2. paragraph 16.2.2. or side impact provisions of paragraph 16.2.3.~~
- ~~15.1.5.1.3. paragraph 16.3.~~
- 15.1.5.1.1. paragraph 16.4.2. or side impact provisions of paragraph 16.4.3.**
- 15.1.5.1.2. paragraph 16.3.2. or side impact provisions of paragraph 16.3.3.**
- 15.1.5.1.3. paragraph 16.2.**
- 15.1.5.2. Vehicles of category N1 with a R-point height above 700 mm: paragraphs **16.4.4.** and ~~16.3.~~ **16.2.**
- 15.1.6. Regardless of paragraph 15.1.5, vehicles that meet the technical requirements of Regulation No 95 without a side airbag are not subject to paragraphs **16.3.2.**, **16.3.3.**, ~~16.1.2.~~ **16.4.2** ~~or~~ and paragraph ~~16.1.3.~~ **16.4.3.**
- 15.2. ~~AECD~~ **AECS** control
- When the vehicle is fitted with an ~~AECD~~ **AECS** control **per paragraph 16.1.**, the ~~AECD~~ **AECS** control shall fulfil the requirements of paragraphs 15.2.1. to 15.2.3.
- 15.2.1. The ~~AECD~~ **AECS** control shall be installed such to comply with the relevant installation requirements of Regulation No.121.
- 15.2.2. The ~~emergency call~~ **AECS** control shall be designed and/or placed in such a way that the risk of an ~~accidental~~ **inadvertent** activation is reduced.
- 15.2.3. **If the AECS control is embedded into a multi-task display, its operation shall be possible with two deliberate actions or less.**

- 15.2.4.** If the ~~emergency call~~ AECS control assessment is not part of the AECD approval per Part I of this regulation, the emergency call control ~~efficiency shall be verified according to the procedure let down in Annex XXX, paragraph XXX~~ **functionality shall be subject to paragraph 16.5.**
- 15.3. AECD information and warning signal
- The following provisions [are applicable if the AECD warning signal verification is not part of the approval of an AECD in a vehicle per Part I of this regulation and] **shall be verified by compliance with the provisions of paragraphs 16.1. and 16.5.**
- 15.3.1.** The AECS information and/or warning signal shall be installed such to comply with the relevant installation requirements of Regulation No.121.
- ~~15.3.1.~~**15.3.2.** Information shall be provided regarding the status of the connection when the ~~AECD~~ AECS is automatically or manually activated.
- ~~15.3.2.~~**15.3.3.** A warning signal shall be provided ~~to the driver~~ when the **onboard AECD AECS** is not functioning properly. **Visual indication of the AECD malfunction shall be displayed at all times while ignition is turned on or the vehicle master control switch is activated (whatever applicable).**
- 15.4.** The AECS shall properly function after the vehicle has suffered a serious road accident. This shall be verified by compliance with the provisions of paragraph 16.5.
- ~~15.4.~~ [Whenever, a third party emergency system is installed in the vehicle compliant with regional or national standards for private Ecall [e.g. for EU CEN 16102:2011 standard “Operating requirements for third party support” (TPS Ecall)], the driver has the free choice to use this system. It has to be ensured that there is only one system active at a time”].
- 15.5. Hands-free audio performance**
- The AECD should be installed in a vehicle in a such a way that it provides sufficient voice intelligibility for near and far listeners according to [Annex XXX] [P.Emergency ITU-T Recommendation]

16. Performance requirements

- 16.1. Verification of the HMI installation**
- Manual control, tell-tale, microphone and loudspeaker installation shall be verified by visual inspection.
- ~~16.3.~~ **16.2. Verification of communication with GNSS** Verification of GNSS functionality
- ~~Communication with GNSS~~ **Verification of the GNSS functionality** shall be performed, at the request of the manufacturer, either
- ~~16.3.1~~ by using actual GNSS signal, per the test methods described in Annexes 5 and 6;
- ~~16.3.2.~~**16.2.1.** by using simulated GNSS signal, per the test methods described in Annexes 5 and 6, or
- ~~16.3.3.~~**16.2.2.** by functional check according to Annex 8.
- ~~16.2.~~ **16.3** Verification of the ~~AECD~~ AECS after vehicle impact test ~~resistance to impact~~
- Subject to the approval procedures defined in paragraph 14.1.4., the verification of the ~~AECD~~ AECS **functionality** ~~resistance to impact~~ resistance to impact shall be performed either

~~16.2.1.~~ **16.3.1.** When ~~simulating~~ **performing** a collision of the vehicle **according to during tests under** Regulation No.94 (frontal collision),

~~16.2.2.~~ **16.3.2.** When ~~simulating~~ **performing** a collision of the vehicle **according to during tests under** Regulation No.95 (lateral collision), or

~~16.2.3.~~ **16.3.3.** ~~At the request of the manufacturer~~ **Subject to Footnote 2 to paragraph 14.1.**, when demonstrating that

- the pulse according to Regulation No.17, annex 9 has no negative effect on the AECD functioning,
- the AECD is located within the safe zone border as defined in paragraph ~~2.13.~~ **12.2.**,
- specific components that are located outside of the safe zone are not negatively affected, and
- if components of the AECS are out of the above defined area, the requirements are also deemed to be fulfilled if the manufacturer can show to the satisfaction of the technical service that the post-crash functioning is given. This can be e.g.:
 - Relevant components are in non-deformed areas,
 - Relevant functions are redundant,
 - ~~Devices are mounted on/in windows (e.g. windshield, rear window, ...);~~ or
 - (others, tbd.)

~~16.1.~~ **16.4.** Verification of the triggering signal emission

Subject to the approval procedures defined in paragraph 14.1., the verification of the triggering signal emission shall be performed either

~~16.1.1.~~ **16.4.1.** When simulating a collision of the vehicle during tests under Regulation No.94 (frontal collision),

~~16.1.2.~~ **16.4.2.** When simulating a collision of the vehicle during tests under Regulation No.95 (lateral collision), or

~~16.1.3.~~ **16.4.3.** At the request of the manufacturer, when demonstrating with existing documentation (report, images, simulation data or equivalent) that during a Regulation No.94 and Regulation No.95 test a triggering signal was generated.

16.4.4. **For the purpose of par. 15.1.4.4 and par. 15.1.5.2. only, the manufacturer shall demonstrate with existing documentation (report, images, simulation data or equivalent) that a triggering signal is available for the purpose of AECS.**

16.5. **Verification of AECS functionality (emission of Ecall, HMI functionality and MSD)**

The following items shall be verified according to the test procedures of paragraph 4 or 5 to Annex 8 of this regulation as appropriate:

16.5.1. **Activation of automatic call**

16.5.2. **When relevant, manual emergency call control operation**

16.5.3. **Warning signal generation and microphone operation**

16.5.3. **Recording, content and emission of Minimum Set of Data (MSD)**

17. Modifications and extension of approval of a vehicle type equipped with an AECD which has been approved to Part I of this regulation

- 17.1 Every modification of the vehicle type shall be notified to the administrative department which approved the vehicle type. The department may then either:
- 17.1.1 Consider that the modifications made are unlikely to have an appreciable adverse effect, and that in any case the vehicle still complies with the requirements; or
- 17.1.2 Require a further test report from the technical service responsible for conducting the tests.
- 17.2 Notice of the confirmation of approval, specifying the alterations made, or refusal shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in annex XXX to this Regulation.
- 17.3 The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such extension.

18. Conformity of production

- 18.1 The conformity of production procedure shall comply with the requirements set out in the Agreement, Appendix 2 (E/ECE/324 E/ECE/TRANS/505/Rev.2).
- 18.2 Every vehicle approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set out in paragraph 15 above.

18. Penalties for non-conformity of production

- 18.1 The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 17.1 above is not complied with or if the vehicle fails to pass the checks prescribed in paragraph 17.2 above.
- 18.2 If a Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation "APPROVAL WITHDRAWN".

19. Production definitively discontinued

If the holder of the approval completely ceases to manufacture a vehicle type approved in accordance with this Regulation, he or she shall so inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the Agreement which apply this Regulation by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation "PRODUCTION DISCONTINUED".

20. Names and addresses of technical services responsible for conducting approval tests, and of administrative departments

The Parties to the Agreement which apply this Regulation shall communicate to the United Nations Secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or refusal, or extension or withdrawal of approval, issued in other countries, are to be sent.

Part III VEHICLES WITH REGARD TO THEIR AECS

21. Definitions

21.1.

21.2. "*Common space*" means an area on which two or more information functions (e.g. symbol) may be displayed but not simultaneously.

22. Application for approval of a vehicle type equipped with an AECS

23. Approval

24. Requirements

24.1 General

24.2 Performance requirements

25. Modifications and extension of approval of a vehicle type equipped with an AECS

26. Conformity of production

27. Penalties for non-conformity of production

28. Production definitively discontinued

29. Names and addresses of technical services responsible for conducting approval tests, and of administrative departments

Annex XX

Communication

(Maximum format: A4 (210 x 297 mm))



issued by :

Name of administration:

.....

3

concerning⁴: **Approval granted**

- Approval extended**
- Approval refused**
- Approval withdrawn**
- Production definitively discontinued**

of a type of AECD intended to be fitted to vehicles of categories M1 and N1 pursuant to Regulation No. ??

Approval No..... Extension No.

1. Trade name or mark of device:
 2. Manufacturer's name for the type of device:
 3. Manufacturer's name and address:
 4. If applicable, name and address of manufacturer's representative:
 5. Submitted for approval on:
 6. Technical Service responsible for conducting approval tests:
 7. Date of report issued by that Service.....
 8. Number of report issued by that Service
 9. Brief description
- AECD information and warning signal:
 yes/no.....
10. Position of the approval mark:
 11. Reason(s) for extension (if applicable):
 12. Approval granted/refused/extended/withdrawn²:
 13. Place:
 14. Date:
 15. Signature:
 16. The list of documents deposited with the Type Approval Authority which has granted approval is annexed to this communication and may be obtained on request.

¹ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulations).

⁴ Strike out what does not apply.

Annex YY

Communication

(Maximum format: A4 (210 x 297 mm))



issued by :

Name of administration:

.....

5

concerning⁶: Approval granted

- Approval extended
- Approval refused
- Approval withdrawn
- Production definitively discontinued

of a type of vehicle of category M1 or N1 approved pursuant to Part II of Regulation No. AECS, fitted with an AECD approved pursuant to Part I of Regulation No. AECS

Approval No..... Extension No.

1. Trade name or mark of device:
 2. Manufacturer's name for the type of device:
 3. Manufacturer's name and address:
 4. If applicable, name and address of manufacturer's representative:
 5. Submitted for approval on:
 6. Technical Service responsible for conducting approval tests:
 7. Date of report issued by that Service.....
 8. Number of report issued by that Service
 9. Brief description
- AECD information and warning signal:
 yes/no.....
10. Position of the approval mark:
 11. Reason(s) for extension (if applicable):
 12. Approval granted/refused/extended/withdrawn²:
 13. Place:
 14. Date:
 15. Signature:

¹ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulations).

⁶ Strike out what does not apply.

16. The list of documents deposited with the Type Approval Authority which has granted approval is annexed to this communication and may be obtained on request.

Annex ZZ

Communication

(Maximum format: A4 (210 x 297 mm))



issued by :

Name of administration:

.....

7

- concerning⁸: Approval granted
 Approval extended
 Approval refused
 Approval withdrawn
 Production definitively discontinued

of a type of vehicle of category M1 or N1 approved pursuant to Part II of Regulation No. AECS.

Approval No..... Extension No.

1. Trade name or mark of device:
2. Manufacturer's name for the type of device:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Submitted for approval on:
6. Technical Service responsible for conducting approval tests:
7. Date of report issued by that Service.....
8. Number of report issued by that Service
9. Brief description
10. Position of the approval mark:
11. Reason(s) for extension (if applicable):
12. Approval granted/refused/extended/withdrawn²:
13. Place:
14. Date:
15. Signature:

¹ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulations).

⁸ Strike out what does not apply.

- 16. The list of documents deposited with the Type Approval Authority which has granted approval is annexed to this communication and may be obtained on request.**

Annex 1

Information document relating to the type approval of an e-call device (AECD)

The following information, if applicable, shall be supplied in triplicate and shall include a list of contents.

Any drawings shall be supplied in appropriate scale and in sufficient detail on size A4 paper or on a folder of A4 format.

Photographs, if any, shall show sufficient detail.

1. Make (trade name of manufacturer):.....
2. Type and general commercial description(s):
3. Means of identification of type, if marked on the device:.....
4. Name and address of manufacturer:.....
5. Location of and method of affixing the approval mark:
6. Address(es) of assembly plant(s):
7. Arrangement (indicate components included on delivery):
8. Description of method(s) of attachment to the vehicle:
9. Sufficiently detailed drawings to identify the complete device, including installation instructions; the position for the type-approval mark must be indicated on the drawings:.....

Annex 2

Information document relating to the type approval of a vehicle with regard to the installation of e-call devices

The following information, if applicable, shall be supplied in triplicate and shall include a list of contents.

Any drawings shall be supplied in appropriate scale and in sufficient detail on size A4 paper or on a folder of A4 format.

Photographs, if any, shall show sufficient detail.

General

1. Make (trade name of manufacturer):
2. Type and general commercial description(s):
3. Means of identification of type, if marked on the vehicle:
4. Location of the marking:
5. Location of and method of affixing the approval mark:
6. Category of vehicle:
7. Name and address of manufacturer:
8. Address(es) of assembly plant(s):
9. Photograph(s) and/or drawing(s) of a representative vehicle:
10. E-call device/system
- 10.1 Make (trade name of manufacturer):
- 10.2 Type and general commercial description(s):
- 10.3 Arrangement (indicate components included in delivery):
- 10.4 Description of means of automatic transmission of information about the accident (if fitted):
- 10.5 Description of method(s) of attachment to the vehicle:
- 10.6 Drawing(s) showing the position of the e-call device/system:
11. Approval procedure (I, II, III)

Annex 3

Information document relating to the type approval of a vehicle with regard to AECS

The following information, if applicable, shall be supplied in triplicate and shall include a list of contents.

Any drawings shall be supplied in appropriate scale and in sufficient detail on size A4 paper or on a folder of A4 format.

Photographs, if any, shall show sufficient detail.

General

- 1. Make (trade name of manufacturer):
- 2. Type and general commercial description(s):
- 3. Means of identification of type, if marked on the vehicle:
- 4. Location of the marking:
- 5. Location of and method of affixing the approval mark:
- 6. Category of vehicle:
- 7. Name and address of manufacturer:
- 8. Address(es) of assembly plant(s):
- 9. Photograph(s) and/or drawing(s) of a representative vehicle:
- 10. E-call device/system
- 10.1 Make (trade name of manufacturer):
- 10.2 Type and general commercial description(s):
- 10.3 Arrangement (indicate components included in delivery):
- 10.4 Description of means of automatic transmission of information about the accident (if fitted):

Test method for resistance to mechanical impact (paragraphs 6.4. and 16.2.3.)

[OICA proposal]

1. Purpose

The purpose of this test is to verify the safety performance of the representative AECD installation under inertial loads which may occur during a vehicle crash.

2. Installation

2.1. This test shall be conducted either with the complete representative AECD installation or with related representative AECD installation subsystem(s) including the electrical connections. If the manufacturer chooses to test with related subsystem(s), the manufacturer shall demonstrate that the test result can reasonably represent the performance of the complete representative AECD installation with respect to its safety performance under the same conditions.

2.2. The tested-device shall be connected to the test fixture only by the intended mountings provided for the purpose of attaching the representative AECD installation.

3. Procedures

3.1. General test conditions and requirements

The following condition shall apply to the test:

- (a) The test shall be conducted at an ambient temperature of 20 ± 10 °C,
- (b) At the beginning of the test, the battery shall be charged at the level recommended by the manufacturer;
- (c) At the beginning of the test, all protection devices which effect the function of the tested-device and which are relevant to the outcome of the test, shall be operational.

3.2. Test procedure

The AECD shall be decelerated or, at the choice of the applicant, accelerated in compliance with the acceleration corridors which are specified in Table 1. The Technical Service in consultation with the manufacturer shall decide whether the tests shall be conducted in either the positive or negative direction or both.

For each of the test pulses specified, a separate tested-device may be used.

The test pulse shall be within the minimum and maximum value as specified in Table 1. A higher shock level and /or longer duration as described in the maximum value in Table 1 can be applied to the AECD if recommended by the manufacturer.

Figure 1
Generic description of test pulses

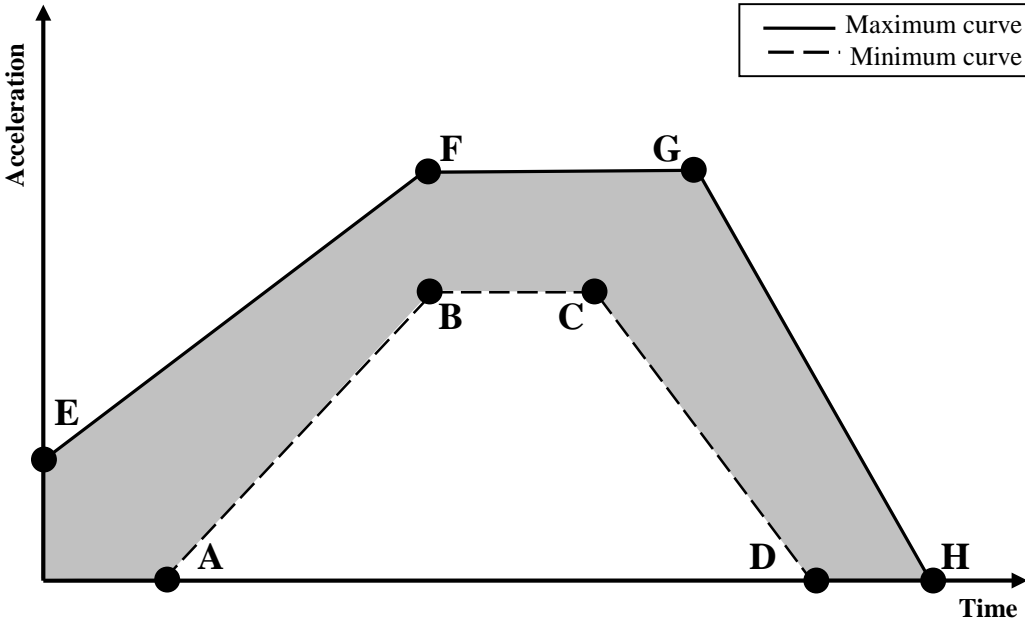
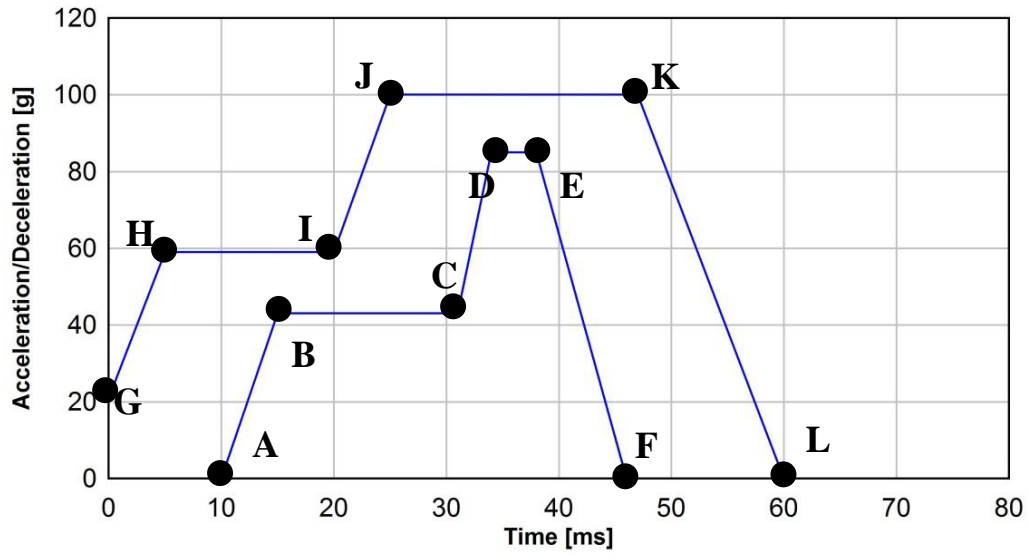


Table 1 for M₁ and N₁ vehicles:

Point	Time (ms)	Acceleration (g)	
		Longitudinal	Transverse
A	20	0	0
B	50	20	8
C	65	20	8
D	100	0	0
E	0	10	4.5
F	50	28	15
G	80	28	15
H	120	0	0

Based on 56 km/h, rigid barrier, full-width impact tests and safety factor 1.3



Point	Time (ms)	Deceleration (g) (in various directions)
A	10	0
B	15	43
C	31	43
D	34	85
E	38	85
F	46	0
G	0	21
H	5	59
I	20	59
J	25	100
K	47	100
L	60	0

Annex 5

Test method for navigation solution (paragraphs 6.2. and 16.3.)

1. Definitions

For the purposes of this Annex:

- 1.1 “*Global Navigation Satellite System*” (GNSS) is a satellite system that is used to pinpoint the location, speed and time of a user's receiver in any point of the Earth surface, water area of the World Ocean, air space, and in the near-Earth space environment.
- 1.2 “*Global Navigation Satellite System receiver*” (“GNSS receiver”) - a component of an AECD designed to determine time, the position and direction of the vehicle using signals from global navigation satellite systems.
- 1.3 “*Satellite-Based Augmentation System*” (SBAS) is a system ensuring the correction of local errors of GNSS systems due to interferences via a network of ground-based stations. (ex: EGNOS, WAAS, SDCM, QZSS)
- 1.4 “*Cold*” start mode” – the condition of navigation module when position, velocity, time, almanac and ephemerides data is not stored in the receiver, the navigation solution is to be calculated by means of a full sky search;
- 1.5 “*Test mode*” – the function mode of the AECD meant for the check of functions and parameters of the AECD during system operation in the vehicle and also during the AECD tests.

2. Test conditions

- 2.1 The test object is the AECD, which includes navigation receiver and global navigation satellite system antenna, specifying navigation characteristics and features of the tested system.
 - 2.1.1 The number of the AECD test samples shall be at least 3 pcs.
 - 2.1.2 The AECD is provided for the test with the installed SIM-card, operation manual and the software (provided on electronic media).
 - 2.1.3 The attached documents shall contain the following data:
 - device serial number;
 - hardware version;
 - software version;
 - device provider identification number ;
 - unique device identifier, assigned by the system operator in case of the first activation of the device.
 - 2.1.4 The navigation receiver shall be able to output the navigation solution in a NMEA-0183 protocol format (RMC, GGA, VTG, GSA and GSV message) [5]. The AECD setup for NMEA-0183 messages output to external devices shall be described in the operation manual
- Note:** For carrying out tests the originals of the operation manual containing specified convergence shall be provided.

- 2.2 The purpose of the tests is to verify the compliance of navigation characteristics of the AECD calculated by its navigation module, to the following requirements:
- 2.2.1 The navigation receiver being a part of the AECD shall be capable of receiving and processing individual GNSS signals of standard accuracy in L1/E1 band from at least three global navigation satellite systems, including GLONASS, GALILEO and GPS.
- 2.2.2 The navigation receiver being a part of the AECD shall be capable of receiving and processing combined GNSS signals of standard accuracy in L1/E1 band from at least three global navigation satellite systems, including GLONASS, GALILEO, GPS and SBAS.
- 2.2.3 The navigation receiver being a part of the AECD shall be able to provide positioning information in WGS-84, PZ-90 and GTRF coordinate systems.
- 2.2.4 According to 2.2.2, horizontal position error shall not exceed:
- under open sky conditions: 15 m at confidence level 0.95 with Position Dilution of Precision (PDOP) not more than 2.5
 - in urban canyon conditions: 40 m at confidence level 0.95 with Position Dilution of Precision (PDOP) not more than 4The specified requirements for accuracy shall be provided:
 - at speed range from 0 to [140] km/h;
 - linear acceleration range from 0 to [2] G;
- 2.2.5 GNSS signal re-acquisition time after block out of 60 sec and signal level down to minus 130 dBm shall not exceed 20 sec after recovery of the navigation satellite visibility.
- 2.2.6 Time to first fix shall not exceed:
- 60 sec for signal level down to minus 130 dBm
 - 300 sec for signal level down to minus 140 dBm.
- 2.2.7 The navigation receiver being a part of the AECD shall provide:
- GNSS signals search (detection) at the level of valid signal at the antenna input (antenna amplifier input) of minus144 dBm;
 - GNSS signals tracking and navigation solution calculation at the level of valid signal at the antenna input (antenna amplifier input) of minus 155 dBm
 - Re-acquisition of GNSS signals and calculation of the navigation solution at the level of valid signal at the antenna input (antenna amplifier input) of minus150 dBm.
- 2.3 Test conditions
- 2.3.1 Tests are carried out in normal climatic conditions in accordance with standard ISO 16750-1:2006:
- air temperature (23 ± 5) °C and
 - relative air humidity of 25 % to 75 %.
- 2.3.2 Technical service of tested samples during tests is not conducted.
- 2.3.3 Tests of the AECD in respect of its navigation receiver shall be performed with test and auxiliary equipment specified in Table 4.

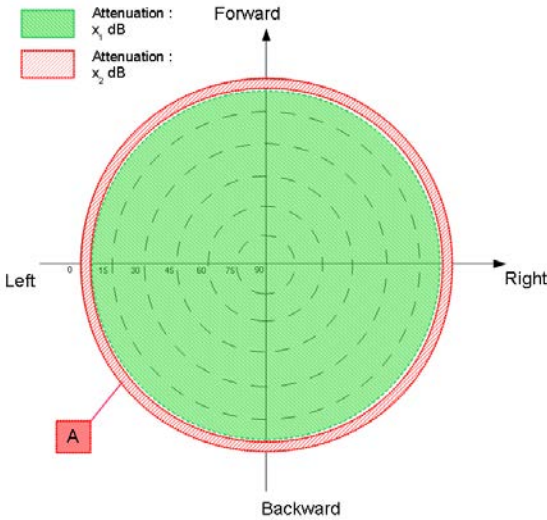
T a b l e 4 – Recommended list of measurement instruments, test and auxiliary equipment

Equipment name	Required technical characteristics of test equipment	
	Scale range	Scale accuracy
Global navigation satellite system simulator of GLONASS, Galileo and GPS signals	Number of simulated signals – at least 18	Mean square deviation of random accuracy component of pseudo-range to GLONASS / Galileo / GPS satellites not more: - <i>stadiometric code phase</i> – 0,1 m; - <i>communication carrier phase</i> – 0,001 m; - <i>pseudovelocity</i> – 0,005 m/sec.
Digital stopwatch	Maximum count volume – 9h 59 min 59,99sec	Daily variation at (25±5)°C not more + 1,0sec. Time discreteness- 0,01sec.
Vector network analyzer	Frequency range 300 kHz .. 4000 kHz Dynamic range (minus 85 .. 40) dB	AccF 1·10 ⁻⁶ AccA (0,1 .. 0,5) dB
Low-noise amplifier	Frequency range 1200.. 1700 MHz Noise coefficient not more 2,0 dB Amplifier gain coefficient 24 dB	
Attenuator	Dynamic range (0 .. 11) dB	Acc ± 0,5 dB
Attenuator	Dynamic range (0 .. 110) dB	Acc ± 0,5 dB
Power source	Range of direct current voltage setting from 0,1 to 30 V Current intensity of output voltage at least 3A	Acc0 ± 3% Acc1 ± 1%
<p>Note – it is allowed to apply other similar types of equipment providing determination of characteristics with required accuracy.</p>		

2.3.4 Unless otherwise specified, GNSS signal simulation shall follow “Open sky” pattern as shown in Figure 1.

Figure 1: Open sky definition

Zone	Elevation range (deg)	Azimuth range (deg)
A	0 – 5	0 – 360
Background	Area out of Zone A	



1) Open Sky plot.

Attenuation:

	0 dB
A	-100 dB

3. Test procedures

3.1 NMEA-0183 messages output test.

3.1.1 Make connections according to Figure 2.

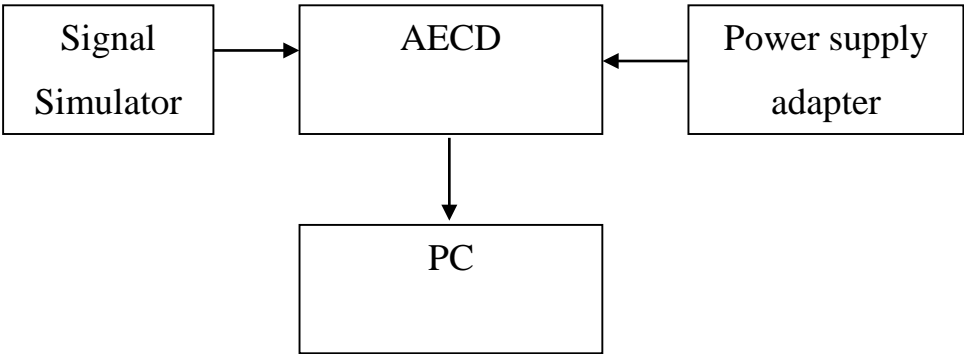


Figure 2 – Diagram of test stand

- 3.1.2** Prepare and turn on the AECD. By means of operation manual and developer software set up the navigation module for receiving signals from GLONASS, Galileo, GPS GNSS and SBAS . Set up the navigation module to output NMEA-0183 messages (messages RMC, GGA, VTG, GSA and GSV).
- 3.1.3** Set up the simulator according to the simulator user guide. Initialize simulator script with the parameters, given in Table 5 for GLONASS, Galileo, GPS GNSS and SBAS signals.

T a b l e 5 – Main parameters of simulation script for static scenario

Simulated parameter	Value
Test duration, hh:mm:ss	01:00:00
Output frequency	1 Hz
AECD location: - CS WGS-84;	Any specified land point between latitude range 80°N and 80°S
Troposphere: Ionosphere:	Standard predefined model by the GNSS simulator Standard predefined model by the GNSS simulator
PDOP value	≤ 2.5 in the test time interval
Simulated signals	- GNSS GLONASS (L1 frequency band CT code); - GNSS Galileo (E1 frequency band OS); - GNSS GPS (L1 frequency band C/A code); - GNSS GLONASS/Galileo/GPS/SBAS.
Signal strength: - GNSS GLONASS; - GNSS Galileo; - GNSS GPS	minus 141 dBm; minus 135 dBm; minus 138,5 dBm.
Number of simulated satellites	- at least 6 GLONASS satellites; - at least 6 Galileo satellites; - at least 6 GPS satellites; - at least 2 SBAS satellites

- 3.1.4** By means of corresponding serial interface set the connection between the AECD and PC. Control the possibility of receiving navigation information via NMEA-0183 protocol.

- 3.1.5 Test results are considered successful if navigation information via NMEA-0183 protocol is received.
- 3.2 The assessment of positioning accuracy in autonomous static mode.
- 3.2.1 Make connections according to Figure 2.
- 3.2.2 Prepare and turn on the AECD. By means of developer software make sure that navigation module is set up for receiving global navigation satellite systems GLONASS, Galileo, GPS and SBAS combined signals. Set up navigation module to output messages according to the NMEA-0183 protocol (GGA, RMC, VTG, GSA and GSV messages)
- 3.2.3 Set up the simulator in accordance with its operational manual. Start simulation of for combined GNSS GLONASS, Galileo, GPS and SBAS signals script with set parameters, given in Table 5.
- 3.2.4 Upon receiving the navigation solution set up recording of NMEA-0183 messages output by navigation module to a file, up to the moment the simulation script is complete.
- 3.2.5 Extract coordinates: latitude (B) and longitude (L) contained in GGA (RMC) messages.
- 3.2.6 Calculate the systematic inaccuracy of coordinate's determination on stationary intervals according to formulas (1), (2), for example for latitude coordinate (B):

$$(1) \Delta B(j) = B(j) - B_{truej},$$

$$(2) dB = \frac{1}{N} \cdot \sum_{j=1}^N \Delta B(j),$$

Where B_{truej} – actual value of B coordinate in j–ed time moment, angle sec.;

$B(j)$ – determined by the navigation module value of B coordinate in j time moment, angle sec;

N – amount of GGA (RMC) messages, received during the test of navigation module.

Similarly calculate the systematic inaccuracy of L (longitude) coordinate.

- 3.2.7 Calculate standard deviation (SD) value according to formula (3) for B coordinate:

$$(3) \sigma_B = \sqrt{\frac{\sum_{j=1}^N (B(j) - dB)^2}{N - 1}},$$

Similarly calculate the (SD) value for L (longitude) coordinate.

- 3.2.8 Convert calculated SD values of latitude and longitude determination from angle seconds to meters according to formulas (4) – (5):

- for latitude:

$$(4) \quad dB(M) = 2 \cdot \frac{a(1 - e^2)}{(1 - e^2 \sin^2 \varphi)^{3/2}} \cdot \frac{0,5'' \cdot \pi}{180 \cdot 3600''} \cdot dB,$$

- for longitude:

$$(5) \quad dL(M) = 2 \cdot \frac{a \cdot \cos \varphi}{\sqrt{1 - e^2 \sin^2 \varphi}} \cdot \frac{0,5'' \cdot \pi}{180 \cdot 3600''} \cdot dL,$$

Where a – major semiaxis of ellipsoid, m

e – first eccentricity

φ – current latitude, rad.

3.2.9 Calculate horizontal coordinates error (at confidence level 0.95) according to formula (6):

$$(6) \quad \Pi = \sqrt{dB^2(m) + dL^2(m)} + 2 \cdot \sqrt{\sigma_B^2(m) + \sigma_L^2(m)},$$

3.2.10 Repeat test procedures according to 3.2.3 – 3.2.9 only for GLONASS GNSS signals with simulation parameters, given in Table 5.

3.2.11 Repeat test procedures according to 3.2.3 – 3.2.9 only for GPS GNSS signals with simulation parameters, given in Table 5.

3.2.12 Repeat test procedures according to 3.2.3 – 3.2.9 for GNSS Galileo signals with simulation parameters, given in Table 5.

3.2.13 Repeat test procedures according to 3.2.3 – 3.2.12 with other AECD samples, provided for the test.

3.2.14 Determine average values according to (6) obtained for all tested AECD samples.

3.2.15 Tests results are considered satisfactory if horizontal coordinates errors as defined by formula (6) obtained with all AECD samples do not exceed 15 m under open sky conditions at confidence level 0.95 for all simulation scripts.

3.3 The assessment of positioning accuracy in autonomous dynamic mode.

3.3.1 Repeat test procedures described in section 3.2, except 3.2.10 - 3.2.12 with simulation script for maneuvering movement (Table 6).

T a b l e 6 – Main parameters of simulation script for maneuvering movement

Simulated parameter	Value
Test duration, hh:mm:ss	01:00:00
Output frequency	1 Hz
AECD location: - CS WGS-84;	Any specified land point between latitude range 80°N and 80°S

Model of movement: - speed, km/h; turn radius, m; - turn acceleration, m/sec ²	Maneuvering movement 140 500 0,2
Troposphere: Ionosphere:	Standard predefined model by the GNSS simulator Standard predefined model by the GNSS simulator
PDOP value	≤ 2.5 in the test time interval
Simulated signals	- combined GLONASS / Galileo / GPS / SBAS.
Signal strength: - GNSS GLONASS; - GNSS Galileo; - GNSS GPS	minus 141 dBm; minus 135 dBm; minus 138,5 dBm.
Number of simulated satellites	- at least 6 GLONASS satellites; - at least 6 Galileo satellites; - at least 6 GPS satellites; - at least 2 SBAS satellites

- 3.3.2 Determine average values according to (6) obtained for all tested AECD samples.
- 3.3.3 Tests results are considered satisfactory if horizontal coordinates errors obtained with all AECD samples do not exceed 15 m under open sky conditions at confidence level 0.95.
- 3.4 Test of movement in shadow areas, areas of intermittent reception of navigation signals and urban canyons.
- 3.4.1 Repeat test procedures described in section 3.3 for simulation script for movement in shadow areas and areas of intermittent reception of navigation signals (Table 7) with an urban canyon signal pattern described in Fig.3.

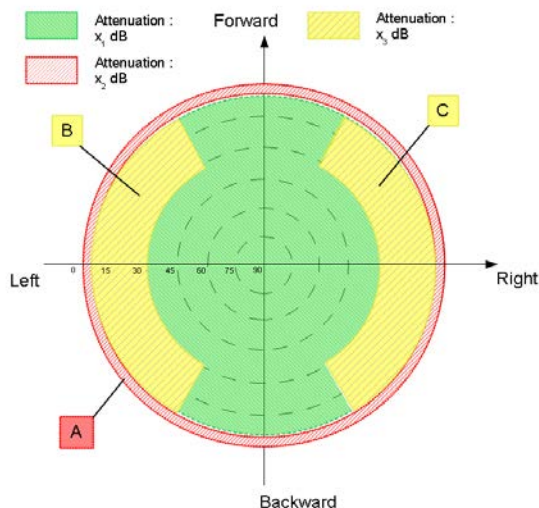
T a b l e 7 – Main parameters of movement in shadow areas and areas of intermittent reception of navigation signals

Simulated parameter	Value
Test duration, hh:mm:ss	01:00:00
Output frequency	1 Hz

Simulated parameter	Value
Motion start point: - CS WGS-84;	Any specified land point between latitude range 80°N and 80°S
Model of movement: - speed, km/h; turn radius, m; - turn acceleration, m/sec ²	Maneuvering movement 140 500 0,2
Satellite visibility: - signal visibility intervals, sec; - signal absence intervals, sec.	300 600
Troposphere: Ionosphere:	Standard predefined model by the GNSS simulator Standard predefined model by the GNSS simulator
Geometric factor PDOP	≤ 4 in the test time interval
Simulated signals	- combined GLONASS / Galileo / GPS / SBAS.
Signal strength: - GNSS GLONASS; - GNSS Galileo; - GNSS GPS	minus 141 dBm; minus 135 dBm; minus 138,5 dBm.
Number of simulated satellites	- at least 6 GLONASS satellites; - at least 6 Galileo satellites; - at least 6 GPS satellites; - at least 2 SBAS satellites

Figure 3: Urban canyon definition

Zone	Elevation range (deg)	Azimuth range (deg)
A	0 – 5	0 – 360
B	5 - 30	210 – 330
C	5 - 30	30 - 150
Background	Area out of Zones A, B, C	



2) Urban canyon plot.

Attenuation:

	0 dB
B	-40 dB
C	-40 dB
A	-100dB

- 3.4.2 Tests results are considered satisfactory if horizontal coordinates errors obtained with all AECD samples do not exceed 40 m in urban canyon conditions at confidence level 0.95.
- 3.5 Cold start time to first fix test.
 - 3.5.1 Prepare and turn on the AECD. By means of developer software make sure that GNSS module is set to receive GNSS GLONASS, Galileo and GPS signals.
 - 3.5.2 Delete all position, velocity, time, almanac and ephemerides data from the navigation receiver.
 - 3.5.3 Set up the simulator according to the simulator user guide. Initialize simulator script with the parameters, given in Table 5 for GNSS GLONASS, Galileo and GPS signals.
 - 3.5.4 By means of a stop watch measure time interval between signal simulation start and the first navigation solution result.
 - 3.5.5 Conduct test procedures according to 3.5.2 – 3.5.4 at least 10 times.
 - 3.5.6 Calculate average time to first fix in cold start mode based on measurements for all AECD samples, provided for the test.
 - 3.5.7 The test result is considered to be positive, if average values of time to first fix, calculated as described in 3.5.6 do not exceed 60 sec.
- 3.6 Test of re-acquisition time of tracking signals after block out of 60 sec.
 - 3.6.1 Prepare and turn on the AECD according to operational manual. By means of developer software make sure that navigation module is set up to receive GNSS GLONASS, Galileo and GPS signals.

- 3.6.2 Set up the simulator according to the simulator user guide. Initialize simulator script with the parameters, given in Table 5 for GNSS GLONASS, Galileo and GPS signals.
- 3.6.3 Wait for 15 minutes and make sure navigation module has calculated AECD position.
- 3.6.4 Disconnect the GNSS antenna cable from the AECD and connect it again after time interval of 60 sec.
By means of stopwatch determine time interval between cable connection moment and restoration of satellites tracking and calculation of the navigation solution.
- 3.6.5 Repeat test procedure according to 3.6.4 at least 10 times.
- 3.6.6 Calculate average value of re-acquisition time of satellite tracking signals by the AECD for all performed measurements and all AECD samples provided for the test.
- 3.6.7 The test result is considered to be positive, if average values of re-acquisition time after block out of 60 sec measured as described in 3.6.6 do not exceed 20 seconds.
- 3.7 Test of navigation receiver sensitivity in cold start mode, tracking mode, and re-acquisition scenario.
- 3.7.1 Turn on the vector network analyser. Calibrate the network vector analyser according to its operational manual.

3.7.2 Set up the diagram according to Figure 4.

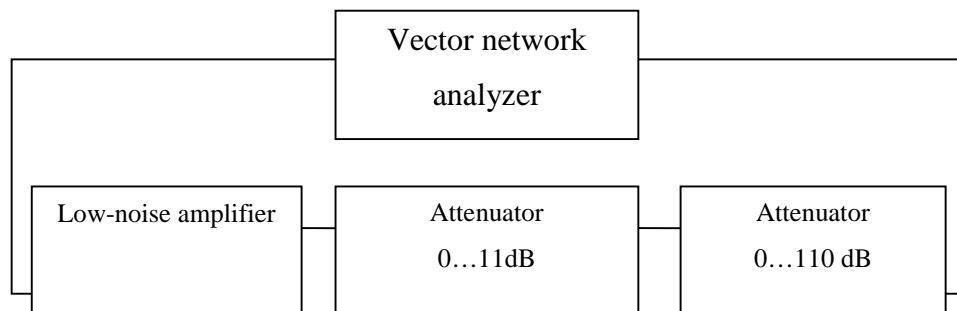


Figure 4 – Diagram of path calibration

- 3.7.2 Set zero signal path attenuation on attenuators. Measure the frequency response for a given signal path in the L1/E1 band of GNSS GLONASS/Galileo/GPS. Record the average path transmission factor in [dB] in this frequency band.
- 3.7.3 Assemble the circuit shown in Figure 5.

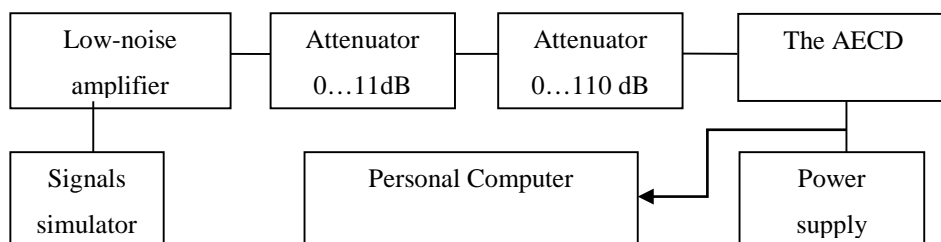


Figure 5 – Arrangement for evaluation of GNSS module sensitivity

- 3.7.4 Prepare and turn on AECD according to operational manual. By means of developer software make sure that GNSS module is set to receive GNSS GLONASS, Galileo and GPS signals. Clear the navigation module RAM such that the “cold” start mode of the navigation module of the AECD is achieved.
- 3.7.5 Set signal path attenuation value equal to 110 dB. Prepare GNSS signals simulator according to its operation manual. Start GNSS GLONASS/Galileo/GPS signals simulation script, with parameters given in Table 5. Set output power level of the simulator to minus 130 dBm.
- 3.7.6 Check that the position, velocity and time information is reset.
- 3.7.7 Decrease path attenuation using attenuators in 1 dB steps (increase the navigation signal power on the navigation module input) until the AECD acquires navigation fix. Record the signal level on the AECD GNSS module input.

Note – Time interval between path attenuation changes shall not be less than 120 s.

- 3.7.8 Set the signal path attenuation on attenuators such that the signal on AECD antenna input is equal to minus 140 dBm. Wait for 15 min to allow the navigation module to collect the ephemerides and the GNSS almanac.
- 3.7.9 Increase the signal path attenuation setting on attenuators in 1 dB steps (decrease the navigation signal power) until the navigation fix is reset. Taking into account the initial transmission factor of the signal path, record such GNSS signal level on an input of the AECD GNSS module antenna that resulted in the last navigation fix of the GNSS module in tracking mode.
- 3.7.10 Decrease path attenuation using attenuators in 1 dB steps (increase the navigation signal power on the navigation module input) until the AECD acquires navigation fix. Record the signal level on the AECD GNSS module input.
- 3.7.11 The test results shall be considered positive if the GNSS signal level on the antenna input of the AECD does not exceed minus 144 dBm in cold start mode as recorded in 3.7.8, minus 155 dBm in tracking mode as recorded in 3.7.10, and minus 150 dBm in reacquisition mode as recorded in 3.7.11 for each AECD submitted to tests.

Annex 6

Test method for emergency call (paragraphs.)

1. MSD emission assessment shall include verification of at least the following:
 - 1.1. Vehicle position accuracy is within the limits defined by paragraph 6.2, and
 - 1.2. Trigger time is transmitted correctly, and
 - 1.3. Vehicle identification number is transmitted correctly
2. MSD emission assessment can be performed either
 - 2.1. By transmitting MSD to a simulator, or
 - 2.2. By transmitting MSD via real PLMN
3. Hands-free voice communication assessment (subjective test) shall include verification of the following:
 - 3.1. Voice originating inside the vehicle can be clearly heard by the remote listener with satisfactory intelligibility, and
 - 3.2. Speech of the remote speaker can be clearly heard in the vehicle with satisfactory intelligibility
4. Hands-free voice communication assessment can be performed either
 - 4.1. By establishing voice communication to a simulator, or
 - 4.2. By establishing voice communication via real PLMN
5. HMI operation assessment shall include the following
 - 5.1. Manual trigger (call generation) is working correctly. This is verified by checking if manual trigger leads to
 - 5.1.1. MSD transmission, which is verified according to paragraph 1 of this Annex, and
 - 5.1.2. Voice communication being established, which is verified according to paragraph 3 of this Annex.
 - 5.2. Call status indication is working properly. This is verified by checking that the following statuses are displayed during test according paragraph 5.1 of the current Annex: [
 - 5.2.1. Call initiated (dialing)
 - 5.2.2. MSD transmitted
 - 5.2.3. Waiting for PSAP operator to answer
 - 5.2.4. Call in progress]
 - 5.3. Malfunction indication is working properly. This is verified by checking malfunction indication in at least one of the following conditions:
 - 5.3.1. Communication module antenna is disconnected, or
 - 5.3.2. GNSS receiver antenna is disconnected, or
 - 5.3.3. Microphone(s) is (are) disconnected, or
 - 5.3.4. Loudspeaker(s) is (are) disconnected, or
 - 5.3.5. AECD control module is disconnected from the HMI module

Annex 7

Test method for SMS transmission

Annex 8

Test method for verifying the on-board AECD via functional check (paragraph 16.3.3.)

1. The functional check of the in-vehicle system shall be performed via one out of the four methods laid down in paragraphs 2. to 5. below.
2. Verification of functional state of the in-vehicle system by using HMI (visual control of tell-tale)
When the in-vehicle AECD is capable to
 - check and diagnose all devices belonging to the AECD scope (Antennas, power supply, Mic, speaker, ...), and
 - discriminate a network failure (*) from an internal failure of the AECD Unitthe communication with GNSS and mobile networks and PSAP is deemed to be compliant if no failure warning is indicated by the HMI.
- (*) An obstruction of the antenna by a metallic part could be detected and indicated as a network failure. In this case, a visual control can be performed around the antenna (or AECD Unit in the case of an internal antenna), if the antenna is not within the safe zone.
3. Verification of functional state of the in-vehicle system by internal memory checking
When
 - the vehicle's diagnostic bus is still functioning and the AECS Unit is still powered (e.g. by main or auxiliary battery), or after AECD Unit disassembly and test bench analysis, and
 - the in-vehicle AECD is capable to
 - check and diagnose all devices belonging to the AECD scope (Antennas, power supply, Mic, speaker, ...), and
 - memorize all steps of an emergency call transaction (e.g.: trigger signal reception, construction of MSD, etc.)the communication with GNSS and mobile networks and PSAP is deemed to be compliant if the AECD unit has memorized the correct emergency call transaction, and no failure is present in memory.
4. Verification of functional state of the in-vehicle system by separated functional test
When
 - the in-vehicle AECD is capable to memorize all steps of an emergency call transaction (e.g.: trigger signal reception, construction of MSD, etc.), and
 - all devices belonging to the AECD scope are removable and their connectors are accessible (for electrical testing), for the visual control or/and for functional teststhe communication with GNSS and mobile networks and PSAP is deemed to be compliant if the AECD unit has memorized the correct emergency call transaction, if all electrical tests are satisfactory and if all devices belonging to the AECD scope are in good condition and functioning correctly.
5. Verification of functional state of the in-vehicle system by functional transmission test with wired procedure
When

- the mobile phone antenna connector is accessible, and
- all other parts (wire) between this antenna and the AECD Unit are accessible/removable for the visual control or/and for functional tests

the communication with GNSS and mobile networks and PSAP is deemed to be compliant if the emergency call transaction is correct (with PSAP simulator) and if all the electrical tests between antenna and the AECD unit are satisfactory

Annex 9

Definition of Minimum Set of Data – MSD (paragraph 12.7.)

The following table lists the minimum set of data (MSD) that shall be conveyed during the eCall data transmission to the PSAP.

The exact format and content is subject to national regulations.

Additional mandatory or optional elements may be subject to national regulations.

Table 1 — Minimum Set of Data (MSD) to be conveyed to PSAP

Short Name of MSD Element	Description
automaticActivation	Indicates whether a call was automatically or manually triggered
testCall	Indicates whether the call is a test call or a real emergency call
positionCanBeTrusted	Indicates whether the position given in the position elements can be trusted or has only low confidence
vehicleType	Provides a vehicle type
VIN	Vehicle Identification number
vehiclePropulsionStorageType	Provides the propulsion type of the vehicle
timeStamp	Timestamp of the initial data message generation within the current Ecall incident event
positionLatitude	The last known vehicle Latitude position determined at the latest moment possible before message generation
positionLongitude	The last known vehicle Longitude position determined at the latest moment possible before message generation
vehicleDirection	The vehicle's last known real direction of travel determined at the latest moment possible before message generation.

Justifications:

Paragraph 1.1: the Regulation is compartmented in three parts according to the decision made at AECS-01:

- Part I aims the approval of a type of Ecall device (AECD)
- Part II aims the approval of a vehicle type when fitted with Ecall device (AECD) approved to Part I
- Part III aims the approval of a vehicle type when fitted fully integrated Ecall system (AECS)

Paragraph 1.2: according to the decision of AECS-06, the regulation covers a restricted scope i.e. the capabilities of the ecall to connect to the mobile phone networks shall not be part of the approval. This was agreed by the informal group on the following reasons:

- Mobile phone networks legislation is not under the control of UNECE/WP29
- Mobile phones networks evolve too rapidly to be regulated by a UN regulation in the frame of the 58 Agreement.
- Regulating the capabilities of the ecall to connect to the mobile phone networks would jeopardise the efforts of the vehicle and AECD manufacturers to best match the evolution of technology.

At the 7th meeting of the informal group, the experts agreed to clearly identify the boundaries of the regulation by listing the items not covered by the regulation.

Paragraph 1.3: In order to avoid extra costs due to the implementation of the Ecall, only the vehicles that are designed by construction to be fitted with an automatic triggering system related to the detection of an impact, are included in the scope of the regulation. For defining these vehicles, it is assumed that all vehicles approved, or subject to the approval to the regulations dedicated to the assessment of the resistance to impact, are fitted with an automatic triggering system. This is because, in the current state of the technology, there is no other way to fulfil the requirements of these regulations than by equipping the vehicles in stake with “airbags” whose inflation must be triggered by an automatic triggering system. The informal group was keen to take the opportunity of the pre-existence of these airbag automatic triggering systems for triggering the ecall intervention.

Paragraph 1.4: At AECS-07, the idea of “if fitted” requirements for GNSS connectivity assessment was further discussed. Some experts requested that, if this alternative were chosen, a wording confirms freedom for Contracting Parties to nationally apply GNSS connectivity approval for the case the UN regulation applicant opts for approval without GNSS connectivity assessment.

Paragraph 1.5: proposal for exemptions:

- **Armoured vehicles:** For security reasons GNSS related devices are usually not installed on these vehicles. They are in addition often equipped with scrambling equipment because their users usually refuse tracing systems. A definition of “armoured vehicle” does already exist in RE.3: *“Vehicle intended for the protection of conveyed passengers and/or goods and complying with armour plating anti-bullet requirements”*.
- **M1 vehicles with a GVM > 3.5t:**

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- **The current version of the draft Regulation includes vehicles of category N1 (limited to GVM < 3.5 t) and vehicles of category M1 (without mass limit).**
 - **The vehicle fleet includes a small number of M1 vehicles with a GVW > 3,5t which are based on vehicles of category N2, N3, M2 or M3.**
 - **Limiting the scope of the regulation to the same maximum masses for commercial vehicles and passenger cars would reduce the burden for those manufacturers producing vehicles of category M1 as a variant of N2, N3, M2, M3 vehicles.**
- Paragraph 2. All definitions are taken from the CLEPA documents **AECS-06-02-Rev.1 and AECS-07-08**
- Paragraphs 3, 4 and 5: Provisions taken from the CLEPA document AECS-06-02-Rev.1
- Paragraph 6.0: Basic description of the sequence of operation of the Ecall. The references to the TPS are still subject to debate in the informal group.**
- Paragraph 6.1: decision taken at AECS-05 to refer to the last series of amendments to UN R10, and to introduce the sentence in [], until the group has solved the question at a future step. **AECS-07 decided to request guidance to GRSG.**
- Paragraph 6.2: Provisions taken from the CLEPA document AECS-06-02-Rev.1 **and AECS-07-02 (RUS, GSA, CLEPA)**
- Paragraph 6.3: SIM-chip or similar technology is targeted in this paragraph for identification and authentication on the mobile phone network or the PSAP. No need for further details as telecommunication performances requirements are out of the scope of the regulation.
- Paragraph 6.4: Basic description of the sequence of operation of the ecall. The references to the TPS are still subject to debate in the informal group.
- Paragraph 6.5: Provisions with regard to Human Machine Interface. Consistency necessary with the provisions of Part II (installation section). **The introductory paragraph addresses the necessary link between Part I and Part II of the regulation, taking into account that the supplier is unable to know, at the time of AECD Type Approval, whether the parts will be approved to Part II. The wording is then linked to paragraph 14.1. (AECS approval procedure) and to the new Annexes XX, YY and ZZ (Communication Forms).**
- The group agreed that the Ecall regulation should focus on when the warning shall be given to the driver, while a dedicated regulation (i.e. UNR121 – controls and tell-tales) should address how the warning shall be given.
- Paragraph 6.6: Provisions with regard power supply. AECS-06 reached the proposed text as an agreement in principle.
- Paragraph 6.7: Provisions with regard to the assessment of the resistance to impact. The informal group did not yet reach consensus on the test procedures and pass/fail criteria. These items are subject to **Annex 4. At AECS-07, CLEPA proposed further references.**
- Paragraph 6.8: Proposal from RUS to add audio performance requirements, referring to the ITU-T recommendations.**
- Paragraph 7: Performance requirements: item deleted per the proposal from CLEPA AECS-06-02-Rev.1
- Paragraphs 8 to 12: conventional paragraphs per the 58 Agreement.
- Paragraph 12: Definitions that are considered necessary for Part II. This section is still under construction, some new definitions may need to be added. The proposed definitions include the OICA proposal for a “safe zone” that was introduced at AECS-05; there is currently no final decision of the group with regard to this principle. **AECS-07 agreed to**
- **delete “trade name and mark” from the definition of type of vehicle.**

- Exclude the glazing from the safe zone.
Some further additional definitions (MSD, AECS, multi-task display) are still under discussion.
- Paragraph 13: conventional text per a regulation annexed to the 58 Agreement.
- Paragraph 14: Approval provisions.
- Paragraph 14.1: **The text of paragraph 14.1. was amended at AECS-07 for improving the link between Part I and Part II with regard to the verification of information and warning signal, which can be performed either under Part I or Part II of the regulation.**
- Attempt to capture the approval procedures as proposed by OICA per their document AECS-05-04. Some solution must still be found for limiting the application of Procedure ~~II~~ **III** to the vehicles not subject to UN R94 or 95, and not fitted with any triggering mechanism.
- At AECS-07 OICA proposed to solve the issue of the limitation of the vehicles approved to Procedure III by well separating the 2 cases:**
- Procedures I and II are dedicated to New Type Approvals
 - Procedure III is dedicated to the extension of existing Type Approvals, and for vehicles already approved to UN R94 or 95.
- The footnote 2 second indent focuses on vehicles being already approved to to UN R94 or 95. These vehicles must be exempted from the obligation of a destructive test for the sake of AECD installation approval, but it is legitimate that the Contracting Parties could assess their AECD performances.**
- While the 58 Agreement does not provide a proper legal frame for directing certain approval applications toward a particular approval procedure, footnote 2 second indent directs Procedure III to vehicles already approved to UN R94 and 95.**
- Paragraph 14.2 to 14.5: conventional text per a regulation annexed to the 58 Agreement.
- Paragraph 15.1.1: according to the definition of Part II of the regulation, the requirements for vehicles equipped with an approved AECD should apply only when the vehicles is indeed equipped with an AECD approved to Part I of the regulation.
- Paragraph 15.1.2: provision per the initial proposal AECS-01-05 (RUS), as a guarantee that the AECD has sufficient power supply at all time.
- Paragraph 15.1.3.: requirement that the AECD capabilities with regard to localisation and access to mobile phone networks, which are assumed to be demonstrated par Part I of the regulation, are not jeopardised by the AECD installation in the vehicle.
- It is deemed beneficial that some information on the performances of the true AECD, with regard to the connections to the networks, are provided to the Technical Services.**
- Paragraph 15.1.4: attempt to capture the provisions for vehicles of category M1 per the table established as in document AECS-04-14 paragraph 7.3. **The references to the requirement paragraphs are updated.**
- Paragraph 15.1.5: attempt to capture the provisions for vehicles of category N1 per the table established as in document AECS-04-14 paragraph 7.3. **The references to the requirement paragraphs are updated.**
- Paragraph 15.1.6: Verification of the triggering signal emission due to side impact is not relevant when the vehicle complies with the provisions of UN R94 despite the absence of airbag, because such vehicle does not have any triggering system. **The references to the requirement paragraphs are updated.**
- Paragraph 15.2: AECD manual control is not required on all vehicles and the informal group still must define a common position with regard to the manual control installation.

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- Paragraph 15.2.1: it is of common understanding that the particular regulations must regulate WHETHER the manual control must be installed, while the UN R121 (controls and tell-tales) must regulate HOW the manual control must be installed.
- Paragraph 15.2.2: in spite of the comments above, when a regulation covers an item particularly related to safety in case of accident, this regulation may add specific requirements.
- Paragraph 15.2.3: this paragraph is included for avoiding continuous display of the AECS control on the multi-task display, hence avoiding mishandling and accidental AECS activation (see paragraph 15.2.2).**
- ~~Paragraph 15.2.3~~ **15.2.4:** agreement within the informal group that the assessment of the manual control can be conducted either per Part I of the regulation (paragraph 6.5.3), or per Part II of the regulation (paragraph 15.2.3).
- Paragraph 15.3: Provisions with regard to Human Machine Interface. Consistency necessary with the provisions of Part I (device section). The group agreed that the ecall regulation should focus on when the warning shall be given to the driver, while a dedicated regulation (i.e. UNR121 – controls and tell-tales) should address how the warning shall be given. **A reference to the relevant HMI test methods is added for consistency with the new regulation structure.**
- Paragraph 15.3.1: this paragraph is included because it is necessary that the AECS warning information respect the relevant provisions of UN R121, similarly to the AECS control.**
- Paragraph 15.4 (new): this paragraph addresses functionality of the AECS post-crash; it is necessary for covering all the aspects of AECS i.e. before and after crash, in the frame of the OICA proposal for re-structuring the section 16 (see justifications to paragraph 16 below).**
- Paragraph 15.4 (former): **AECS-07 agreed to delete provisions related to TPS. Paragraph deleted.**
- Paragraph 15.5: Proposal from RUS to add audio performance requirements, referring to the ITU-T recommendations.**
- Paragraph 16.1: Verification of the Human Machine Interface per visual inspection: the presence of HMI can be visually verified. The tests to be performed prior the crash test are indicated in paragraph 15.3.**
- ~~Paragraph 16.3~~ **16.2:** All references to the communication with the mobile phone networks ~~has~~ **have** been deleted due to the decision of the informal group to restrict the scope to the “red components”. This proposal indeed endorses the option that communication with GNSS shall be assessed as an option at manufacturer’s choice. **OICA proposed at AECS-07 that an assessment of connection with “a” GNSS constellation is performed, but the OICA proposal does not specify any particular GNSS constellation; this remains at the full choice of the manufacturer for the sake of Type Approval.**
- ~~Paragraph 16.2~~ **16.3:** performance requirements for resistance of AECS to vehicle impact. The verification shall be performed according to the approval procedure chosen ~~per~~ **per** paragraph 14.1: frontal or lateral collision, or demonstration with functional provisions. This latter procedure should be primarily used **for extensions of existing approvals and** when the vehicle is already approved to the frontal/lateral impact regulations, ~~and were fitted with an AECD prior the entry into force of this regulation.~~ **In this regard, OICA proposed at AECS-07 inserting an additional sub-paragraph in 14.1. with a dedicated footnote 2/. OICA additionally proposed compliance with the requirements of a new annex 4 (see justifications to Annex 4 below).**
- ~~Paragraph 16.1~~ **16.4:** performance requirements for triggering signal emission. The verification shall be performed according to the approval procedure chosen ~~par~~ **per** paragraph 14.1: frontal or lateral collision, or demonstration with documentation. This latter procedure should be primarily used **for extensions of existing approvals and**

- when the vehicle is already approved to the frontal/lateral impact regulations, and were fitted with an AECD prior the entry into force of this regulation.
- Paragraph 16.4.4:** this new provision is necessary for vehicles out of UN R94 and UN R95, but equipped with a triggering system, because they need to meet some requirements. As they are not subject to any crash test, the manufacturer must demonstrate by proper means the generation of a triggering signal for the purpose of AECS.
- Paragraph 16.5:** as per the re-structuration proposed by OICA, a new paragraph 16.5 is inserted with the purpose of checking the proper functioning of the AECS after crash in the proper sequence:
1. activation of automatic call and dial-up;
 2. when existing, manual emergency call control operation;
 3. the generation of a warning signal and the operation of the microphone; and
 4. checking the correct recording, content and emission of the Minimum Set of Data (MSD).
- All these performances shall be verified according to the relevant test procedures of Annex 8.
- Paragraphs 17 to 20: Conventional wording per regulations under the 58 Agreement
- Part III: Section still to be developed. It will be largely inspired from Part II of the regulation.
- Annexes XX, YY, ZZ:** AECS-07 agreed to the addition of Annexes XX, YY and ZZ as Communication Forms which permit the Type Approval authorities to communicate with each other on the approvals granted. A sub item to item 9 in Annexes XX and YY provides an entry for indicating whether the AECD approval contains assessment of the AECD information and warning signal. Should the answer be “no” in Annex XX, then the Communication form for AECS in Annex YY should contain a “yes” to this entry, and vice-versa. Such discrimination is not necessary when the AECS is fully integrated in the vehicle (Annex ZZ).
- Annexes 1 to 3: Conventional annexes per regulations under the 58 Agreement.
- Annex 4: Annex dedicated to the assessment of the resistance to mechanical impact. ~~Details are still under discussions.~~ **Two test methods are in competition:**
- the OICA test method is based on the sled test of UN R17 (seat strength). This test is considered by OICA as well representative of the conditions of real world crashes, is well recognized as a relevant test among the passive safety experts community, is dedicated to safety related components (seats) and has the advantage of being already well defined and applied.
 - The European Commission (TRL) test method is not based on any existing test, but is considered by TRL as ensuring that AECS deliver high societal benefits to those casualties who need it most because it covers collision configurations that are more challenging to AECD than full-scale tests (UN R94 & 95). TRL proposal is based on the decelerations a sample of full-scale crash test results of superminis, MYs 2012 and 2013 (56 km/h, rigid barrier, full-width), with a safety factor of 1,3.
- Annex 5: Annex dedicated to the assessment of the navigation solution, at the request of the manufacturer. ~~This annex is still under construction~~ **Proposal per document AECS-07-13 (GSA).**
- Annex 6: Annex dedicated to the assessment of the emission of an emergency call signal, and of the presence and content of the MSD. ~~Could be deleted according to the decision of the informal group to restrict the scope of the regulation.~~ **Content of Annex 6 as proposed by RUS at AECS-07. Russian Federation believe**

	Annex 6 is required to describe methods to assess post-crash operation. Needs to be high level.
Annex 7:	Could be deleted
Annex 8:	Detailed justifications still need to be elaborated. OICA proposed the following at AECS-07: <ul style="list-style-type: none"> - For consistency, this annex should relate to the AECS, because it addresses “the installation of an AECD” (Part II of the regulation). - The procedure for verification of functional state of the in-vehicle system by separated functional test is described in the detailed separate appendices 1 and 2. - Paragraph 2: Verification by simple Human Machine Interface should be sufficient if the AECD is capable of diagnosing all its components and discriminating the failures coming from the environment (e.g. network failures) from internal failures. - Paragraph 3: verification, per post-crash memory checking, that the correct MSD and emissions to networks properly occurred. This can be permitted only if the AECD as the relevant capabilities (energy supply, self-diagnosis, event sequence memorization, etc.) - Paragraph 4: the separate functional test of Appendix 1 should be permitted if the AECD has the capabilities of memorizing all steps of an emergency call transaction and if all the AECD components are removable for laboratory inspection. - Paragraph 5: functional transmission test when the connectivity components are accessible for functional testing.
Appendix 1:	Verification of functional state of the in-vehicle system by separated functional test: the proposed criteria and confirmation methods are elaborated keeping in view the need for practical provisions. Provisions for AECD with internal antenna must be different to those with external antenna as the latter can be accessible to the operator.
Appendix 2:	Verification of functional state of the in-vehicle system by functional transmission test with wired procedure (for AECS with external antenna): these provisions are inspired from those of appendix 1, with some changes due to wire connection. This appendix indeed is restricted to AECD with external antenna.
Annex 9:	Definition of the minimum set of data (MSD). As agreed at the 2 nd meeting of the informal group, this dedicated annex provides the minimum requirements for the MSD, i.e. the mandatory part of CEN15722 Standard, Table 1. The annex is limited to a list of the basic minimum data to be conveyed to PSAP; the exact format of MSD is still under the responsibility of the manufacturer, in relation with the countries were the vehicle is intended to be marketed.
Annex XXX:	HMI (AECD/AECS control) testing. RUS proposed at AECS-07 to add such annex.