# GOST R 54620-2011
# Global Navigation Satellite System.
# Emergency Response System in case of Accidents.
# Car System Call Emergency Services.
# General Technical Requirements

GOST R 54620-2011

## NATIONAL STANDARD OF THE RUSSIAN FEDERATION

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**Foreword**

The objectives and principles of standardization in the Russian Federation established by the Federal Law of 27 December 2002 N 184-FZ "On Technical Regulation" , and the rules for the application of standards organizations - GOST 1.0-2004 "Standardization in the Russian Federation. Summary of" information about the standard

1 developed an open joint stock company "Navigation Information Systems" (JSC "NIS")

2 Make the Technical Committee for Standardization TC 363 "Radionavigation"

3 APPROVED AND ENTERED INTO FORCE Order of the Federal Agency for Technical Regulation and Metrology of December 8, 2011 N 755-item

4 This standard takes into account the main regulatory provisions of the following international instruments: — UNECE Regulation establishing uniform provisions concerning the approval of passenger vehicles of categories M and N with regard to the protection of occupants in different types of collisions, as well as with regard to electromagnetic compatibility - European regional standards (EN) on Intelligent Transport Systems in the field of safety in emergency situations with regard to pan-European eCall system; - Specifications (TS) of the European Telecommunications Standards Institute (European Telecommunications Standards Institute, ETSI) and the Association affiliate group of telecommunications companies (3rd Generation Partnership Project (3GPP)) to the system and data transfer protocols as well as to

hardware of the wireless communication technology based 3rd generation system, with reference to European eCall

5 is completely new *information on changes to the current standard is published in the annual index published by the Information "National Standards", and the text changes and amendments - in monthly indexes published information "national standards." In the case of revision (replacement) or cancellation of this standard a notice will be published in the monthly index published by the Information "national standards." Relevant information, notification and lyrics are also posted in the public information system - the official website of the Federal Agency for Technical Regulation and Metrology of the Internet*

## Introduction

This standard is one of the foundations of complex standards, "Global Navigation Satellite System. Emergency response system in case of accidents." system of emergency response in case of accidents, "ERA-GLONASS" is created in order to reduce the severity of accidents and other emergencies on the roads of the Russian Federation by reducing the response time of emergency services. Automotive system call emergency services - a key structural element of the "ERA-GLONASS", designed to generate and transmit a minimum set of data on the vehicle when a traffic accident and provide two-way voice communication with emergency services . This standard is interconnected with the following standards: GOST R 54619-2011 Global Navigation Satellite System. Emergency response system in case of accidents. Communication protocol automotive systems call emergency services with the infrastructure of emergency response in case of accidents; GOST R 54721-2011 Global Navigation Satellite System. Emergency response system in case of accidents. General procedure for the provision of basic services. Analogue system "ERA GLONASS" is a pan-European system of eCall, with which the system "ERA-GLONASS" is harmonized in order to ensure technological compatibility of the main functional properties (using a modem tone as the main mechanism for transferring data structure and format of the standardized mandatory data transmitted as part of the minimum set of data to establish uniform rules and complete the two-way voice connection with persons in the cab of the vehicle, etc.)

## 1 Scope

This standard applies to automotive systems call emergency services, which are the structural elements of the emergency response system in case of accidents, "ERA-GLONASS" and designed to be mounted on wheeled vehicles of categories M and N. This standard

specifies the general technical requirements to the car call emergency services associated with the provision of basic services to the emergency response system in case of accidents, "ERA-GLONASS" by IEC 54721 .

## 2 References

Used in the standard normative references to the following standards:

ISO / IEC 8824-1-2001 Information technology. Abstract Syntax Notation One (ASN.1). Part 1. Specification basic notation

ISO / IEC 8825-93 Information technology. Open Systems Interconnection. Specification of basic encoding rules for abstract syntax notation One (ASN.1)

ISO / IEC 8825-2-2003 Information technology. ASN.1 encoding rules. Part 2. Specification Packed Encoding Rules (PER)

GOST 50607-93 * Electromagnetic compatibility. An electric cars. Disturbance from electrostatic discharges. Requirements and test methods

* On the territory of the Russian Federation, the document is not valid. GOST R 50607-2012, here and hereafter. - Note the manufacturer's database.

GOST 50905-96 Road vehicles. Electronic equipment. General technical requirements

GOST R 52230-2004 Electrical autotractor. General specifications

GOST R 52456-2005 Global Navigation Satellite System and the Global Positioning System. Individual receiver for automotive vehicles. Technical requirements

GOST R 52928-2010 global satellite navigation system. Terms and definitions

GOST R 54618-2011 Global Navigation Satellite System. Emergency response system in case of accidents. Methods of test for automotive systems call emergency services to meet the requirements for electromagnetic compatibility, resistance to climatic and mechanical influences

GOST R 54619-2011 Global Navigation Satellite System. Emergency response system in case of accidents. Communication Protocols car system call emergency services with the infrastructure of emergency response in case of accidents

GOST R 54721-2011 Global Navigation Satellite System. Emergency response system in case of accidents. General procedure for the provision of basic services

GOST 12.1.044-89 (ISO 4589-84) safety standards system. Fire and explosion hazard of substances and materials. The range of indicators and methods for their determination

Standard 12.2.007.0-75 safety standards system. Electrotechnical products. Safety requirements

GOST 14254-96 (IEC 529-89) Degrees of protection provided by enclosures (code IP)

GOST 15150-69 Machines, tools and other industrial products. Versions for different climatic regions. Categories, operation, storage and transportation to the impact of climatic factors in the external environment

GOST 16019-2001 land mobile radio equipment. Requirements for resistance to mechanical and environmental factors and test methods

GOST 28279-89 Electromagnetic compatibility of electrical vehicle and automotive consumer electronic equipment. Limits and methods of measurement

GOST 28751-90 electric cars. Electromagnetic compatibility. Conducted interference on the supply lines. Requirements and test methods

GOST 29157-91 Electromagnetic compatibility. An electric cars. Interference in control and on-board signal circuits. Requirements and test methods

GOST 30429-96 Electromagnetic compatibility. Noise from equipment and apparatus installed in conjunction with the service of radio receivers for civilian use. Standards and test methods

Note - When using this standard appropriate to test the effect of reference standards for public information system - the official website of the Federal Agency for Technical Regulation and Metrology on the Internet or published annually by the information sign "national standards", which is published on the 1st of January of the current year and the respective monthly published by Information Index, published in the current year. If the reference standard is changed (modified), when using this standard should be guided by substituting (modified) standard. If the reference standard is repealed without replacement, the position in which reference is made to it, is used in the part which does not affect the link.

## 3 Terms, definitions, symbols and abbreviations

3.1 This Standard uses the terms defined in IEC 52928 , as well as the following terms and definitions apply:

3.1.1 car system call emergency services, AC**:** The system, installed on a wheeled vehicle the appropriate category and are designed to determine the location and parameters of the vehicle on the GLONASS or GLONASS signals with other global navigation satellite systems, the message of the vehicle with traffic accident and two-way voice communication with the emergency services.

3.1.2 The basic service system "ERA-GLONASS": The result of the operation of the system "ERA-GLONASS", which consists in the formation and transmission of emergency messages about road accidents, the reception, processing and communicating the messages into a single on-duty dispatchers system-112 and providing for the (switching) two-way voice communication with the persons in the vehicle.

3.1.3 accident, road accident: An event that has arisen in the course of on-road vehicle and with his participation, which killed or injured people, damaged vehicles, facilities, goods or other pecuniary loss suffered.

3.1.4 Sensor automatically identify events Accidents: Technical device designed to determine whether an accident on the basis of data received from being a part of three-axis acceleration sensor, and provides information to an external device for recording acceleration profile in the accident, and (or) the assessment of the severity accident. Note - For vehicles of category M1 sensor automatically identify events accidents can be part of regular car system, the requirements for which are set by the vehicle manufacturer.

3.1.5 The uniform number "112": A single number call emergency services, set in the Russian system and the numbering plan [ 14 ].

3.1.6 The index of potential damage in an accident; : The indicator on the possible extent of the impact of inertial forces on the persons in the vehicle in a traffic accident.

3.1.7 configurable parameter: Parameters affecting the functioning of the AC algorithm, the value of which may vary in accordance with the instruction that comes from a system operator or

by using diagnostic interface defined by the vehicle manufacturer or the manufacturer of the AU.

3.1.8 The minimum set of data; MND: A set of data that is passed to the automotive system call emergency services when a car accident, and includes information about the coordinates and parameters of movement of the emergency vehicle and the time of the accident, VIN-code of the vehicle and other information, necessary for emergency response.

3.1.9 The operator of an emergency response in case of accidents, "ERA-GLONASS" (system operator): A legal entity performing the operation and maintenance of the system "ERA-GLONASS", including the processing of the information contained in its database.

3.1.10 The assessment of the severity of accidents: A binary indicator used for imputation of accidents on the potential damage to the lives and health of people in the cabin of the vehicle, depending on the accepted level of probability of the specified event.

Note - This component can take the following values:

" 0 "- with a low probability of causing damage to the life and health of people in the cabin of the vehicle in a car accident;

"1" - with a high probability of causing damage to the life and health of people in the cab of the vehicle, resulting in an accident.

3.1.11 acceleration profile of road accidents: Data file that contains records of acceleration in the directions of three axes of the vehicle (longitudinal, lateral, vertical) to set the period of time prior to, during and after an accident.

3.1.12 The emergency response system in case of accidents (the system "ERA-GLONASS"): Federal Public automated navigation and information system, which operates using the global navigation satellite system of the Russian Federation (GLONASS) standard accuracy, realizing the delivery of messages about traffic accidents and other emergency situations on the roads of the Russian Federation emergency services. Note - The analogue system "ERA-GLONASS" system is developed pan-European eCall, with which the system "ERA-GLONASS" is harmonized by the basic functional properties (using a modem tone as the main mechanism for transferring data; uniform structure and format of the required data transmitted in the MND, the establishment of uniform rules and complete the two-way voice

connection with persons in the cab of the vehicle, etc.).

3.1.13 -112 system: The system of calling emergency services on a single number "112".

3.1.14 tone modem: Modem that allows the transfer of data within the established voice connection.

3.1.15 vehicle: Ground-based mechanical device on wheels categories M, N, for the transport of people, goods, or equipment installed on it on public roads [ 1 ].

3.1.16 narrowband AC: AC working with the usual quality of the speech signal (in the frequency range up to 3.6 kHz and a sampling rate of 8 kHz).

3.1.17 wideband AC: AC, operating with high-quality voice signal (in the band up to 7 kHz with a sampling frequency of 16 kHz).

3.1.18 The emergency call: Actions taken by the automotive system call emergency services for the implementation of a telephone call to a single number "112" at a sign from the emergency vehicle.

3.2 In this Standard, the following symbols and abbreviations are used:

| | |
|---|---|
| ASN.1 | - Abstract Syntax Notation One; |
| BIP | - Block the user interface; |
| GNSS | - Global navigation satellite system; |
| NCA | - The navigation spacecraft; |
| PZ-90.02 | - State geocentric reference system "Settings land in 1990"; |
| Software | - Software; |
| TC | - A vehicle; |

DTMF - Dual-Tone Multi-Frequency (DTMF analog signal used to dial a phone number and answer setting for the voice);

eCall - Emergency Call (European system of emergency response in case of accidents);

EDGE - Enhanced Data rates for GSM Evolution (digital wireless communications technology for mobile communications, which functions as an add-on 2G and 2,5 G GPRS-networks);

GPRS - General Packet Radio Service (Service Packet Radio Networks);

GPS - Global Positioning System (Global Navigation Satellite System of the United States of America);

GSM - Global System for Mobile communications (global digital standard for mobile communications);

FIFO - First In First Out (order receipt and delivery of data on a "first come - first serve": a data block which is first, first processed / maintained / passed on to the processing);

HSDPA - High-Speed Downlink Packet Access (high-speed packet data transmission from base station to mobile device)

IMEI - International mobile equipment identity (International Mobile Equipment Identity);

IO - Input-output (input-output);

IP - Internet protocol (Internet Protocol);

LIFO - Last In First Out (order receipt and delivery of data on the principle of "last in - first serve": a block of data received last is processed first / served / is passed on to the processing);

MMF2 - Machine to Machine Form Factor (code name of standards defining characteristics of SIM-cards, executed in desktop devices);

RLR - Receiving loudness rating (the volume level of the playback audio);

RAIM - Receiver Autonomous Integrity Monitoring (autonomous integrity monitoring the processed navigation data in a navigation receiver);

SIM - Subscriber Identity Module (Subscriber Identity Module, SIM-card);

SMS - Short Message System (short message system);

TCLw - Weighted Terminal Coupling Loss (attenuation weighted index);

TS - Technical Specification (technical specifications);

UMTS - Universal Mobile Telecommunications System (Universal Mobile Telecommunications System, the European version of third generation mobile communication)

USIM - Universal Mobile Telecommunications System (extended version SIM-card supports UMTS)

VIN - Vehicle Identification Number (vehicle identification number)

WGS-84 - World Geodetic Coordinate System 1984

# 4 General

4.1 Requirements for the AU are used depending on the category of vehicle and possible ways to install this system on it.

4.2 This standard covers the following categories of vehicle [ 1 ]:

4.2.1 Category M - TC, having at least four wheels and used for the carriage of passengers, including:

- Passenger cars, including:

- Category M1 - TS used for the carriage of passengers and comprising in addition to the driver's seat no more than eight seats;

- Buses, trolley buses, specialized passenger vehicles and their chassis, including:

- Category M2 - TS used for the carriage of passengers, excluding the driver having more than eight seats, the maximum mass not exceeding 5 tonnes;

- Category M3 - TC used for the carriage of passengers, excluding the driver having more than eight seats, the maximum mass exceeding 5 tonnes

4.2.2 Category N - vehicle used for transporting goods - cars trucks and chassis, including:

- Category N1 - TC, intended for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes;

- Category N2 - TC, intended for the carriage of goods and having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes;

- Category N3 - TC, intended for the carriage of goods and having a maximum mass exceeding 12 tonnes

4.3 The following methods (config) installation for the system call emergency services on the vehicle:

- In the configuration of standard equipment, in which the installation is performed by the AU assembly line vehicle manufacturer;

- In option configurations in which the installation is carried out by the AU service (installation) stations authorized by the established procedure for the production of these works, either on-site vehicle manufacturer or dealer vehicle manufacturer after the release of (manufacturing) TC on the main assembly plant.

4.4 Settings speakers should be the same as specified in Annex A.

## 5 Components of automotive systems call emergency services

5.1 Automotive system call emergency services should include the following components.

5.1.1 The navigation receiver GLONASS or GLONASS / GPS and other global navigation satellite systems.

5.1.2 GNSS antenna.

5.1.3 The communication module (modem) GSM / GPRS and UMTS.

5.1.4 Antenna for communication module GSM / GPRS and UMTS (optional - EDGE / HSDPA).

5.1.5 Built-in SIM chip.

5.1.6 Tone modem.

5.1.7 Sensor automatic identification of an accident (for M1 vehicles).

5.1.8 If the system supports recording acceleration profile in the accident, and (or) an assessment of the severity of an accident - the necessary additional components for recording acceleration profile in the accident, and (or) the assessment of the severity of an accident.

Note - use the information from the full-time automotive systems for automatic identification of an accident event, recording acceleration profile in the accident, and (or) the assessment of the severity of an accident.

5.1.9 User interface box with buttons "Emergency Call" and "Extras".

5.1.10 Status Indicator speakers.

Note - the use of full-time automotive systems providing the functionality of the buttons "Emergency Call" and "functions" and to display the status of the AU, if the guaranteed performance of these systems under mechanical loads listed in 13.3.1 and 13.3.2.

5.1.11 The internal non-volatile memory and RAM.

5.1.12 Managing microcontroller.

Note - The control microcontroller can be combined with other modules (e.g., the communication module GSM / UMTS receiver or GNSS).

5.1.13 interface access to diagnostic data for reading and clearing the internal nonvolatile memory.

For full-time automotive systems interface to access diagnostic information determined by the manufacturer of the vehicle.

For automotive systems installed in the configuration of additional hardware, the interface for access to diagnostic data identifies the manufacturer speakers.

5.1.14 Power Supply.

5.1.15 Backup power source for voice communication in the absence of an external power supply for emergency assistance in accordance with the requirements of 8.11.

This requirement does not apply to the AU, set in the configuration of standard equipment to ensure efficiency speakers in the vehicle without using the built-in backup battery in the presence of mechanical impact listed in 13.3.1 and 13.3.2.

5.2 Requirements for components of the AU are listed in section 8.

5.3 In the configuration of the AC auxiliary equipment must have at least two digital output and ECALL_MODE_PIN GARAGE_MODE_PIN, calculated by the current to 200 mA (switched to the ground) and the maximum off-state voltage of 36 V.

Note - Here and henceforth the name and value settings AC - in accordance with Appendix A.

## 6 Functions of automotive systems call emergency services

6.1 Automotive system call emergency services should ensure the formation and transmission of MND upon the occurrence of an accident:

- For vehicles of category M1 - will (according to the testimony of the respective sensors that are part of this system or other systems TS);

- For vehicles of categories M and N - in manual mode (by pressing the "Emergency Call").

6.2 Automotive system call emergency services, installed on the vehicle category M1 should automatically detect the event of the accident, in which there is a substantial likelihood of threat to life and health of people in the cabin (cabin) vehicle at the time of the accident.

6.2.1 Automotive system call emergency services should recognize the following types of accidents: a frontal collision, side impact, rear impact.

6.2.2 For the AU, established in the configuration of standard equipment, the mechanism of determining the moment of the accident is determined by the vehicle manufacturer.

6.2.3 AC installed in the option configurations, as a criterion of operation of the system it is recommended to use the condition in which the value of the index is greater than the possible damage ASI15_TRESHOLD, given in Annex A.

Index of possible damage ASI $_{15}$ is calculated using the following equations:

$$ASI_{15} = \{\frac{1}{t_2 - t_1}\int_{t1}^{t2} ASI(t)\,dt\}_{max} \quad (1)$$

$$ASI(t) = \sqrt{\left(\frac{\bar{a}_x}{\hat{a}_x}\right)^2 + \left(\frac{\bar{a}_y}{\hat{a}_y}\right)^2 + \left(\frac{\bar{a}_z}{\hat{a}_z}\right)^2} \quad (2)$$

$$\bar{a}_x(t) = \frac{1}{\delta}\int_{t}^{t+\delta} a_x\,dt \quad (3)$$

$$\bar{a}_y(t) = \frac{1}{\delta}\int_{t}^{t+\delta} a_y\,dt \quad (4)$$

$$\bar{a}_z(t) = \frac{1}{\delta}\int_{t}^{t+\delta} a_z\,dt \quad (5)$$

where: (t 2-t 1) - a record interval parameters for evaluation index of possible damage equal to 15 ms

$ASI(t)$ - The current value of the index of possible damage

$a_x, a_y, a_z$ - Components of the acceleration of the point vehicle in place of the sensor acceleration direction of the main axes vehicle (longitudinal-x, transverse-y, vertical-z);

$\bar{a}_x, \bar{a}_y, \bar{a}_z$ - Components of the acceleration of the point vehicle in place of the sensor acceleration direction of the main axes vehicle averaged over the interval interval δ = 50 ms;

$\hat{a}_x, \hat{a}_y, \hat{a}_z$ - The limit values for the components of the acceleration on the main directions of the axes of TS.

6.3 The structure of MND should include information about the last known location of the vehicle at the time of the event definition accident in accordance with Annex B.

6.4 If at the time of generation of MND is no reliable information on the last known location of the vehicle at the time of the event definition accident, the sign "no reliable information about the location of the TC" should be included in the MND in accordance with Annex B. In this case, part of the MND should also include information about the last known location of the proposed vehicle at the time of the event definition accident. Method for determination of the alleged last known location is determined by the vehicle manufacturer speakers.

6.5 Sign of the availability of reliable information about the location of the TC must be installed in accordance with Annex V. The sign of having reliable information about the location of the TC should be set to "have reliable information about the location of the TC" if there is information on the reliability of determining the location of the vehicle, corresponding to the requirements specified in Appendix B.

6.6 The structure of MND should contain information about the direction of the TC in accordance with Annex V. The above information must correspond to the actual direction of the vehicle and should not depend on the possible spread of values about the location of the vehicle,

resulting from the GNSS receiver. The filtering algorithm (smoothing) of the data is determined by the manufacturer of the AU and (or) GNSS receiver manufacturer.

For 6.7 speakers mounted on vehicles of category M1 must be implemented the ability to disable the initialization mode "emergency call" in the automatic mode by using the parameter settings ECALL_NO_AUTOMATIC_TRIGGERING speakers.

**6.8 Recording and transfer acceleration profile in an accident (only for vehicles of category M1)**

6.8.1 The function of recording and transmitting acceleration profile of road accidents is to be implemented for the speakers installed in the configuration of additional equipment if the AU does not support the assessment of the severity of an accident.

6.8.2 If the event an accident is determined automatically and AU support sending acceleration profile in an accident, you should be recording and transmission system operator acceleration profile vehicle on three axes in the time periods specified in Annex A to, during and after the event an accident.

6.8.3 If the speaker is supported by the record function and transmission of acceleration profile in the accident, the recorded data set to accelerate in an accident along the three axes must be contained in a circular buffer and cover the time period CRASH_RECORD_TIME (not less than 250 ms) with a resolution of CRASH_RECORD_RESOLUTION (no more than 5 ms desired resolution - 1 ms) during a crash and CRASH_PRE_RECORD_TIME (20) with a resolution CRASH_PRE_RECORD_RESOLUTION (100 ms) - for accident history.

6.8.4 If the speaker is supported by the record function and transmission of acceleration profile in the accident, the acceleration of the vehicle shall be determined on the three axes in the following ranges with an accuracy of 10% and a resolution of not less than indicated below:

- Side: from minus to plus 8G 8G (resolution 0,1 G);

- Longitudinal: from minus to plus 24G 24G (resolution 0,1 G in the range from minus to plus 10G and 10G 0,5 G - outside the range from minus to plus 10G 10G);

- Vertical: from minus to plus 8G 8G (resolution 0,1 G).

6.8.5 If the speaker is supported by the record function and transmission of acceleration profile in the accident and the acceleration of the vehicle cannot be measured with precision and resolution specified in 6.8.4, the acceleration profile should not be written, that should be reflected in the corresponding information message that be transmitted to the system operator.

6.8.6 Profile of the acceleration of road accidents is to be transmitted to the system operator via a packet data stored in non-volatile memory when the AU cannot transmit over the air. The data source for recording acceleration profile can serve as a three-axis acceleration sensor that is connected to the AC and other electronic unit (s) installed (installed) in the vehicle, if the requirements for resistance to external influences, as defined in 13.3.1 and 13.3.2 are performed for all parts (components) AC needed for recording and transmitting acceleration profile.

6.8.7 If the speaker is supported by the record function and transmission of acceleration profile in the accident, the acceleration profile should always be written with the ignition on and after the ignition is switched off for a configurable period of time specified in the settings IGNITION_OFF_FOLLOW_UP_TIME1.

**6.9 Recording and transfer path of the TC in an accident (only for vehicles of category M1 and only for AC installed in a configuration option)**

6.9.1 In determining the event an accident Speaker shall determine and maintain the data in a circular buffer on the time of occurrence, geographic coordinates in the coordinate system specified in 8.1.6, and the speed of the vehicle. The format of such data - in accordance with IEC 54619.

6.9.2 Data on the geographical coordinates should cover the time interval is 10 seconds after the moment of determining the AU fact accidents and 20 from prehistory (before the determination of the AU fact RTA) with a resolution on the time axis is not more than 1 s and maximum positioning error of no more than specified in 8.1 .7.

6.9.3 If the ignition is on, the module information of the velocity vector of the vehicle must be kept in a circular buffer, and cover an interval of 10 s after the time of determination of the AU fact accidents and 20 from prehistory (before the determination of the AU fact RTA) with a resolution on the time axis is not more than 1 s and the ultimate accuracy of determining the rate of not more than specified in 8.1.7.

Note - For information about the velocity vector can be used by GNSS receiver.

6.9.4 In the case of automatic detection of the accident data on the location and speed of the vehicle must be sent to the system operator via a packet data stored in non-volatile memory when the AU can not transmit data over the air.

**6.10 Recording and transfer of data to assess the severity of an accident (only for vehicles of category M1)**

6.10.1 If the speaker function is supported assess the severity of an accident, the assessment of the severity of accidents should be transmitted to the system operator as additional information in the MND in accordance with Annex B.

6.10.2 Evaluation of severity crashes may be carried out both on the automotive system, and the system operator side.

**6.11 General requirements for the recording and transmission of data (only for vehicles of category M1)**

6.11.1 Profile acceleration in the accident (if supported by the record function and transmission of acceleration profile in the accident), and the trajectory of the vehicle in case of accident (if supported by the record function and the transmission path of the TC in the accident) to be transmitted by an operator, if the event an accident is defined in the automatic mode.

6.11.2 Evaluation of the severity of accident (if supported by the function of determining the severity of an accident assessment) shall be transmitted automatically to the system operator if the event an accident is defined in the automatic mode.

6.11.3 If the recording function is supported and transfer acceleration profile in the accident, the event an accident is defined in the automatic mode, and record acceleration profile that characterizes the previous event of exceeding the threshold speed is not over yet, the speakers should be written to two parallel acceleration profiles, if the amount of memory AS defined in 6.11.6, allows it.

6.11.4 If the event an accident is defined in the automatic mode, the recording acceleration profile that characterizes the previous event of exceeding the threshold speed is not over yet, and the memory AU, as defined in 6.11.6, full, recording acceleration profile that characterizes the previous event must exceed the threshold acceleration be completed, a request to record a

new profile of acceleration should be ignored and the relevant information message should be transmitted to the system operator.

6.11.5 If the event an accident is defined in the automatic mode, but failed to transfer the information specified in 6.5, 6.8.3 and 6.9.1, then this information must be stored in non-volatile memory of the AU in FIFO order and sent to the system operator when restoring transmission capabilities information.

6.11.6 Non-volatile memory of the AU should allow to save up to five records the information specified in 6.5, 6.8.3 and 6.9.1.

6.11.7 MND and information about the accident referred to in 6.5, 6.8.3 and 6.9.1 shall be retained in non-volatile memory of the AU-bound mileage of the vehicle.

Note - Run the vehicle can be determined through the use of a full-time automotive systems, and through the use of GNSS receiver. The information stored in non-volatile memory device must contain an indication of which method definition mileage vehicle was used.

6.11.8 Non-volatile memory of the AU should allow to store up to 100 sets of information referred to in 6.11.7.

6.11.9 If there is a non-volatile memory AC 100 sets of information, as defined in 6.11.8, and the need to save the new set of said information recording a new set of information in non-volatile memory of the AU should be made in order FIFO.

6.11.10 Make AU should ensure hardware and software solutions for reading and clearing the NVRAM speakers.

Producer AU should provide the necessary protection mechanism implemented in the system to read and clear the contents of the nonvolatile memory AU from unauthorized use.

6.12 AU, set in the mode of standard equipment, when making an emergency call must provide in the cabin (cabin) vehicle hands-free mode, providing off other nominally established reproducing apparatus and systems in the vehicle.

6.13 AU, set in the mode of additional equipment when making an emergency call must provide in the cabin (cabin) vehicle hands-free mode, providing off other nominally established reproducing apparatus and systems in the vehicle, if technically possible.

6.14 AU should provide the ability to input (using the microphone) and output sound during voice call.

6.15 AU must be capable of full-duplex hands-free voice communication.

6.16 AU must provide their own display of technical condition and mode of operation with the status indicator in the form of the corresponding icon or indicator light or a text message in the visibility of the driver of the vehicle.

**6.17 AU should provide a self-test and the transmission of information on the technical condition of the system operator.**

Note - The format and rules for the transfer of information on the technical condition set in IEC 54619.

6.17.1 AC should run the self-diagnosis function when switching the ignition.

6.17.2 Frequency of self-AC in the operation defined by the parameter settings SELFTEST_INTERVAL.

6.17.3 If the SELFTEST_INTERVAL set to 0, then the periodic self-test speaker in the operation is not performed.

6.17.4 Information on AC failure, identified as a result of execution of self-test function, must be communicated to the user by means of indicator (s) of the state (for example, a warning light or the appropriate icon or text message in scope by the driver of the vehicle).

6.17.5 SELFTEST_INTERVAL If not set to 0, the results of periodic self-SS during operation to be transmitted to the system operator. Self-diagnosis data must be transmitted in accordance with IEC 54619. Upon completion of transmission of self-test diagnostic system operator SS must remain registered in the network at time POST_TEST_REGISTRATION_TIME for further commands from the system operator. List of commands processed by the AU in the period POST_TEST_REGISTRATION_TIME, defined in IEC 54619.

6.17.6 If self-diagnostics speakers should be implemented, if technically possible, the following checks:

- The integrity of the software image;

- The interface connections to GSM communication module and UMTS;

- Performance GNSS receiver;

- Integrity (reliability) defined GNSS receiver navigation and timing parameters (function RAIM);

- The adequacy of the level of charge the backup battery (if the battery is installed);

- Performance (correct connection) external GNSS antenna (if the antenna is installed);

- Performance (correct connection) external antenna GSM and UMTS (if the antenna is installed);

- Operation of the sensor automatically identify events of an accident (only vehicles of category M1);

- Performance BIP;

- The correct connection of the microphone;

- Performance microphone;

- Performance speakers (speakers).

Note - Technical feasibility of the relevant test procedures and requirements for self-determined: the manufacturer of the vehicle - for full-time automotive systems and manufacturer of AC - for systems installed in option configurations.

6.18 For the AU, performed in the original equipment configuration, interface, interaction with other systems, AU TC TC is determined by the manufacturer.

6.19 For the AU, performed in the configuration of additional equipment:

- Interface between the AU with security systems and other systems TC agreed with the vehicle manufacturer;

- Cannot provide for interaction with the AU vehicle systems [eg, a sensor automatically identify events of an accident (optional) that is directly connected to AC].

# 7 The main modes of auto-call system operational emergency

## 7.1 Types of modes

7.1.1 Installed this standard modes of AC associated with providing basic services system, emergency response in case of accidents, "ERA-GLONASS" in accordance with IEC 54619. In this case, the communication module (communication module) AC is not registered with a network operator to determine the moment of crash events.

Note - If the speaker supports the provision of additional services beyond basic (eg, remote control central locking system of the vehicle or the security-research services), additional modes of AC can be administered on the basis of the above requirements to it. In this scheme of registration of the communications module AS in cellular network may vary.

7.1.2 For the AC system installed in option configurations, set the following modes:

- Mode "Off";

- Passive mode;

- Mode "ERA";

- Mode "Emergency Call";

- Test mode;

- Mode " Auto Service;

- The mode of downloading software.

7.1.3 The state diagram of the AC system installed in the option configurations is shown in Figure 1.

Figure 1 - State diagram car system call emergency services in the configuration of additional equipment

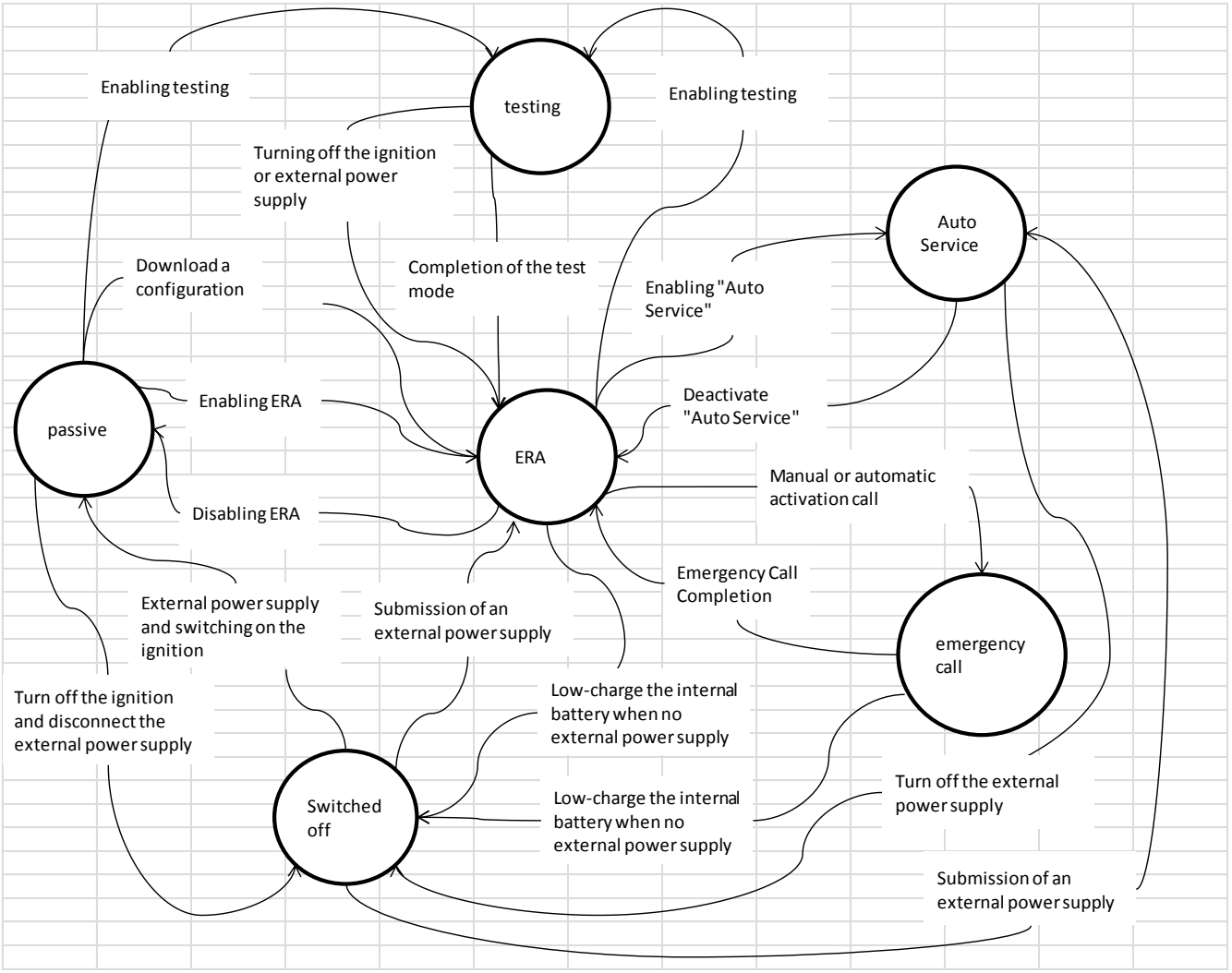



Figure 1 - State diagram car system call emergency services in the configuration of additional equipment

Note - Figure 1 shows the mode does not download the software.

7.1.4 For the AU, established in the configuration of standard equipment, set the following modes:

- Mode "Off";

- Mode "ERA";

- Mode "Emergency Call";

- Test mode;

- The mode of downloading software.

7.1.5 The state diagram of the vehicle system call emergency services, applies to the original equipment configuration is shown in Figure 2.

Figure 2 - The state diagram of the vehicle system call emergency services in the configuration of standard equipment

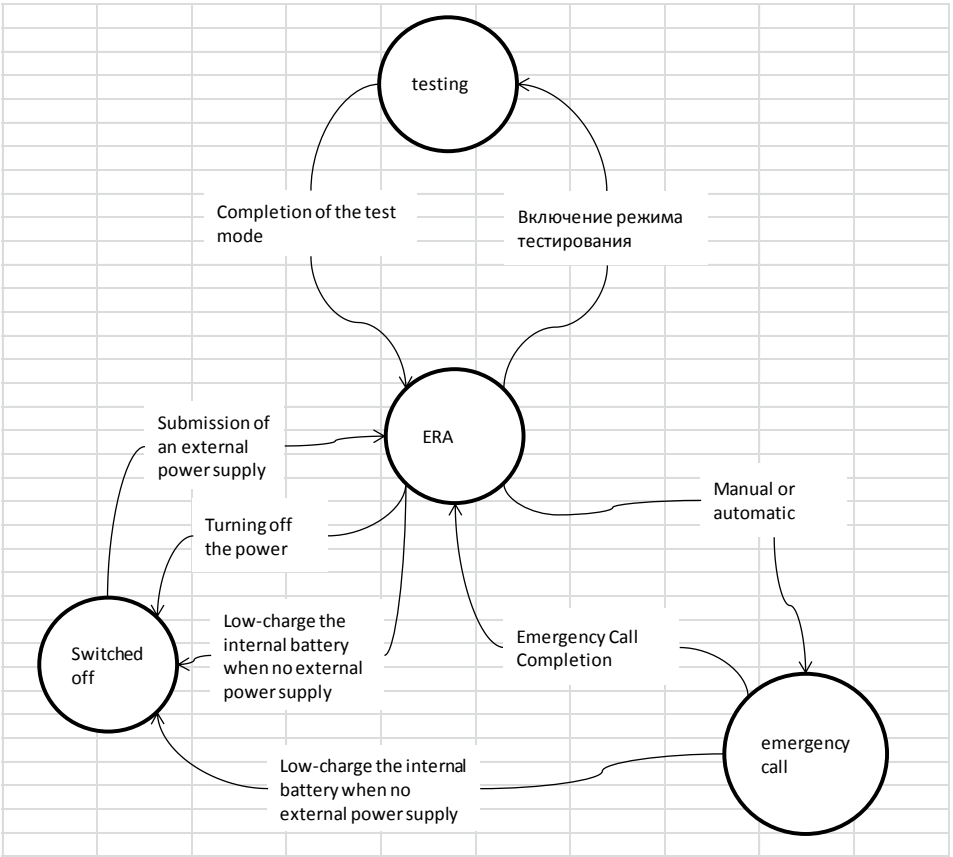



Figure 2 - The state diagram of the vehicle system call emergency services in the configuration of standard equipment

Note - Figure 2 shows the regime does not download the software.

## 7.2 The "Off"

7.2.1 Automotive system call emergency services should be in the "Off" in the absence of external power supply, and subject to discharge the backup battery is below the limit value (or in the absence of an external backup battery). Maximum allowable discharge the backup battery is determined by the vehicle manufacturer or the manufacturer of the AU.

7.2.2 Output AC mode "Off" must be carried out when an external power supply.

7.2.3 Moving the AU to "Off" from other states occurs when the backup battery discharges below the limit values as specified in 8.11 or the power is turned off (in the absence of an external backup battery).

## 7.3 Passive mode

7.3.1 Passive mode should be implemented in speakers mounted on the vehicle in the configuration of additional equipment. For speakers mounted in the configuration of standard equipment, the passive mode is optional (optsialnym).

7.3.2 Passive mode is designed for the transportation of the AU and the repair and installation work with the system.

7.3.3 Automotive system call emergency services is in passive mode, if not carried out, or if its configuration mode "ERA" is disabled in the AU. NOTE - This standard initialization mode (configuration) is combined with a passive speaker mode.

7.3.4 Registration AU in GSM and UMTS networks only occurs when there is an external power supply and turn on the car ignition, depending on your settings, check (parameter settings AUTOMATIC_REGISTRATION). If an external power supply and the ignition is switched on AC must register with the GSM or UMTS network by pressing a button "Options" (for speaker installed in the configuration options) or through the use of a user interface implemented in a vehicle (for speakers installed in the configuration of the original equipment), and waits for the command to perform the configuration of the system operator. After receiving the command to perform the configuration (this command can be obtained by using the mechanism of SMS or packet data) AS shall: - carry out the check for the configuration settings for the speakers; - download the configuration settings for the speakers (if available) - save the

resulting settings in non-volatile memory - switch to "ERA".

7.3.5 If a team to carry out the configuration is not received or received command was ignored, the speaker should be in passive mode until the expiration of the (pre-) time or turn off the car ignition off or an external power supply.

7.3.6 If in passive mode, a critical problem functioning of the AU (eg neustranyaemy failure of the software), the speaker has to be restarted again and go into passive mode.

7.3.7 If the speaker is in a passive mode, all the other functions of the AU (eg, support for additional services) should be available.

7.3.8 The method of transition from passive speakers to the test mode defined by the manufacturer speakers. Testing Methodology AU during the transition from passive mode to the test mode and method of indicating the test results are determined by the manufacturer speakers. Specification AS configuration procedure, see the IEC 54619 .

## 7.4 The "ERA"

The "ERA" is designed to monitor and record vehicle parameters, define the event an accident in the automatic mode (only for vehicles of category M1) and to provide responses to user control actions.

## 7.5 The "Emergency Call"

7.5.1 The "Emergency Call" is intended to make an emergency call from the AS in order to establish a voice connection to the AC system operator and transmission to MND. After the completion of the emergency AC is registered in the GSM or UMTS network during the time specified in the installation (Appendix A). When you break a telephone connection to the AU to establish a connection again with the following requirements:

7.5.1.1 If the gap telephone connection occurred before the AU has received confirmation AL-ACK according to IEC 54619 and before 20 seconds elapsed reserved for transmission through the use of MND tone modem in accordance with Table 4, the AU should establish repeated telephone connection and shall initiate retransmission MND through the use of a

modem tone.

7.5.1.2 If a break has occurred telephone connection after received confirmation AU AL-ACK, in accordance with IEC 54619 , or after 20 seconds has expired, the transmission MSD designated by using modem tones, in accordance with Table 4, the SS must re-establish a dial-up connection, but should not initiate retransmission of MND through the use of a modem tone.

**7.5.2 The sources for the initialization mode "Emergency call (only vehicles of category M1)**

7.5.2.1 To speakers installed in the configuration of additional equipment, the source for the initialization mode "emergency call" should be configurable and should be selected from the following options (such as one or two) - signal from the acceleration sensor (CRASH_SIGNAL_INTERNAL); - an alarm signal, coming from the onboard vehicle system (CRASH_SIGNAL_EXTERNAL).

7.5.2.2 For systems installed in the configuration of standard equipment, the source for initialization mode "Emergency Call" is defined by the vehicle manufacturer.

**7.5.3 General requirements for the implementation of the AU mode "Emergency Call"**

7.5.3.1 For the AU, established in the configuration of additional equipment, emergency calls must be initiated automatically (only for vehicles of category M1): - with the ignition, if the conditions specified in 6.2.3, and the value CRASH_SIGNAL_INTERNAL set to TRUE; - with the ignition off for a period of time after the ignition is switched off IGNITION_OFF_FOLLOW_UP_TIME2 (configurable) if the conditions specified in 6.2.3, and the configuration option is set to TRUE CRASH_SIGNAL_INTERNAL; - on admission of the board of the TC signal of an accident, if the ignition is on and the value of the parameter settings CRASH_SIGNAL_EXTERNAL set to TRUE.

7.5.3.2 For the AU, established in the configuration of standard equipment (only for vehicles of category M1), the emergency call must be initiated automatically when the ignition is switched on the signal of the accident, was received from the onboard vehicle system.

7.5.3.3 To speakers installed in the configuration of additional equipment, the emergency call will be initiated by pressing the "Emergency Call" (see 8.8.1.1) during a time interval exceeding

the time SOS_BUTTON_TIME (configurable value), regardless of the ignition line .

7.5.3.4 To speakers installed in the configuration of standard equipment, the emergency call will be initiated by pressing the "Emergency Call" during a time interval greater than the value set vehicle manufacturer, regardless of the line switch.

7.5.3.5 In the exercise of dialing 112 on a single number in the "emergency call" the AU should make notification of persons in the cab vehicle, the implementation through the use of dial-up status indicator AC (see 8.8.2) and playback of the corresponding audio signal or a voice prompt .

7.5.3.6 In the implementation of the transfer MND in the "Emergency Call" AS must make notification of persons in the cab vehicle, the transfer of MND through the use of status indicator AC and play the corresponding sound or voice prompts.

7.5.3.7 After the transfer of MND before connecting voice channel speaker should make notification of persons in the cabin (cabin) TC on the implementation of the connection through the voice channel playback of the corresponding audio signal or a voice prompt.

7.5.3.8 After the connection of the voice channel speaker should make notification of persons in the cabin (cabin) TC on how to connect the voice channel through the use of status indicator AC.

7.5.3.9 Algorithm is sound in handsfree mode "Emergency call" must meet the requirements set out in section 10.

7.5.3.10 Sound hands in the "Emergency Call", characterized by an indicator RLR, should allow the implementation of two-way voice communication with the operator of the system when operating in AC normally expected conditions. required value of this indicator is determined by the manufacturer or the vehicle manufacturer AU. Recommended index RLR is (minus 6 ± 2) dB. minimum possible value of the index is 2 dB RLR.

7.5.3.11 In the "Emergency call" the user should not be able to reduce the volume of the voice signal for hands-free in the cabin (cabin) TC below the level that allows two-way voice communication with the system operator. minimum volume is determined by the manufacturer of AC or vehicle manufacturer, and its recommended value is (2 ± 2) dB.

7.5.3.12 In the "Emergency call" the use of a microphone for hands-free communication in the cabin (cabin) of the vehicle must have the highest priority.

7.5.3.13 After the "emergency call" SS must remain registered with the GSM or UMTS network during the time specified in the installation NAD_DEREGISTRATION_TIME.

7.5.3.14 The "Emergency Call" and all the functions of the AU related to the support of basic services "ERA-GLONASS" should be available if an emergency call is allowed by parameter settings ECALL_ON and configure the speakers.

7.5.3.15 The "Emergency Call" and all the functions of the AU related to the support of basic services "ERA-GLONASS" (except for the configuration and settings) should be available if an emergency call is denied by parameter settings ECALL_ON or speaker configuration failed.

7.5.3.16 from "Emergency call" transition to "ERA" is performed at the termination of voice calls and is set to "Off" - when the lowest possible charge the backup battery (if the backup battery is used).

7.5.3.17 After the emergency call, the AU remains registered in the network within the time specified in the installation NAD_DEREGISTRATION_TIME.

7.5.3.18 from "Emergency Call" cannot follow in the test mode, " Auto Service " and download the software.

7.5.3.19 Car system should keep a list of cellular networks ECALL_BLACK_LIST, in which the implementation of the emergency call is not supported. Note - It is assumed that the networks listed in ECALL_BLACK_LIST, no support for single number "112" and, as a consequence, the AU should not be recorded in the data networks and make attempts to call on a single number "112" in these networks.

7.5.3.20 Register speakers in networks from the list ECALL_BLACK_LIST should have the lowest priority. To implement this requirement, GSM / UMTS modem speaker must search for available networks in the background (background scan).

7.5.3.21 Car system should provide the ability to save information about at least 20 networks in the list ECALL_BLACK_LIST in the data format specified in IEC 54619 .

7.5.3.22 The contents of the list ECALL_BLACK_LIST be stored in non-volatile memory AU and updated on the initiative of the operator of the system.

7.5.3.23 If you need to make an emergency call, but the AU is registered on the network from a list of ECALL_BLACK_LIST, then the speaker must terminate the registration on the network and try to register on the network that is not contained in ECALL_BLACK_LIST. If you register online, not contained in ECALL_BLACK_LIST, could not be implemented, the emergency call can not be initiated and an appropriate error message should be communicated to the user by an indicator states the AU. List of networks included in ECALL_BLACK_LIST, forms the operator of the system, which is responsible for that in this list are not network the European Union (EU), which is subject to the standards of eCall.

7.5.3.24 User AU should be notified of the inability to make an emergency call to the manner specified in 8.9.3.

7.5.3.25 For speakers mounted in the configuration of additional hardware, the hardware line output ECALL_MODE_PIN be activated car system if it is in the "Emergency Call". Requirements Hardware withdrawal line identified in 5.3.

7.5.3.26 For speakers mounted in the configuration of additional hardware, the hardware line output ECALL_MODE_PIN must be reset automotive system if it is in any other mode except mode "Emergency call".

7.5.3.27 After the emergency session speakers should automatically answer incoming calls during a period CALL_AUTO_ANSWER_TIME.

7.5.3.28 Operation of the AU regarding the use of mobile communication of GSM and UMTS must meet the requirements of [ 11 ], [ 12 ].

7.5.3.29 The values of bit 6 and bit 7 must be specified in the element "Service Categories" (initializing an emergency call message), in accordance with 9.1.2 and Table 6 with the mode of activation of the emergency call (manual or automatic).

7.5.3.30 value dialer period when initiating an emergency call should be configurable in accordance with ECALL_DIAL_DURATION.

7.5.3.31 The number of call attempts for automatic initiation of an emergency call is set by parameter settings ECALL_AUTO_DIAL_ATTEMPTS.

7.5.3.32 The number of call attempts for manual initiation of an emergency call is set by parameter settings ECALL_MANUAL_DIAL_ATTEMPTS. The value will ECALL_MANUAL_DIAL_ATTEMPTS not be set to "0".

7.5.3.33 If an emergency call is initiated manually and ECALL_MANUAL_CAN_CANCEL configuration parameter is set to TRUE and have not yet established a connection to the system operator, the call should be terminated: - Clicking on the "Options" (for the AU, set in the configuration options); - by use of an appropriate user interface implemented in a vehicle (for speaker mounted in standard equipment configuration).

7.5.3.34 In the AU should be possible to initiate an emergency call, the operator of the system by sending an SMS to the AU for a period of time when it is registered in the network after it initiated the implementation of the emergency call. Symptom emergency call (call hand, automatic call) defined in the request from the system operator. Possibility of implementing the call should be given only after the session is an emergency call initiated by the AU, during a period when it is registered in the network, waiting to callback from the system operator.

7.5.3.35 After a failed attempt to pass through the use of MND tone modem speaker should transmit MND system operator through the use of SMS mechanism for configurable number ECALL_SMS_FALLBACK_NUMBER.

7.5.3.36 When receiving the appropriate command from the operator AC system must transmit to the system operator the current MND by using the mechanism of SMS. This receiving SMS messages from the system operator may, after the emergency call from the speaker during the time interval when it is registered in the network. Current MND must contain the same data, after determining that the set of event an accident, but the updated location information (cm . Annex B, MND field "Vehicle Location", "Recent Vehicle Location n-1", "Recent Vehicle Location n-2") and direction of motion (MND field "Vehicle Direction") vehicle, a vehicle for the state at the time the command from a system operator. Speaker shall send an SMS to a configurable number ECALL_SMS_FALLBACK_NUMBER. The possibility of this parcel should be granted only after the completion of the emergency call, initiated by the AU for a period of time

when it is registered in the network, waiting for a possible return call from the operator of the system.

7.5.3.37 If the connection in the "Emergency call" the AU should establish the connection again.

7.5.3.38 After establishing voice communication with the operator of the system (with optional power supply) to the telephone line must be generated DTMF tone: - corresponding to the symbol "0" - the first time you click on "Emergency Call", - corresponding to the symbol "1" - the second click on the "Emergency Call", - corresponding to the symbol "2" - the third of clicking the "Emergency Call". Subsequent clicks on the "Emergency Call" during a voice call should be ignored.

7.5.3.39 If during emergency event is defined car ignition off, the emergency call should continue regardless of the vehicle ignition line until the emergency call terminated by the system operator.

7.5.3.40 Dial in "emergency call" must begin no later than 1 second after the definition of the event of the accident in an automatic mode or confirm pressing the "Emergency Call" in manual mode.

7.5.4 After the occurrence of the events of the accident AU should ensure the correct functioning in accordance with the requirements of 13.2.2 and 13.2.3.

## 7.6 Test Mode

7.6.1 Test mode is used to check the functioning of the AU. Note - Testing AS, usually carried out with the participation of accredited professionals who have access to the interface of the system operator.

7.6.2 The transition to the AC test mode shall be possible only after the appropriate action to activate the test mode on the side of the vehicle, with an external power supply, without moving the vehicle within the last minute, and with the ignition on. Manufacturer of the vehicle can define additional condition (Additional Facility) to switch to test mode for regular speakers.

7.6.3 The transition from the AU test mode to "ERA" should be carried out at the completion of the testing session, or if the event is defined disconnect switch or an external power supply.

7.6.4 Messaging AC in test mode with the operator of the system must be carried out through the use of a modem tone for calls to numbers ECALL_TEST_NUMBER.

7.6.5 For the AU, set in the configuration of additional equipment, the entrance to the test mode from "ERA" should be done by pressing the "Options".

7.6.6 For the AU, set in the configuration of standard equipment, the entrance to the test mode from "ERA" should be done by using the user interface that is implemented in the TS. Instructions for using the user interface to enter the test mode must be presented to the user manual of TS.

7.6.7 If the speaker is not used to provide additional telematics services in addition to services to respond in an emergency and the AU has been registered in the network by clicking on the "Options" (for the AU, set in the mode option) or by using the user interface that is implemented in the transport means (for the AU, set in the mode of standard equipment), and was launched by the testing procedure, the speaker must terminate the registration of the network by the end of the testing procedures.

7.6.8 If the speaker is used to provide additional telematics services in addition to responding in an accident and was incorporated in the network by clicking on the "Options" (for the AU, set in the mode option) or by using the user interface that is implemented in the vehicle ( to AU, set in the mode of standard equipment), and was launched by the testing procedure, the behavior of the speaker in the online registration at the end of the testing procedure is determined by: - the manufacturer AU (AU to set mode options); - vehicle manufacturer (for AC established in the mode of standard equipment).

7.6.9 If the speaker is not used to provide additional telematics services in addition to services to respond in an emergency and the AU has been registered in the network by clicking on the "Options" (for the AU, set in the mode option) or by using the user interface that is implemented in the transport means (for the AU, set in the mode of standard equipment), the subsequent registration of the network for these variants AU possible not earlier than after the interval specified in the TEST_REGISTRATION_PERIOD. TEST_REGISTRATION_PERIOD If the value is set to "0", the time limit for subsequent registration AC network is not imposed.

7.6.10 If the speaker is used to provide additional telematics services in addition to responding in an accident and was incorporated in the network by clicking on the "Options" (for the AU, set in the mode option) or by using the user interface that is implemented in the vehicle ( to AU, set in the mode of standard equipment), the rules of the subsequent registration of the network for these variants are determined by the manufacturer of the AU and the AU vehicle manufacturer.

7.6.11 The test mode should stop automatically when the vehicle ignition is moved to a distance greater than a predetermined parameter settings TEST_MODE_END_DISTANCE. The accuracy of determining the distance should be no more than 45 meters If the coordinates of the point where the testing mode is not defined, the mode must be switched off at a predetermined distance from the point at which the vehicle is defined by the coordinates of the first time you turn on the ignition. Note - If the in the test mode is not possible to receive data from the GNSS receiver, for determining the distance is allowed to use other methods for determining the distance traveled.

7.6.12 In the test mode to be implemented the following tests: - the test connect a microphone. For example, the AU plays a voice prompt asking the tester to say the phrase, records an audio clip inserted in the internal memory, plays a recorded sound clip and asks the tester to click on the appropriate button (on the button), if the sound clip played correctly; - test connection speakers (speakers). For example, the AU plays audio tone or voice prompt to the left and right speakers and asks the tester to click on the appropriate button (on the button), if an audio clip replayed correctly; - test ignition OFF / ON for the CA installed in the option configurations. For example, the AU plays a voice prompt asking the tester to switch off and switch on the ignition of the vehicle or the AU decides to determine the correct operation of the logic state of the line car ignition, using previously obtained data on changes in automotive ignition line (for example, if the state of the line car ignition changed for predetermined period) - Extended test unit user interface. For example, the AU plays a voice prompt requesting the tester to press the buttons in a certain sequence. Additionally AU plays a voice prompt asking the tester to confirm the correct operation of the indicators of the AC; - test battery backup if the backup battery is used and there is a technical possibility of testing the state of the backup battery (the amount of testing is determined by the vehicle manufacturer or the manufacturer of the AU) - operational test sensor (mechanism ) automatic identification event of accident (only for vehicles of category M1), which is mandatory for this category of vehicle. Note - If the source of the information about the event an accident is used full-time automotive systems, it is allowed to use previously obtained data about the health of the sensor (the mechanism) automatic identification Accident events received during the period of time after

the ignition is switched (for example, data on the operation of the sensor automatic identification event an accident, resulting in the diagnosis of full-time automotive systems that run after the ignition is switched on) - additional tests that are performed in the process of self-contained in 6.17.6.

7.6.13 Upon completion of testing the AU data about the test results must be sent to the system operator through the use of a modem tone for calls to numbers ECALL_TEST_NUMBER. minimum data set with the test results must be submitted to the AU in the format of the test results in accordance with Annex B.

7.6.14 The minimum set of data with the test results shall be transmitted to the speaker set identifier "test call" in accordance with Annex B.

7.6.15 AC output from its testing should be carried out: - after the transfer of MND with the results of testing the AC system operator; - when disconnecting the external power supply; - removing the vehicle (ignition) from the trigger point test mode at a distance greater than a given parameter setting TEST_MODE_END_DISTANCE (configurable parameter). Note - For regular speaker may establish additional conditions and exit the test.

6.7.16 Before the release of the AC test mode it should bring the results of testing the tester by using the status indicator AC or by playing an appropriate voice message.

## 7.7 The "Car"

7.7.1 The "Car" is designed to turn off all speakers at the time of the vehicle at the service center.

7.7.2 The "Car" has to be implemented in the speaker installed in the option configurations, and is not required for full-time automotive systems.

7.7.3 In the transition to " Auto service " AU should establish a hardware line output GARAGE_MODE_PIN. When you exit the "Auto service" AS should reset the hardware line output GARAGE_MODE_PIN.

7.7.4 All the functions of the AU relating to the provision of basic services, "ERA-GLONASS" and testing the speakers should be turned off if it is in the " Auto service ".

7.7.5 Exiting the " Auto service " has to be carried out automatically if the vehicle when the ignition is moved to a distance greater than a predetermined parameter settings GARAGE_MODE_END_DISTANCE (configurable parameter). If the coordinates of the point at which the mode is enabled, "Car" is not defined, This mode must be switched off at a predetermined distance from the point at which the first time, the coordinates of the TC after the ignition. Accuracy distance should be no more than 45 meters

Notes

1 If the speaker is in the "Car", the ignition is switched off, all modules (components) speakers are turned off.

2 Conditions for transfer AC to "UNITY" are defined by the manufacturer speakers.

3 AC Output from "Car" when the ignition is carried out on the basis of information provided by the navigation module speakers.

## 7.8 Mode software downloads

7.8.1 Boot Mode software is designed to update it using a packet data.

7.8.2 Boot Mode software is a must for AC installed in the option configurations.

7.8.3 The need to support the regime download software for speaker installed in the configuration of standard equipment is determined on the basis of appropriate agreements between the manufacturer of the vehicle and the operator of the system and will not be binding.

7.8.4 If the speaker is in the "ERA" or "Car", it is connected to external power and the operator of a command to download the software for entering, the speaker must make the transition into this mode and connect to the system operator for packet data. command from the system operator, or may be obtained after the emergency call or after the closure process of self-AS for a period specified by setting POST_TEST_REGISTRATION_TIME.

7.8.5 If the speaker is not in the "ERA" or "Car" or without power supply it receives from the system operator command to switch mode software download, the speaker should ignore the received command and remain in pre-defined modes.

7.8.6 In the software download operation AU in accordance with the parameters of the regime that preceded the inclusion of the loading mode software.

7.8.7 In the software download to the AU to boot the software image into memory SS in accordance with the communication protocol defined in IEC 54619 .

7.8.8 If the ignition is switched off after the download software, the AU must upgrade the software image in non-volatile memory, then the cycle self-diagnosis.

7.8.9 If the ignition is switched on after the download software, the AU must upgrade the software image in non-volatile memory and to carry out self-diagnosis cycle after the ignition is switched off.

7.8.10 It shall be the integrity of the software image to non-volatile memory of the AU and should be implemented mechanism (s) of protection of the integrity of the software image to non-volatile memory of the AU in the following situations: - if there are errors in the data transmission channel between the AU and the system operator; - with the possible disconnection between the AU and the system operator; - with the possible disconnecting the external power supply during the update the software image in non-volatile memory of the AU.

7.8.11 If the speaker is in the downloads and made an emergency call, then this treatment should be interrupted and the downloaded data should be ignored. If the mode software download was interrupted due to an emergency call, then on completion of the AU must pass the appropriate information message operator of the system and go to "ERA".

## 8 Requirements for components of automotive systems call emergency services

8.1 The navigation receiver (navigation unit)

8.1.1 The navigation receiver, which is part of the AU, can be both a built-in speaker and external to it (embedded in other electronic unit mounted on the vehicle).

8.1.2 Part of the AU navigation module must receive and process to determine the location coordinates and velocity components of the vehicle signals in the range of standard accuracy of

GLONASS L1.

8.1.3 in the incoming AC navigation module can receive and process to identify the location coordinates and velocity components of the vehicle other GNSS signals (e.g., GPS).

8.1.4 Part of the AU navigation module must receive and process all supported GNSS signals with the same priority and use the RAIM to determine those satellites from which information can not be used in the calculation of navigation performance. Note - When you select a navigation receiver for the assembly of the AU preference should be given to the receivers, which take into account the planned change frequencies and structures used GLONASS signals.

8.1.5 Part of the AU GNSS receiver must provide the ability to determine the parameters of the navigation signals using only the navigation system GLONASS.

8.1.6 Part of the AU GNSS receiver shall provide the definition of navigation parameters in systems PZ-90.02 or WGS-84. Using the PZ-90.02 is preferred.

8.1.7 Limits of error (at P = 0.95) should be no more than: - plane coordinates - 15 m - height - 20 m, - velocity - 0.1 m / s. These accuracy requirements shall be provided: - in the speed range from 0 to 250 km / h - in the range of linear accelerations from 0 to 2G; - in the presence of short-term vertical acceleration from 0 to 5G; - for the values of the spatial geometry factor is not more than 4; - in the absence of and under the influence of interference allowable level of which is given by the EMC given in 13.3.

8.1.8 The minimum time interval updates observational data should be no more than 1 s.

8.1.9 Recovery time tracking signals working constellation NCA after the loss of tracking them for up to 60 seconds should be no longer than 5 seconds after the restoration of sight NCA.

8.1.10 Time to get the first GNSS receiver after the ignition of navigation solutions should be no more than 60 seconds.

8.1.11 Part of the AU GNSS receiver must provide: - search (discovery) GNSS signals at the level of the desired signal at the antenna input (input antenna amplifier) minus 163 dBW; - tracking of GNSS signals and output the navigation solution at the level of the desired signal to antenna input (input antenna amplifier) minus 188 dBW.

8.1.12 If a GNSS receiver allows you to change the rate of emission of navigation data, the target frequency of their issue should be set with the parameter settings of GNSS_DATA_RATE set this parameter to a range of values in accordance with Annex A.

8.1.13 If a GNSS receiver can not change the frequency of issuance of navigation data, the supported navigation receiver frequency of their issue should be in the range of values for a given parameter setting GNSS_DATA_RATE in accordance with Appendix A.

8.1.14 The minimum elevation angle (angle cut) navigation spacecraft must be set with the parameter settings of GNSS_MIN_ELEVATION set this parameter to a range of values in accordance with Appendix A. The default value of this parameter is assumed to be 5 degrees.

8.1.15 shall be possible to perform the following functions in test mode GNSS receiver: - Manage the settings GNSS receiver using software developer receiver - giving navigation and time information in the format of NMEA-0183 [5]; - giving the results of autonomous integrity monitoring ( confidence) navigation definitions and exclusions of unreliable measurements (function RAIM). Note - The test mode GNSS receiver is used in the tests for compliance with the AU in terms of GNSS receiver. Methods of testing for compliance with the AU in the receiver involves the use of GNSS navigation and timing information in NMEA-0183 format.

8.1.16 For the AU, set in the configuration of additional equipment, food GNSS receiver must be switched off after the ignition is switched off after a period of time determined by the parameter GNSS_POWER_OFF_TIME.

8.1.17 Navigation module must ensure that the requirements of destination, the level of useful signals, equal to -161 dBW, and the impact of harmonic interference with power levels at the antenna input, equal to the threshold values specified: - Table 1 - At work on signals of GLONASS standard accuracy; - Table 2 - during operation the signals of GPS.

Table 1 - Thresholds harmonic interference in the signals of the GLONASS standard precision

| Frequency MHz | Thresholds interference, dBW |
|---|---|
| F < 1540 | Minus 15 |
| 1540 < F <= 1562 | From minus 15 to minus 50 |
| 1 562 < F <= 1583 | From minus 50 to minus 90 |

| | |
|---|---|
| 1583 < F <= 1593 | From minus 90 to minus 140 |
| 1593 < F <= 1609 | Minus 140 |
| 1,609 < F <= 1613 | From minus 140 to minus 80 |
| 1,613 < F <= 1626 | From minus 80 to minus 60 |
| 1,626 < F <= 1670 | From minus 60 to minus 15 |
| F > 1670 | Minus 15 |

Table 2 - Thresholds harmonic interference in the signals of GPS

| Frequency MHz | Thresholds interference, dBW |
|---|---|
| F < 1525 | Minus 15 |
| 1 525 < F <= 1565 | From minus 50 to minus 140 |
| 1565 < F <= 1585 | Minus 140 |
| 1585 < F <= 1610 | From minus 140 to minus 60 |
| 1610 < F <= 1626 | From minus 60 to minus 50 |
| 1626 < F <=1670 | From minus 50 to minus 15 |
| F > 1670 | Minus 15 |

8.1.18 Navigation module should provide tracking signals of GLONASS and GPS for impulse noise at the antenna input generated in the frequency of the received signals of GLONASS and GPS, as with the parameters specified in Table 3, at a power level of the desired signal -161 dBW.

Table 3 - Parameters of impulse noise

| Parameter name | Value |
|---|---|
| Threshold interference (peak power), dBW | Minus 10 |
| Pulse duration, ms | <= 1 |
| The duty cycle | >= 10 |

## 8.2 GNSS Antenna

8.2.1 Automotive system call emergency services should be equipped with external and (or) internal antenna for the reception of GNSS signals, ensuring the required quality of signal

reception after installing speakers on the vehicle.

8.2.2 For the AU in the configuration of additional equipment requirements for installation of external GNSS antenna manufacturer determines the AU. speaker configuration for the original equipment requirements for the installation of external GNSS antenna determined by the manufacturer of the vehicle.

## 8.3 The communication module (modem) GSM / UMTS

8.3.1 Communication module should operate in dual-band GSM900 (P-GSM, E-GSM, and R-GSM) and 1800 to support packet data transmission procedure and provide control for the transition from one band to another.

8.3.2 Communication module GSM 900/1800 must meet the requirements set forth in [ 10 ].

8.3.3 The communication module must operate in two bands UMTS900 and UMTS2000 supporting packet data transmission control procedure to ensure the transition from one range to another.

8.3.4 Communication Module UMTS 900/2000 must meet the requirements set forth in [ 11 ] and [ 12 ].

## 8.4 Antenna for communication module GSM / GPRS (GSM / GPRS / EDGE / UMTS / HSDPA)

8.4.1 Automotive system call emergency services to enable communication between the AU and the operator of the system must be equipped with external and (or) internal antenna, which provides the necessary quality of signal reception after installing speakers on the vehicle.

8.4.2 At least one antenna (internal or external) is designed to provide communication between the AU and the system operator shall continue to operate after the events of the accident in accordance with the requirements specified in 13.3.2 and 13.3.3.

8.4.3 For the AU in the configuration of additional equipment requirements for installing external antennas GSM and UMTS manufacturer determines the AU.

8.4.4 For the AU in the original equipment configuration requirements for installing external antennas GSM and UMTS vehicle manufacturer specifies.

## 8.5 Built-in SIM chip

8.5.1 Built SIM / USIM chip should be implemented as a chip is soldered to the form factor MFF2 according to Figure 3 and contacts specification shown in Table 4.

Figure 3 - Form Factor MFF2, view from below

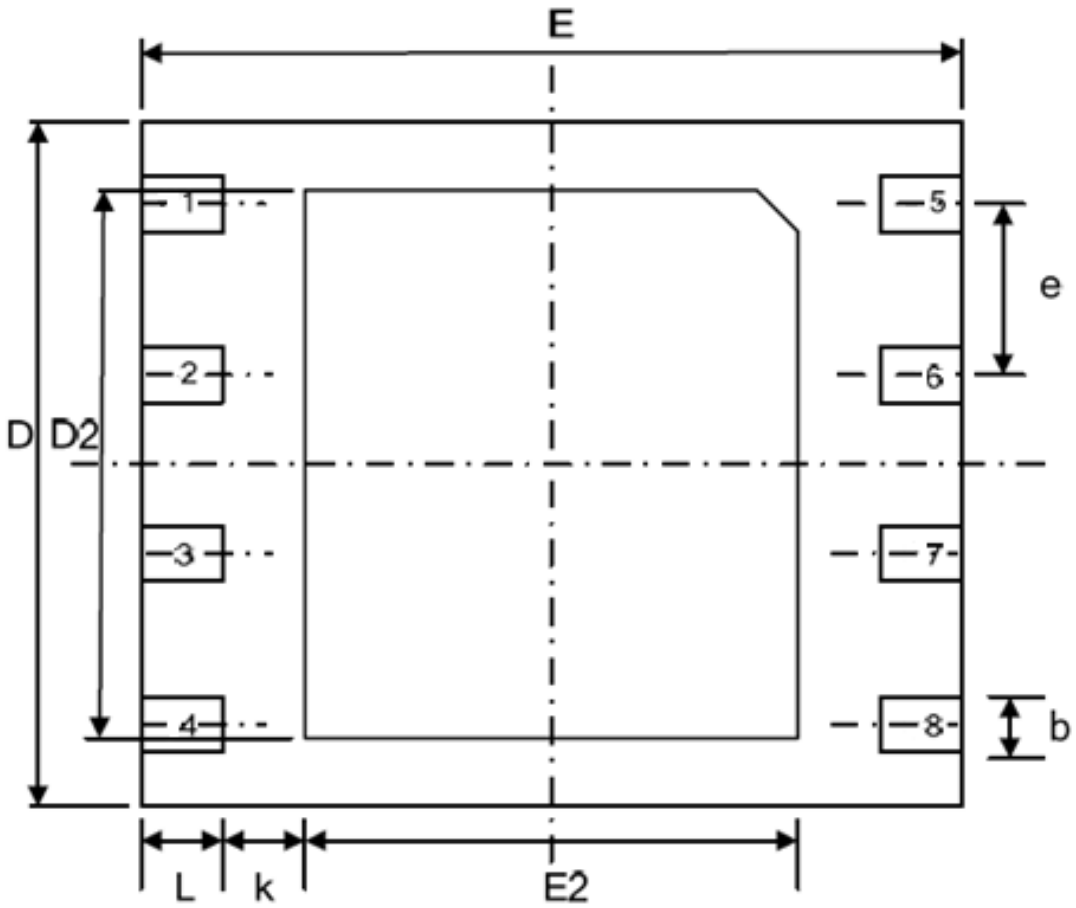



Figure 3 - Form Factor MFF2, view from below

Table 4 - Specification of contacts

| Parameter | Description | Dimensions |
|---|---|---|
| E | The horizontal length of the body | 6,00 ± 0,15 |
| D | The vertical length of the body | 5,00 ± 0,15 |
| L | Length of signal contacts | 0,60 ± 0,15 |
| b | Width of the signal contact | 0,40 ± 0,10 |
| E2 | The horizontal length of the thermal contact | 3,30 ± 0,15 |
| D2 | The vertical length of the thermal contact | 3,90 ± 0,15 |
| k | The distance between the signal and the thermal contact | 0,80 ± 0,10 |
| e | The distance between the centers of the signal contacts | 1.27 |

8.5.2 SIM / USIM chip needs to be soldered into the speaker so as to prevent the possibility of its removal from the board speaker for later use.

8.5.3 SIM / USIM chip must not contain in its composition of lead.

8.5.4 SIM / USIM chip to store data without loss in 10 years, if data loss is not associated with the excess of the number of instructions overwriting specified in 8.5.5.

8.5.5 SIM / USIM chip to ensure error-free data storage with not less than 500,000 commands overwrite if data loss is not associated with the excess of the retention period specified in 8.5.4.

8.5.6 SIM chip for resilience to climatic and mechanical factors in the product shall comply with the requirements of Section 13.

8.5.7 SIM chip must contain information for identifying and authenticating a speaker in one or more cellular networks.

## 8.6 Tone modem

8.6.1 Tone modem must be capable of transmitting MND within the established voice connection between the AU and the system operator.

8.6.2 Tone modem must meet the requirements specified in [2].

## 8.7 Sensor automatic identification event of accident (only vehicles of category M1)

8.7.1 For the AU, established in the configuration of additional equipment if the sensor is automatically identify the event an accident is not installed inside the speaker, mount it to the elements of the vehicle shall be capable of measuring acceleration sensor to 24G. sensor must remain in a fixed position and continue to operate under acceleration in its point of attachment to 75G of 1 to 5 ms.

8.7.2 For the AU, established in the configuration of additional equipment if the sensor is automatically identify the event an accident is installed inside the AC, the AC unit should be supplied with the mechanism (s) fixtures, providing measurement of the acceleration sensor to 24G.

8.7.2.1 Unit AU must remain in a fixed position and remain operational during acceleration at mounting block to 75G of 1 to 5 ms. If battery backup is located within a block AC, then the test should be conducted at temperatures lower than minus 30 ° C.

8.7.2.2 AC unit must remain in a fixed position and keep working when accelerating at securing the unit to 35G for up to 10 ms. If battery backup is located within a block AC, then the test should be conducted at temperatures lower than minus 30 ° C.

8.7.3 For the AU, established in the configuration of additional equipment if required after the installation of the AC automatic or manual adjustment (calibration) sensor automatically identify events of an accident, the process of this adjustment (calibration) should be included in the list of works to install and configure speakers.

8.7.4 For the AU, established in the configuration of additional equipment, if there are restrictions on the orientation of the speaker or sensor automatically identify events in a vehicle crash, the data limitations should be reflected in the documentation of the AU and the Manual for installing speakers.

8.7.5 For the AU, established in the configuration of additional equipment, the correct procedure for checking the sensor automatically identify events of accidents and health of the AU should be established supplier of AC and is listed in the instructions for installing it. If necessary,

the supplier must provide the AU mechanism (s) used to verify the correct installation of the sensor automatic identification event an accident.

8.7.6 Ignition AU should produce constant testing of functional correctness sensor automatic identification of events in an accident during the operation and report the sensor fault, if the fault is detected.

8.7.6.1 For systems installed in the configuration of standard equipment, the requirements for testing the sensor automatic identification of accident events are defined vehicle manufacturer.

8.7.6.2 For systems installed in the configuration of additional equipment requirements for testing the sensor automatically identify events accidents are determined by the manufacturer speakers.

## 8.8 User interface box

### 8.8.1 Controls AC

8.8.1.1 User interface box must have the "Emergency Call".

8.8.1.2 In the AC system installed in the option configurations, the BIP must have the "Options". Note - The buttons can be shown on the touch screen mounted in the vehicle, if the efficiency of these buttons is stored under the conditions specified in 13.3.

8.8.1.3 In the AC system installed in the configuration of standard equipment, controls, devices implemented in the vehicle shall provide the ability to start the test.

8.8.1.4 If the speaker is in the "ERA", clicking on the "Emergency Call" should be made an emergency call to the manual activation of a sign as defined in 7.5.3.29.

8.8.1.5 If the speakers installed in the configuration of additional equipment, is in the "ERA", clicking on the "Options" should be used to start the test mode, as defined in 7.6.

8.8.1.6 If the speakers installed in the configuration of standard equipment, is in the "ERA" and by using the user interface that is implemented in the TS command is selected to run the test mode, the specified mode must be run in accordance with 7.6.

8.8.1.7 If the speakers installed in the configuration of additional equipment, is in the "Emergency Call" (automatic activation), then click on the "Options" should be ignored.

8.8.1.8 If the speakers installed in the configuration of standard equipment, is in the "ERA", produced by manual activation of the emergency call, but a connection to the operator of the system is not implemented, then the user interface is implemented in the vehicle, must provide the possibility of ending the emergency call.

8.8.1.9 If the speaker is in the "Off" or "Car", then click on the "Emergency Call" should be ignored.

8.8.1.10 If the speaker is in the "Off" or "Car", the reaction of the AU to press "Options" is determined by: - the manufacturer AC (for AC system installed in the option configurations) - manufacturer of the vehicle (for AU A configurable standard equipment).

8.8.1.11 If the speaker is in the "Testing", then clicking on the "Emergency Call" should lead to a test call to the selected number as defined in 7.6.

8.8.1.12 If the speakers installed in the configuration of additional equipment is in "Testing", the reaction of the AU to press "Options" is determined by the manufacturer of the AU.

8.8.1.13 If the speakers installed in the configuration of additional equipment is in passive mode, clicking on the "Emergency Call" should be ignored.

8.8.1.14 For the "Emergency Call" must be implemented constructive mechanism to protect against accidental operation. For speakers mounted in the configuration of additional equipment, the structural mechanism of protection against accidental pressing of the button "Emergency Call" and the interface between the AU and the BIP are determined by the manufacturer AU . to speakers installed in the configuration of standard equipment, the structural mechanism of protection against accidental pressing of the button "Emergency Call" and the interface between the AU and the BIP determined by vehicle manufacturer.

8.8.1.15 The "emergency call" to remain in a fixed position and keep working in the tests conducted for compliance with the requirements specified in 13.3.2.

8.8.1.16 The "Emergency Call" should be in the line of sight from the driver's seat and must be capable of using this function without changing the position of the driver at the wheel and

disconnect the seat belts.

8.8.1.17 The "Emergency Call" should be in line of sight with the front passenger seat (front passenger seat), and it must be possible to use this button, the front passenger seat if the vehicle cabin would be expected for people in the front of the vehicle near the driver's seat.

8.8.1.18 If the "Emergency Call" is implemented as a button on a touch screen, access to this key must be made by no more than one transition between screens.

8.8.2 User interface box must have the indicator (s) for visual display of the AU. Note - You can use regular automotive display systems for displaying the status display AC if guaranteed performance of these systems in the presence of mechanical impact listed in 13.3.

## 8.9 Status Indicators car system call emergency services

8.9.1 Status Indicator AU should remain in a fixed position and keep working with tests in compliance with the requirements specified in 13.3.2.

8.9.2 Status Indicator AU should be in line of sight: - from the driver's seat - with the front passenger seat (passenger) vehicle when the vehicle design requires a front occupant (s).

8.9.3 Using the indicator (s) of the state should see the following status AC: - failure; - an emergency call is not possible (this status is displayed only when you try to make an emergency call) - dial-in "emergency call", - the transfer of MND in " Emergency call ", - a voice connection in the "Emergency Call"; - test mode; - the internal memory of events (this condition can be combined with the state of "fault") - the mode of " Auto service " (for systems installed in the configuration of additional equipment) - made a backup battery discharge below the maximum level (this condition can be combined with the state of "fault".) Note - The maximum discharge rate battery backup is installed car manufacturer or the manufacturer of the AU.

8.9.4 For the AU, established in the configuration of standard equipment, the implementation of the indicator (indicators) of the states and the interface between the indicator (s) of the states and the AU are defined by vehicle manufacturer.

8.9.5 For the AU, established in the configuration of additional equipment, the implementation of the indicator (indicators) of the states and the interface between the indicator (s) of the states

and the system is determined by the manufacturer of the AU.

## 8.10 The internal non-volatile memory and

8.10.1 Car System call emergency services to have an internal memory to store messages if the messages can not be sent to the system operator (for example, if there is no network coverage).

8.10.2 The internal memory should be capable of storing at least 100 posts. Messages containing the MND have the largest size.

8.10.3 If the internal memory is full and you want to save the message, the message must be stored in the internal memory.

8.10.4 If the internal memory is full and you want to save the message, then place in the internal memory must be released to store the message in accordance with the priorities of messages and message substitution rules defined in Table 5.

Table 5 - Priorities and substitution rule posts

| The message priority 1) | The message type | Terms messaging | Substitution Rule posts 2) |
|---|---|---|---|
| 0 | MND | FIFO | Messages are not replaced |
| 1 | Response to a request from the operator | FIFO | Messages are not replaced |
| 2 | Message with the results of the periodic self-test | FIFO | FIFO |
| 2 | Information about faults detected by self-diagnosis | FIFO | LIFO |
| 1) The value "0" is the message with the highest priority, "2" - post the lowest priority.<br>2) Examples of substitution posts<br>1 The internal memory contains 100 posts MND, received new MND - MND new message is ignored.<br>2 The internal memory contains 100 messages with a priority of "2", received a new message | | | |

with a priority of "1" - the oldest message with a priority of "2" should be deleted from the internal memory, the arriving message with a priority of "1" must be saved in the internal memory.

3 The internal memory contains 100 messages with a priority of "2", received a new message with a priority of "2" - the oldest message with a priority of "2" should be deleted from the internal memory, the new message with a priority of "2" should be placed in the internal memory.

8.10.5 If the entire amount of internal memory is full of messages with priority "0" and "1" in the internal memory to record a new message with a priority of "0" or "1", then the new message should be ignored, and this erroneous situation must be reported the user through the status of the AU.

8.10.6 If we receive a message with a priority of "1" (the answer to the request of the operator) ignored because the internal memory is filled with the AU, as defined in 8.10.5, the following operator requests should be ignored as long as there is space available to save at least one message in the internal memory AC.

8.10.7 If the entire amount of internal memory is full of messages with priority "0" and "1" and received a new message with a priority of "2", then the new message should be ignored.

8.10.8 If the entire amount of internal memory is full of messages with priority "greater than / equal X" and received new priority "less than / equal to X", a place in the internal memory of the AU shall be released in accordance with the priorities of messages and the rules of substitution messages defined in 8.10.4 and the new message should be stored in the internal memory of the AU.

8.10.9 If the speaker has to make an emergency call, the phone call before initiating the AU should save the message to the corresponding MSD's internal memory speaker.

If 8.10.10 telephone connection is established and MND successfully transmitted by using modem tones in accordance with a request for an emergency call, the message with the corresponding MND must be removed from the internal memory AC.

8.10.11 When a message containing a response to the request of the operator, can not be passed to the operator of the system by using a data connection (for example, there is no network coverage; USE_GPRS_WHITE_LIST configuration option is set to TRUE and the AU

registered on the network that is not contained in the list GPRS_WHITE_LIST; on the side of the mobile operator for any reason the mechanism of packet data or the message was not sent because of any other error), then the message must be stored in the internal memory of the AU-priority "1".

10/08/12 If a message with the results of the periodic self-test can not be passed to the operator of the system by using a data connection, then the message must be stored in the internal memory of the AU-priority "2".

8.10.13 When a message containing information about faults detected by self-diagnosis cannot be transferred to the operator of the system by using a data connection, then the message must be stored in the internal memory with a priority of "2".

08/10/14 If AU is in the "ERA" and internal memory is not empty, the SS must make an attempt to send messages stored in the internal memory of the AU, the system operator, using a packet data transmission mechanism.

08/10/15 The messages contained in the internal memory AU, must be sent to the system operator in accordance with the priorities of messages and message-passing rules as defined in 8.10.4. Messages with a higher priority must be passed in the first place.

8.10.16 The message should be deleted from internal memory AC after receiving confirmation of successful receipt of the message from the operator.

10.8.17 If there is no apparent reason that prevent sending messages (for example, there is coverage; USE_GPRS_WHITE_LIST configuration option is set to FALSE or if this parameter is set to TRUE and the AU is registered in the network contained in GPRS_WHITE_LIST) and the AU is in the "ERA", but Message priority "0" or "1" is not transmitted through the mechanism to the system operator packet data, the message must be sent in addition to the system operator by using the mechanism of SMS.

08/10/18 If no apparent reason preventing sending messages defined in 10.08.17, but the message can not be transmitted to the system operator by using a data packet (message priority "0", "1" and "2") and through the use of mechanism of SMS (messages with the priorities of the "0" and "1"), the forwarding of the message should be suspended for a period of time INT_MEM_TRANSMIT_INTERVAL.

10/08/19 If a shipment has been suspended messages in accordance with the requirements set out in 08.10.18 and expired period INT_MEM_TRANSMIT_INTERVAL, it must be made the next attempt to send the message as defined in 8.10.14 and 8.10.17.

10.8.20 If the number of attempts to send a message exceeds the value specified in the parameter settings INT_MEM_TRANSMIT_ATTEMPTS, then attempts to send the message to be stopped and this error situation must be reported to the user through the status of the AU.

08/10/21 The contents of internal memory must be preserved when you turn off the AC.

08/10/22 VAC should be implemented the ability to read and clear the contents of the internal memory by using the diagnostic interface. Communications interface for reading and clearing the internal memory of the AU through the use of diagnostic interface determined by: - the manufacturer AC - for the systems, performed in the configuration of additional equipment; - vehicle manufacturer - for the systems, performed in the configuration of standard equipment.

## 8.11 Backup Battery and power source

8.11.1 In the AU, set in the configuration of additional equipment to be used as a backup battery power supply in the absence of an external (board) power supply.

8.11.2 If using the standard battery vehicles do not guarantee functionality AC when tested for compliance with the requirements specified in 13.3, the AU, performed in the original equipment configuration must use a backup battery as a power source in the absence of external power. Note - When installing the speakers in the configuration of standard equipment and power is lost from the standard battery jump powered by the backup battery is allowed to produce in all cases, but only in the case of determining the time of the accident.

8.11.3 For the AU, set in the configuration, additional equipment, and to provide for the use of a backup battery onboard systems after the event definition accident backup battery should document the AC network, messaging, provided the regime "Emergency Call", as well as 10 min Voice when the volume specified in 7.5.3.10, and 8 hours of operation in the standby mode AC possible callback from the operator system. When the backup battery is a rechargeable battery type, then check for compliance above requirements must be performed after charging the backup battery within 24 h . backup battery and test that checks the length of the system using a backup battery that should be carried out at a constant temperature of 20 ° C. In conducting this test requirements for applying power to external sensors (eg, an external sensor

automatically identify events RTA) will be charged. Lifetime backup battery under the anticipated conditions at a temperature of minus 20 ° C to 85 ° C should be defined in the user manual the AU.

8.11.4 Subject to the availability of external power supply, if at the lowest possible amount of charge the backup battery, the AC must send a message to the operator telematics system, which contains information about the backup battery charge failure. Then the speaker should tell the user with the status indicator AC or playing audio tone / voice prompts that achieved the lowest possible amount of charge the backup battery.

8.11.5 Built-in AC power supply should ensure that the AU if the pre-backup battery with the appearance of the external power supply.

8.11.6 For the AU, set in the option configurations that use rechargeable backup battery, the charge of the battery should be made in any of the operating modes of the AU with the ignition.

8.11.7 For the AU, set in the configuration of standard equipment that use rechargeable backup battery charge determined by the rules of its vehicle manufacturer.

8.11.8 If a rechargeable backup battery, its charge should not be started with the ignition off.

8.11.9 The service life of the backup battery and recommended action to replace the batteries must be represented in the documentation by the AU. Note - It is assumed that an authorized service center should replace the battery end of life for full-time automotive systems.

8.11.10 If a backup battery without recharging capabilities, the procedure for replacing the battery end of life for a new battery should be provided in the documentation for the AU. Must also be provided a visual or audible warning to replace the battery.

## 9 Requirements for interfaces and data formats

9.1 General requirements for the transfer of data

9.1.1 Data in the "Emergency call" between the auto call system of emergency services and operator of the system, "ERA-GLONASS" must be carried out in a voice channel through a modem tone. In the event of a failure in the transmission of data in the voice channel speakers should provide support for redundant transmission channel using the mechanism of SMS.

9.1.2 When transferring data in the "Emergency call" the AU should establish the value of bit 6 and bit 7 is entered in "Service Categories" (initializing an emergency call message - automatic or manual operation) as shown in Figure 4 and the value of the bits shown in Table 6.

## Figure 4 - The "Service Categories"

| Bit number | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| Byte 1 | | Identifier information element | | | | | | |
| Byte 2 | Length of the element "categories of service" | | | | | | | |
| Byte 3 | 0 | Value of the item "Service Categories" | | | | | | |
| | reserve | | | | | | | |

Figure 4 - The "Service Categories"

Table 6 - bit values in the element "Service Category"

| Bit number | Interpretation |
|---|---|
| 1 | Police |
| 2 | Medical Assistance Service |
| 3 | Fire service |
| 4 | Maritime Assistance Service |
| 5 | Mountain Aid Service |
| 6 | Manual call |
| 7 | Automatic Call |
| 8 | Reserved (default 0) |

The remaining bits in the element "categories of service" must be set to "0".

9.1.3 The minimum set of data transmitted by the tone modem should have the structure described in Annex B.

9.1.4 When passing through the MND tone modem speaker must meet the requirements specified in [2].

9.1.5 Requirements for composition and format of data and commands exchanged between the AS and the operator system is shown in Table 7.

Table 7 - Requirements for composition and format of data and commands

| Data and commands | The transmitting side | The receiving party | Data transfer mechanism | Note |
|---|---|---|---|---|
| MND with data on road accidents | AU | The system operator | Tone modem | The main mechanism of transmission of the system failure "ERA-GLONASS". |
| Team MND to transfer the data on accidents through the use of a modem tone | The system operator | AU | Tone modem | |
| Team MND to transfer data from an accident by using SMS | The system operator | AU | SMS | Redundant data transmission mechanism in the "ERA-GLONASS".MND transmission via SMS done automatically by the speaker by a failed attempt to pass MND through the use of a modem and a dial on demand from a system operator |
| MND with data on road accidents | AU | The system operator | SMS | |
| Acceleration profile of road accidents 1), accidents severity score 2) | AU | The system operator | Packet data | Format and transmission of data / commands - in accordance with IEC 54619 |
| Configuration parameters AU | The system operator | AU | Packet data, SMS | |
| Software updates | The system operator | AU | Packet data | |

| | | | | |
|---|---|---|---|---|
| | | | | |
| The team on the implementation of the re-emergency call | The system operator | AU | SMS | |
| MND with the results of testing AC | AU | The system operator | Tone modem | The format of the data defined in Annex B |

1) Transfer acceleration profile of road accidents is mandatory for systems installed in the configuration of additional equipment if the system does not provide information about the evaluation of the severity of an accident.

   Transfer acceleration profile in the accident is not mandatory for full-time automotive systems
2) The transmission of information about the assessment of severity of accidents for full-time automotive systems is performed only when technically feasible.
3) The implementation of the software update mode is not mandatory for full-time automotive systems.

   Mode software updates can be supported by the manufacturer in agreement with the operator of the vehicle system.
4) An indication of a failure in the transmission data by using the voice channel is no tone modem side speaker verifying correct reception of the data for 20 seconds after the start of data communication.

9.1.6 In the case of transmission errors in the voice channel through the use of dial modem speaker should provide voice communication with emergency services and sending data through the use of SMS mechanism in parallel with the implementation of voice communication.

9.1.7 Sending an SMS in the case specified in 9.1.5 should be done only once. The criterion for the success of sending SMS is the lack of information on the side of the AC error (errors) encountered when sending SMS.

9.1.8 In the presence of the AU on the side of error information (error) when sending SMS in the case specified in 9.1.5, a message containing the MND should be stored in the internal memory of the AU in accordance with 8.10.

## 9.2 The composition of messages between the car system call emergency services and the system operator

9.2.1 Message exchange between the AU and the system operator with the following directions: - from speakers to the system operator - for the transfer of telematic messages (for example, information about the profile of the acceleration in the accident, if the function is supported by the AU) - the operator of the system to the AC :

1) for transmitting control commands (e.g., a request for re-implementation of "Emergency Call");

2) for transferring configuration parameters SS;

3) to transfer data to a software update, if supported by the AU, the update software by using a data connection. transfer protocol messages between the AU and the system operator must comply with IEC 54619 .

9.2.2 General Packet

9.2.2.1 If the USE_GPRS_WHITE_LIST set to FALSE (see Appendix A), for the transmission of messages between the AU and the system operator must use the mechanism of packet data.

9.2.2.2 If the parameter is set to TRUE USE_GPRS_WHITE_LIST and GPRS_WHITE_LIST list is empty, the AS should not use the packet data transmission mechanism for transmitting messages between the AS and the system operator.

9.2.2.3 If the parameter is set to TRUE USE_GPRS_WHITE_LIST and AC registered in the network from the list GPRS_WHITE_LIST, is to transmit messages between the SS and the system operator must use the mechanism packet data.

9.2.2.4 If the parameter is set to TRUE USE_GPRS_WHITE_LIST and AU registered on the network that is not contained in the list GPRS_WHITE_LIST, then the AU should not use the mechanism of packet data to transmit messages between the AU and the system operator.

9.2.2.5 If the USE_GPRS_WHITE_LIST set to TRUE, then when you initiate an emergency call, check-in networks of GPRS_WHITE_LIST list should have priority over the registration of the networks, which are not contained in the list

GPRS_WHITE_LIST USE_GPRS_WHITE_LIST If the parameter is set to TRUE, then the AU must periodically carry out a survey availability of cellular networks for the implementation of priority registration in the networks contained in the list GPRS_WHITE_LIST Sampling availability of cellular networks for the implementation of priority registration in the networks contained in the list GPRS_WHITE_LIST, determined by the manufacturer speakers.

9.2.2.6 Updating the parameter list GPRS_WHITE_LIST USE_GPRS_WHITE_LIST and can be made by the system operator for both full-time speaker, and for systems installed in the configuration of additional equipment for a period of time specified in the settings POST_TEST_REGISTRATION_TIME, at the end of the transmission system operator to test diagnostic or in the period time AC is registered on the network after the completion of the emergency call.

9.2.2.7 Automotive system call emergency services to store information about at least 20 networks in the list GPRS_WHITE_LIST. data format is defined in IEC 54619 .

9.2.3 The AU must be capable of changing the settings on the initiative of the operator of the system through the use of mechanisms SMS or packet data for periods of time when the AU is registered on the network after the emergency call and after the transfer of the results of self-diagnosis.

## 9.3 Registration of the state of the automotive call emergency services in the network

9.3.1 If the configuration parameter is set to FALSE AUTOMATIC_REGISTRATION and AU only supports the provision of basic services system "ERA-GLONASS", the registration mode AC network must comply with the regime "Emergency calls only" ("eCall only mobile station").

9.3.2 If AUTOMATIC_REGISTRATION configuration parameter is set to TRUE, then the AU should implement automatic registration in the network after the ignition is switched on and remain registered in the network until the ignition is switched off.

9.3.3 If AUTOMATIC_REGISTRATION configuration parameter is set to TRUE, the behavior of the speaker in the online registration after the ignition is determined by: - the manufacturer AC (for AC system installed in the option configurations) - manufacturer of the vehicle (for speakers installed in the regular configuration equipment.) Note - This mode can be used to

provide additional services that require registration in AC network.

9.3.4 If AUTOMATIC_REGISTRATION configuration parameter is set to TRUE, AS expect a call back from the operator of the system and turn off the ignition event is defined, then the AU should terminate the registration of the network after the expiration of a timer that determines the timeout callback from the system operator.

## 10 Providing the required quality of the sound processing in the implementation of voice

10.1 Narrowband AU must meet the requirements of [3], and meet the minimum performance of the type specified in Table 8.

Table 8 - Minimum performance narrowband AU

| Speaker type | Used speakers | The volume level of the input signal | Minimum type of productive sequences |
|---|---|---|---|
| Normally installed speakers | Determined by the manufacturer of the vehicle | The nominal level [RLR parameter should be set to (2 ± 2) dB] | 2a |
| | | The high volume of the incoming signal [RLR parameter should be set to negative (13 ± 2) dB] | 2b |
| AU option configurations | Fitted (front) loudspeakers vehicle | The nominal level [RLR parameter should be set to (2 ± 2) dB] | 2a |
| | | The high volume of the incoming signal [RLR parameter should be set to negative (13 ± 2) dB] | 2b |
| | Additionally mounted speaker | The nominal level [RLR parameter should be set to (2 ± 2) dB] | 2b |
| | Additionally mounted speaker | The high volume of the incoming signal [RLR parameter should be set to negative (13 ± 2) dB] | 2c |

Note - When the desired volume level of the incoming signal RLR, equal to minus (13 ± 2) dB can be achieved by using an AC, the performance must be measured at the highest possible volume.

10.2 Broadband speaker must satisfy the requirements of [4] and correspond to the minimum type of performance as defined in Table 9.

Table 9 - Minimum capacity broadband AU

| Speaker type | Used speakers | The volume level of the input signal | Minimum type of productive sequences |
|---|---|---|---|
| Normally installed speakers | Determined by the manufacturer of the vehicle | The nominal level [RLR parameter should be set to (2 ± 2) dB] | 2a |
| | | The high volume of the incoming signal [RLR parameter should be set to negative (13 ± 2) dB] | 2b |
| AU option configurations | Fitted (front) loudspeakers vehicle | The nominal level [RLR parameter should be set to (2 ± 2) dB] | 2a |
| | | The high volume of the incoming signal [RLR parameter should be set to negative (13 ± 2) dB] | 2b |
| | Additionally mounted speaker | The nominal level [RLR parameter should be set to (2 ± 2) dB] | 2b |
| | Additionally mounted speaker | The high volume of the incoming signal [RLR parameter should be set to negative (13 ± 2) dB] | 2c |
| Note - When the desired volume level of the incoming signal RLR, equal to minus (13 ± 2) dB can be achieved by using an AC, the performance must be measured at the highest possible volume. | | | |

10.3 Attenuation in the outgoing and incoming directions should be within the limits specified in Table 10 for narrowband and wideband speakers.

Table 10 - The maximum attenuation

In decibels

| Type of performance | | | | |
|---|---|---|---|---|
| Full duplex | Partial duplex | | | The absence of duplex |
| 1 | 2a | 2b | 2c | 3 |
| <= 5 | <= 8 | <= 11 | <= 13 | > 13 |

10.4 The switching time required to remove the attenuation introduced a non-linear processor in the outgoing and incoming directions, must be within the limits defined in [3] and [4] for narrowband and wideband speakers, respectively.

10.5 AU must be capable of automatic gain control signal in the outgoing direction to compensate for a low level of sound that can occur in case of accident (e.g., if a driver in said direction different from the microphone directivity pattern). Growth gain of 6 dB should be reached in no more than 200 ms. Tests should be carried out in the presence of noise in the signal / noise ratio is less than 15 dB. There should be no error in the signal amplification (when only noise).

10.6 V AC must be possible to auto gain volume of incoming voice signal up to 15 dB in accordance with the increase in the noise level in the cabin (cabin) of the vehicle. The increase in gain of 6 dB should be applied no later than 2 seconds after the corresponding change in the noise level.

10.7 Delay in the outgoing and incoming directions (the amount of signal delay in the outgoing and incoming directions) must be within the limits defined in [3] and [4] for narrowband and wideband speakers, respectively.

10.8 echo attenuation (TCLw) at ambient silence must be 50 dB or more at a nominal volume.At maximum volume level attenuation level TCLw exceed 50 dB.

## 11 Power requirements and power consumption

11.1 AC Power must be on-board power supply system of the vehicle with a rated voltage of 12 V or 24 V and must be implemented simultaneous support for 12 V and 24 V in accordance with IEC 52230 . Speaker shall continue to operate while changing the supply voltage (mean) minus 10% to plus 25% of the nominal value.

AC 11.2 shall continue to operate after exposure to the nominal voltage of reversed polarity for 5 minutes.

11.3 AU to ensure the protection of electric circuits against short-circuit on the power supply voltage poles.

11.4 Current consumption (peak) for AC, performed in the configuration of additional equipment, the supply voltage 12 V (24 V), depending on the mode of the AU should not exceed the following values:

11.4.1 The "Emergency Call" with GSM network - no more than 1500 mA at 12 V (1200 mA at 24 V) when using an external speaker 8 ohms, 5 watts (excluding current charge the backup battery.) Note - Characteristics of an external speaker (8 ohms, 5 watts) are presented for reference in order to determine the conditions under which must be guaranteed to the claimed power consumption. Speaker characteristics used in the product may differ materially.

11.4.2 In the "ERA", with the ignition off after the emergency call waiting call back from the operator of the system (sensor automatically identify events accidents included - only vehicles of category M1, GNSS receiver is off, GSM and UMTS module is enabled, the AU is registered in the network, but the transmission of voice and data is performed) current consumption should not be more than 10 mA.

11.4.3 In the "ERA" for a configurable period of time specified in the settings IGNITION_OFF_FOLLOW_UP_TIME1, after turning off the ignition switch (sensor automatically identify events accidents included - only vehicles of category M1, GNSS receiver is off, GSM and UMTS module is turned off) the current consumption should be less than 1 mA.

11.4.4 In the "ERA" after a configurable period of time specified in the settings IGNITION_OFF_FOLLOW_UP_TIME1, after turning off the ignition switch (sensor automatically identify events accident off - only to vehicles of category M1, GNSS receiver is off, GSM and

UMTS module is turned off) the current consumption should be not more than 100 microamps.

11.5 The requirements for power consumption for AC, performed in the configuration of standard equipment is determined by the vehicle manufacturer.

## 12 Automotive Wiring system call emergency services to the audio system of the vehicle

12.1 Wiring AC, performed in the configuration of additional equipment to the audio system of the vehicle is determined by the manufacturer of the AU and the need to negotiate with the manufacturer of the vehicle. recommended regimen (example) connecting speakers to the audio system of the vehicle is given in Appendix G.

12.2 Wiring AC, performed in the configuration of standard equipment, the audio system of the vehicle is determined by the vehicle manufacturer.

## 13 Requirements for resistance to conditions

13.1 General requirements for resistance to the conditions

13.1.1 Car System, performed in the configuration of additional equipment must meet the requirements for resistance to the conditions set out in 13.2-13.4.

13.1.2 Car System, performed in the original equipment configuration must meet the requirements for resistance to the conditions set out in 13.2-13.4, as well as the requirements set out in [ 1 ].

13.1.3 Tests of the AU to meet the requirements set out in 13.2-13.4, are carried out in accordance with IEC 54618 .

13.2 Requirements for resistance to climatic influences

13.2.1 SS must provide their nominal values at normal climatic factors of the environment on the IEC 52230 (Section 4.2): - ambient temperature (25 ± 10) ° C; - relative humidity from 45% to 80% - atmospheric pressure from 84.0 to 106.7 kPa (630 to 800 mm Hg).

13.2.2 AC must match the operating conditions for climatic modification or have CL on IEC 52230 (Section 4.7), GOST 15150 at the minimum operating temperature of minus 40 ° C.

13.2.3 Protection AC penetration of foreign bodies and water in accordance with IP52 according to GOST 14254 . Only for vehicles of category M1: If speakers installed in the option configurations, uses an external sensor is an accident, the degree of protection from external sensor accident penetration of foreign bodies and water in accordance with IP67 according to GOST 14254 .

13.2.4 On the resistance to climatic influences AU must meet the requirements of IEC 50905 ,IEC 52230 , IEC 52456 and GOST 16019 . According to GOST 52230 and GOST 16019(section 4.1) speaker refers to a group B4.

13.2.5 In accordance with the requirements of IEC 52230 (Section 4.12), the AU has to be stable and durable when used in the following temperature range of the environment: - the minimum working temperature - minus 40 ° C - Maximum Operating Temperature - +85 ° C. If the AC is used in the back-up battery, the requirements of the operating temperature is also subject to the battery. If you use a rechargeable battery, the power from the battery and charging the battery can not be made at a "very low" and "very high" temperatures. The value of the parameters "very low temperature" and "very high temperature" determined by the manufacturer or the vehicle manufacturer speakers.

13.2.6 In accordance with the requirements of IEC 52230 (Section 4.14), the AU must operate at lower atmospheric pressure to 61 kPa (457.5 mm Hg), which corresponds to the pressure at an altitude of 4000 m above sea level. speaker designed for use on commercial vehicles for working at heights up to 4650 m above sea level, must operate at lower atmospheric pressure to 57 kPa (427.5 mm Hg).

13.2.7 SS must withstand exposure to damp heat protection in accordance with IEC 52230(section 4.13) for 4sut at (40 ± 2) ° C and a relative humidity of (95 ± 3)%.

13.2.8 Paints AU appearance shall meet the requirements of design documents, and the outer parts must be resistant to the effects of fuel and lubricants.

13.2.9 Environment for plant operation must be non-hazardous, contains no conductive dust, corrosive gases and vapors at concentrations that destroy electronic products and electrical

insulation.

13.2.10 AU in packaging containers should be strong in her carriage transport of all kinds, except aircraft with ventilated compartments for any distance in accordance with the requirements of IEC 52230 (Sections 4.2 and 8.4).

13.2.11 The requirements and test parameters AU GOST 52230 and GOST 16019 to climatic factors are given in Table 11.

Table 11 - Impact of climate factors

| Influencing factor | Test Parameters | Influencing factor | |
|---|---|---|---|
| | | Value | Tolerances |
| Stability at low temperature for the execution of the degree of hardness 2 (IP52) | Operating temperature, ° C | Minus 40 | ± 3 |
| | The holding time at temperature, h | 3 | - |
| Strength at low temperature for the execution of the degree of hardness 2 (IP52) | Limiting temperature, ° C | Minus 40 | ± 3 |
| | The holding time at temperature, h | 3 | - |
| Stability at elevated temperature for the performance by the degree of stiffness 2 (IP52) | Operating temperature, ° C | Plus 85 | ± 3 |
| | The holding time at temperature, h | 3 | - |
| Strength at elevated temperature for the execution of the degree of hardness 2 (IP52) | Operating temperature, ° C | Plus 85 | ± 3 |
| | The holding time at temperature, h | 3 | - |
| Strength with temperature for the execution of the degree of hardness 2 (IP52) | Temperature range, ° C | From minus 40 to plus 85 | ± 3 |

| | | | |
|---|---|---|---|
| | Exposure time in the chamber at each temperature, h | 3 | - |
| | Number of cycles | 3 | - |
| Strength at low temperature for the execution of the degree of hardness 2 (IP52) | Limiting temperature, ° C | Minus 40 | ± 3 |
| | The holding time at temperature, h | 3 | - |
| Strength and resistance to humidity at elevated temperature in a constant mode for execution on the degree of hardness 2 (IP52) | Relative humidity in% | 95 | ± 3 |
| | Temperature, ° C | Plus 40 | ± 3 |
| | Duration of exposure, h | 144 | - |

**13.3 The requirements for mechanical stability**

13.3.1 In accordance with the requirements of IEC 52230 (Section 4.20) and GOST 16019 SS must be workable and not be damaged and the damage after the action of vibration and shock loads specified in Table 12.

Table 12 - Vibration and shock

| The estimated property AU | Test Parameters | Influencing factor | |
|---|---|---|---|
| | | Value | Tolerances |
| The stability when exposed to a sinusoidal vibration | Frequency range, Hz | 10-70 | ± 1 |
| | Amplitude acceleration m / s $^2$ (g) | 39.2 (4) | ± 2 (0.2) |
| | Duration of exposure for each of three directions, min | 30 | - |
| Strength when exposed to a sinusoidal vibration | Frequency range, Hz | 50 | ± 1 |
| | Amplitude acceleration m / s $^2$ (g) | 49 (5) | ± 2 (0.2) |

| | | | |
|---|---|---|---|
| | Duration of exposure in each of the three directions | At 2 h 40 min | - |
| The stability when exposed to multiple mechanical shocks | Peak shock acceleration, m / s $^2$ (g) | 98 (10) | ± 20% |
| | Impact duration, ms | 10 | - |
| | Number of strokes in each of the three directions | 333 | - |
| Strength when exposed to multiple mechanical shocks | Peak shock acceleration, m / s $^2$ (g) | 98 (10) | ± 20% |
| | Impact duration, ms | 10 | - |
| | Number of strokes in each of the three directions | 3333 | - |
| Resistance to mechanical shock during transportation | Peak shock acceleration, m / s $^2$ (g) | 250 (25) | ± 20% |
| | Impact duration, ms | 6 | - |
| | Number of strokes in each of the three directions | 4000 | - |
| Resistance to a single mechanical shock | A single blow, g | 75 | - |
| | Impact duration, ms | 1-5 | - |

13.3.2 Car System, performed in the original equipment configuration should provide the correct functioning during the tests defined:

- for vehicles of category M1 - [6] and [7]
- for vehicles of categories M2 and M3 - [8 ].

13.3.3 The manufacturer of the vehicle (for OEM AC) and manufacturer of AC (for AC installed in a configuration option) must take all measures to ensure efficiency audio channel speaker of the crash. The data volume of work is determined by the vehicle manufacturer and the manufacturer of the AU, respectively. In the event of damage to the AC elements responsible for ensuring operability audio channel (eg, a speaker and a microphone), as a result of the tests specified in 13.3.2, the AU should ensure the correct implementation of all the other functions, with the exception of two-way voice communication between the cabin and the vehicle operator system.

13.4 Requirements for Electromagnetic Compatibility

13.4.1 AC should be resistant to the effects of conducted interference on the supply lines in accordance with GOST 28751 . The degree of hardness test pulses and the functional state of the AU shall be as given in Table 13.

Table 13 - Degree of hardness test pulses and the functional state of the system

| Test impulse | The degree of stiffness | The functional state of the AU |
|---|---|---|
| 1 | IV | A |
| 2 | | |
| 3a | | |
| 3b | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| Note - These requirements apply to the AU, performed in the configuration of additional equipment, as well as for established speakers mounted on the vehicle, in electrical systems that use electro-mechanical controls. | | |

13.4.2 The degree of emission and noise levels of the stress of all kinds, created by an AUGOST 28751 for on-board electrical power supply voltage of 12 V (24), shall not exceed the following values: - the degree of the issue: I; - peak voltage noise of the form 1 - -15 (35) V - peak voltage value for the interference type 2 - 15 (15) V - voltage peak value for three types of interference - from minus 15 (25) plus 15 V to (25) V

13.4.3 AC should be resistant to the effects of conducted interference in the control and signal circuit board in accordance with GOST 29157 . The required hardness test pulses and functional status AS shown in Table 14.

Table 14 - Severity test pulses and functional state of the system

| Test impulse | The degree of stiffness | The functional state of the AU |
|---|---|---|
| 1 | IV | A |

| | | |
|---|---|---|
| 2 | | |
| 3a | | |
| 3b | | |

13.4.4 SS must be resistant to interference from electrostatic discharge (contact and air) according to IEC 50607 (Section 4.1) with the following characteristics: - contact discharge with test voltages ± 4; ± 6; ± 7; ± 8 kV , - air discharge test voltages from ± 4; ± 8; ± 14; ± 15 kV.

13.4.5 Voltage interference on AC power connectors should not exceed the control limits established by GOST 28279 (section 2) and GOST 30429 (Section 2) for a group of devices 1.1.1.

13.4.6 The control limits of narrowband and broadband electromagnetic interference generated by the AU in the frequency range from 30 MHz to 1000 MHz, shall not exceed the limits set out in [9, (Sections 6.5 and 6.6)].

13.4.7 AC should be resistant to electromagnetic radiation in the frequency range from 20 MHz to 2000 MHz with a field strength depending on the test method specified in [9, (Section 6.7)].

## 14 Requirements for the frequency selectivity of the receivers

14.1 Blocking dynamic range or crosstalk must be at least 60 dB.

14.2 The dynamic range of side-channel reception must be at least 60 dB.

14.3 Intermodulation free dynamic range at a level of 0 dBm signal at the output of the receiving antenna GNSS should be: - for the second order and frequency separation between the signals of no more than ( - nominal value of the carrier navigation signal) - not less than 60 dB - for the third order and frequency separation between the signals of no more than 0.1 ( - nominal value of the carrier navigation signal) - not less than 50 dB.

## 15 Requirements for Reliability

15.1 AU must meet the requirements of IEC 50905 for safety.

15.2 Reliability of the AU should be characterized by the following parameters: - the basic elements of the AU should be capable of day and night modes; - MTBF speakers should be at least 10,000 hours; - lifetime warranty AU should be at least 3 years - the life of the AU should be not less than 7 years, except for the backup battery; - warranty period of storage must not be less than one year, provided that the storage is done in heated rooms in standard packing in the absence of aggressive media and steam.

# 16 Design requirements

16.1 The design and dimensions and mounting dimensions of the AU, including the external components must be consistent with the companies - manufacturers of vehicles.

16.2 The main body of the AU should be applied: - the name of the electronic unit; - the serial number on the numbering system of the manufacturer; - the year of manufacture; - stamp of acceptance for the type of equipment - marking connectors; - a sign of market access. NOTE - The requirement for a sign of circulation market extends only to the AU, set in the configuration of additional equipment.

# 17 The requirements for ergonomics and industrial design

Requirements for ergonomics and aesthetics of technology is determined by: - vehicle manufacturer - to AU, performed in the configuration of standard equipment; - manufacturer of AC - to AU, performed at the option configurations.

# 18 Requirements for safety and environmental friendliness

18.1 AU and its constituent components should be safe during storage, transportation and use, and respond to health and safety standards.

18.2 When using the AC should be safe for the driver of an electric shock protection class III according to GOST 12.2.007.0 .

18.3 When making speaker is not allowed to use flammable, emit harmful substances during combustion of materials in accordance with the fire safety requirements in accordance with GOST 12.1.044 .

## 19 Marking

19.1 Marking of the AU must meet the requirements specified in section 16, to be clearly visible and meet the requirements of the AU assembly drawing of the composition, location and method of application.

19.2 AU markers should be stable over the lifetime of mechanically strong and must not be erased.

## 20 Packaging

Packaging must comply with the requirements of the design documentation for the AU.

## 21 requirements in the delivery and documentation

21.1 Scope of delivery

21.1.1 Delivery of the AU option configurations must include the following components: - the AU and the mechanism (s) securing the plant; - the user interface unit AU and mechanism (s) securing the BIP; - AC cable connection and BIP; - Sensor automatic identification of the event an accident with a cable connection and mechanism (s) of the sensor acceleration (if the acceleration sensor is not installed inside the AS) - only for vehicles of category M1. Note - If the definition of the event an accident does not use the regular system of the vehicle, such as a block airbag control; - microphone (microphone array) with cable connection and mechanism (s) fix the microphone (microphone array) - cable (s) connections and AC electronic vehicle (adapter-specific TC) - the backup battery; - hands-free speakerphone communication mechanism (s) securing the handsfree speaker and cable connections speakerphone (optsialno).

21.1.2 Any combination of the components of the AU in one case (for example, the main unit and an additional speaker, combined in one case)

21.1.3 Supply AC configuration is determined by the original equipment vehicle manufacturer.

21.2 Documentation

21.2.1 Documentation for the AU option configurations must include the following documents: - Installation Guide, - a guide for setting up and testing; - User speakers; - a short brochure on the use of the plant; - passport speakers.

21.2.2 Composition of the documentation for the AU in the configuration of standard equipment is determined by the vehicle manufacturer.

## 22 Logos

22.1 The "Emergency Call" must contain an image of the icon "Emergency Call". Thumbnail picture of the "Emergency Call", performed in accordance with [ 14 ] is shown in Figure 5.

Figure 5 - Image icon "Emergency Call"


Figure 5 - Image icon "Emergency Call"

22.2 The "Options" must contain an image of the icon shown in Figure 6.

Figure 6 - Image icon "ERA-GLONASS"

Figure 6 - Image icon "ERA-GLONASS"

22.3 For the AU, established in the configuration of additional equipment, the main unit speakers, user manual and AC short brochure on the use of the AU must contain an image of the icon "ERA-GLONASS". Thumbnail picture of the "ERA-GLONASS" is shown in Figure 6.

## Annex A (normative). Settings automotive systems call emergency services

Annex A

(normative)

Speaker settings that must be supported in its intended use, are shown in Table A.1.

Table A.

| The parameter name | Unit | Type / interval setting 2) | The initial value of the parameter | Description of the parameter | Applicability require-ments 1) | Woz-one can completely changes present Rojek-AU 4) |
|---|---|---|---|---|---|---|
| **Radio mute** | | | | | | |
| RADIO_MUTE_DELAY | Milliseconds | INT | 0 | The delay between the setting of the signal "radio mute" and start playing sound | TO | Yes |
| RADIO_UNMUTE_DELAY | Milliseconds | INT | 0 | The delay between the removal of the signal "radio mute" and the end of playing audio | TO | Yes |
| **Position utility** | | | | | | |
| ECALL_BLACK_LIST | - | Data format 3) | The empty list | List of networks to which the service "Emergency Call" is not granted | TO, SHO | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| AUTOMATIC_ REGISTRATION | - | BOOLEAN | FALSE | Flag to enable automatic registration of SIM on the network after power | TO, SHO | Yes |
| CALL_AUTO_ANSWER_ TIME | Minutes | INT | 20 | The time interval after completion of the emergency call, during which the AU automatically answers incoming calls | TO, SHO | Yes |
| SELFTEST_INTERVAL | Watch | INT | 0 | The interval for periodic self-test.When set to "0", the periodic self-test is not carried out | TO, SHO | Yes |
| POST_TEST_ REGISTRATION_TIME | Seconds | INT | 120 | The time interval during which the AU is registered in the network after the transfer test diagnostic system operator | TO, SHO | Yes |
| TEST_MODE_END_ DISTANCE | Meters | INT | 300 | Distance at which the test mode is automatically turned off | TO, SHO | Yes |
| GARAGE_MODE_END_ DISTANCE | Meters | INT | 300 | Distance at which the mode "car" turns | TO | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | off automatically | | |
| ECALL_TEST_NUMBER | - | STRING | 112 | The telephone number for test calls eCall | TO, SHO | Yes |
| GARAGE_MODE_PIN | - | ENUM {NONE, PIN_1-PIN_8} | NONE | The line that signals that the system is in the "Car": - NONE - no alarm mode; - PIN_X - PIN_X - line is active when the system is in this mode, | TO | Yes |
| INT_MEM_TRANSMIT_ INTERVAL | Minutes | INT | 60 | The time interval between attempts to send the message contained in the internal memory of the AU. The value cannot be set to "0" | TO, SHO | Yes |
| INT_MEM_TRANSMIT_ ATTEMPTS | - | INT | 10 | The number of retries the message contained in the internal memory of the AU. The value set to "0" means that retries the message is not made | TO, SHO | Yes |
| **The configuration and the configuration data services** | | | | | | |
| **The basic service "ERA-GLONASS" service (eCall)** | | | | | | |
| ECALL_ON | - | BOOLEAN | TRUE | eCall service is included | TO, SHO | Yes |
| CRASH_SIGNAL_ INTERNAL | - | BOOLEAN | TRUE | Only vehicles of category M1 - to determine the events of the | TO | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | accident the built-in accelerometer | | |
| CRASH_SIGNAL_ EXTERNAL | - | BOOLEAN | FALSE | Only vehicles of category M1 - to determine whether an accident using an external sensor in the vehicle | TO | Yes |
| ASI15_TRESHOLD | - | REAL | 1.8 | Only vehicles of category M1 - Threshold sensor automatically identify events of accidents | TO | Yes |
| ECALL_MODE_PIN | - | ENUM {NONE, PIN_1 .. PIN_8} | NONE | Line, signaling that the system is in the eCall: - NONE - no alarm mode; - PIN_X - PIN_X line active when the system is in this mode, | TO | Yes |
| SOS_BUTTON_TIME | Milliseconds | INT | 200 | While clicking on the "Emergency Call" to activate the "Emergency Call" | TO | Yes |
| CCFT | Minutes | INT | 60 | Duration counter automatic termination call (60 m) | TO, SHO | Yes |
| INVITATION_SIGNAL_ DURATION | Milliseconds | INT | 200 | Signal duration INVITATION (2) | TO, SHO | Yes |
| END_MSG_PERIOD | Milliseconds | INT | 200 | Period message SEND MSG (2) | TO, SHO | Yes |
| AL_ACK_PERIOD | Milliseconds | INT | 200 | Period AL-ACK (2) | TO, SHO | Yes |
| MSD_MAX_ TRANSMISSION_TIME | Seconds | INT | 20 | The maximum duration of the | TO, SHO | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | transmission MSD (20) | | |
| NAD_DEREGISTRATION_ TIMER | Minutes | INT / greater / equal to 480 | 8 | Time after which, the communication module GSM and UMTS terminate registration in the network (8 h) | TO, SHO | Yes |
| ECALL_DIAL_DIRATION | Minutes | INT | 5 | The total duration of the dial at the initiation of emergency | TO, SHO | Yes |
| ECALL_AUTO_DIAL_ ATTEMPTS | - | INT | 10 | Only vehicles of category M1 - number of call attempts when an emergency call is automatically initiated. It can be set to "0" | TO, SHO | Yes |
| ECALL_MANUAL_DIAL_ ATTEMPTS | - | INT | 10 | The number of call attempts to the emergency call, initiated manually. The value cannot be set to "0" | TO, SHO | Yes |
| ECALL_MANUAL_CAN_ CANCEL | - | BOOLEAN | TRUE | TRUE - emergency call initiated manually, can be terminated by the user | TO, SHO | Yes |
| ECALL_SMS_FALLBACK_ NUMBER | - | STRING | 112 | The room in which the AU sends a SMS request to the MND for the operator system | TO, SHO | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Packet data** | | | | | | |
| USE_GPRS_WHITE_LIST | - | BOOLEAN | FALSE | The parameter indicating the need to use the organization GPRS_WHITE_LIST Packet | TO, SHO | Yes |
| GPRS_WHITE_LIST | - | Data format 3) | The empty list | List of networks to which the packet data is available. If GPRS_WHITE_LIST list is empty, the packet data is prohibited | TO, SHO | Yes |
| **Test mode** | | | | | | |
| TEST_REGISTRATION_ PERIOD | Minutes | INT | 5 | If the speaker has been registered in the network by clicking on the "Options", then the subsequent registration of the AU on the network by clicking on the "Options" available no earlier than the given time interval.When set to "0", the limitations on the subsequent registration AC network is not applied | TO, SHO | Yes |

| Record acceleration profile in road accidents | | | | | | |
|---|---|---|---|---|---|---|
| IGNITION_OFF_FOLLOW_UP_TIME1 | Minutes | INT | 120 | The length of time during which the acceleration profile record in the accident with the ignition off | TO | Yes |
| IGNITION_OFF_FOLLOW_UP_TIME2 | Minutes | INT | 240 | The period of time during which the event definition of the accident with the ignition off | TO | Yes |
| CRASH_RECORD_TIME | Milliseconds | INT/0-250 | 250 | Time recording information about the profile of acceleration in road accidents | TO | Yes |
| CRASH_RECORD_ RESOLUTION | Milliseconds | INT/1-5 | 1 | Readability profile recording speed in road accidents | TO | Yes |
| CRASH_PRE_RECORD_ TIME | Milliseconds | INT/0-20000 | 20000 | The recording speed profile information before the accident event occurred | TO | Yes |
| CRASH_PRE_RECORD_ RESOLUTION | Milliseconds | INT/5-100 | 5 | The duration of one count of recording acceleration profile before the event an accident occurred | TO | Yes |
| **Other Options** | | | | | | |
| GNSS_POWER_OFF_TIME | Milliseconds | INT | 500 | The period of time over which removes power GNSS receiver after | Yes | Yes |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | switching off the ignition | | |
| GNSS_DATA_RATE | Hertz | INT / 1, 2, 5, 10 | 1 | Rate of data output GNSS receiver | TO, SHO | No |
| GNSS_MIN_ELEVATION | Degrees | INT/5-15 | 15 | The minimum value of the angle of elevation (angle cut) navigation satellites | TO, SHO | No |
| **Vehicle parameters** | | | | | | |
| VIN | - | STRING | Defines- Xia on stage configurations AU | VIN is determined in accordance with [ 1 ] | TO, SHO | No |
| VEHICLE_TYPE | - | INT | - | Vehicle category Bit 4-0: 00001 - passenger (category M1) 00010 - bus (category M2) 00011 - bus (category M3)00100 - light truck (category N1) 00101 - heavy truck category N2) 00110 - Heavy Freight machine (category N3) 00111 - motorcycle (category L1e) 01000 - motorcycle (category L2e) 01001 - motorcycle (category L3e) 01010 - motorcycle (category L4e) 01011 - | TO, SHO | No |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | motorcycle (category L5e) 01100 - motorcycle (category L6e) 01101 - Motorcycle (category L7e) | | |
| VEHICLE_PROPULSION_STORAGE_TYPE | - | INT | - | Type of energy carrier , when all bits of "0", the type is not specified Bit 7: Not used Bit 6: Not usedBit 5: 1 - hydrogenBit 4: 1 - electricity (more than 42 V and 100 Ah) Bit 3: 1 - liquid propane gas (LPG) Bit 2: 1 - liquefied natural gas (CNG) Bit 1: 1 - diesel Bit 1: 0 - petrol | TO, SHO | No |
| **Device Options (AC)** | | | | | | |
| SERIAL_NUMBER | - | STRING | - | The serial number of the device | - | No |
| HW_VERSION | - | STRING | - | Version of the hardware platform | - | No |
| SW_VERSION | - | STRING | - | The software version | - | No |
| VENDOR_ID | - | INT | - | Vendor ID Device | - | No |
| UNIT_ID | - | INT | - | The unique device identifier assigned by the system operator at the first activation device | - | No |
| LANGUAGE_ID | - | INT | - | Preferred language for voice | - | No |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | communication 0x5F - Russian | | |

1) Meaning "to" in this column indicates that the corresponding parameter is required only for the CA installed on the vehicle in the configuration of additional equipment.
Meaning "TO, SHO" in this column indicates that the corresponding parameter is mandatory for systems installed in the configuration of additional equipment and systems installed in the configuration of standard equipment.

2) ranges (intervals), change the settings depending on the type of the parameter:
- INT: 0-65535;
- BOOLEAN: TRUE, FALSE;
- STRING: 255.

3) Data format - according to with IEC 54619 .

4) "Yes" in this column means that the establishment of the initial value of the AU is subject to change after the initial installation speakers, and a value of "No" - that set the initial values can not be changed in the application of the AU

# Annex B (informative). Description of the method of determining the severity of the accident for vehicles of category M1

Annex B
(informative)

To determine the severity of the accident in the case of speakers installed in the additional hardware configuration, it is recommended to use a sequence of actions.

B.1 continuous recording accelerations ( $a_x$, $a_y$ , $a_z$ ) (see 6.2.3) coming from the three-axis acceleration sensor in each of the three directions ( X,Y ,Z ) associated with the coordinate system of the vehicle. Record the current values of the accelerations ($a_x$, $a_y$ , $a_z$ ) is performed at a frequency of 3 kHz.

B.2 Identify the event an accident by using the data from the three-axis acceleration sensor installed in the vehicle.

B.3 Determine the maximum amplitude of acceleration for a period of time,

characteristic of the events taking place during the accident (150 ms)
values using the $ASI_{15}$.

B.4 Compare the obtained value of ASI with the limit value ASI15_TRESHOLD, in Annex A. The limiting value of ASI, equal to the value ASI15_TRESHOLD, defines the operation of the AU to determine the time of the accident an accident. The values of ASI, greater than or equal ASI15_TRESHOLD, indicate the event an accident, potentially leading to a substantial likelihood of danger to life and health of people in the vehicle cabin. The values of ASI, smaller ASI15_TRESHOLD, indicate the event an accident, potentially leading to a substantial likelihood of danger to life and health of people in the cab vehicle.

Record the measurement acceleration sensor is recommended to be conducted in two parallel data set and stored for at least 150 ms. Duration of each record - 150 ms. The second entry to be shifted in time relative to the first 75 ms. Each of the components of acceleration must be treated filter CFC60. Reservation recording acceleration sensor readings is performed to determine the exact peak accelerations and, accordingly, peak $ASI_{15}$.

Methods for determining the events of the accident and the severity of the accident in the case of the AC system installed in the configuration of standard equipment are determined by vehicle manufacturer.

# Annex B (normative). The minimum set of data

Annex B
(normative)

**B.1 Submission of data**

B.1.1 The minimum set of data to be presented in an abstract syntax notation one in accordance with ISO / IEC 8824-1 and ISO / IEC 8825-2 using the Packed Encoding without alignment. Location of individual data elements in the overall structure of the data is determined by the in accordance with ISO / IEC 8824-1 and ISO / IEC 8825 , taking into account the information given in B.3.

B.1.2 The sequence data must meet the requirements specified in B.2.

**B.2 The minimum set of data**

B.2.1 The sequence of bits and bytes in the message must be in the sequence set out in ISO / IEC 8824-1 .

B.2.2 content dataset minimum standard data identical with eCall, are given in Table B.1.Table B.1 - minimum content dataset standard data

| Data block number | Name of the data | Type of data block | Unit of measure-rhenium | Status | Description of the data |
|---|---|---|---|---|---|
| 1 | ID | Integer (whole number) | - | M | REQUIRES MND data format is set to "1". Subsequent versions have to be compatible with previous versions.Systems receiving MND should support all standardized versions MND |
| 2 | Message Identifier (message ID) | Integer (whole number) | - | M | The message identifier begins with "1" for each new session of emergency and must be incremented with each re sending MND |
| 3 | Control | Sequence bit sequences | - | M | Automatic Activation (automatic call): - True - automatic call; - False - handmade call. TestCall type (test call):- True - a test call; - False - an emergency call. PositionCanBeTrusted (the reliable determination of the location): - True - the reliable determination of the location ; - False - unreliable positioning. encoding method of |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | the type of vehicle is defined in B.3.list of supported categories of vehicles: - passenger (category M1) - Buses (category M2) - Buses (category M3) - Light Trucks ( category N1); - trucks (category N2); - trucks (category N3); - motorcycles (category L1E); - motorcycles (category L2E); - motorcycles (category L3E); - motorcycles (category L4E); - motorcycles (category L5e); - motorcycles (category L6E); - motorcycles (category L7e).PositionCanBeTrusted parameter is set to FALSE, the location data if the vehicle is not altered up to 150 meters, 95% |
| 4 | Vehicle identification (vehicle identification number) | String (string successive sequences) | - | M | VIN vehicle |
| 5 | Vehicle propulsion storage type (type of energy source of the vehicle) | Integer (whole number) | - | M | Fuel (energy) of the vehicle. For each type of fuel (energy source) the following coding: - False - this type of fuel (energy source) is not represented; - True - this type of fuel (energy source) is presented. can be supported by the following types of fuel (energy): - tank gasoline; - tank for diesel fuel - a compressed gas, - liquefied propane gas, - electrical energy storage (more than 42 V and 100 A / h) - store |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | hydrogen. All bits shall be set to "0" to indicate unknown second-hand * or type of fuel (energy). More than one bit can be set when the vehicle uses several types of fuel (energy). |
| * The text of the document to the original. - Note the manufacturer's database. | | | | | |
| 6 | Time stamp (time stamp) | Integer (whole number) | UTC, with | M | The time stamp events accidents - the number of seconds elapsed since January 1, 1970 UTC. If there was an error in determining the time of the event an accident, this value should be set to "0". |
| 7 | Vehicle Location (vehicle position) | Integer (whole number) | Arc second, ... " | M | Latitude 1). If the latitude is not known or if there was an error in the determination of latitude, this value should be set to 0x7FFFFFFF |
| | | Integer (whole number) | Arc second, ... " | M | Longitude 2). If longitude is unknown or if there was an error in the determination of longitude, this value should be set to 0x7FFFFFFF |
| 8 | Vehicle direction (direction of the vehicle) | Integer (whole number) | Degrees | M | The direction of motion (the course) of the vehicle, measured from the direction to the magnetic pole clockwise in increments of 2 ° (range, 0 ° to 358 °). If the direction of motion is not known or if there was an error in determining the direction of motion, then this value should be set to 0x7F |
| 9 | Recent vehicle location n-1 | Integer (whole | 3) | About | Variance latitude ("plus" - for the north direction and the "minus" - |

| | | | | | |
|---|---|---|---|---|---|
| | (position of the vehicle n-1) | number) | | | for the direction south) relative to the parameter value of the current vehicle position determined in the data block number 7 |
| | | Integer (whole number) | 4) | About | Deviation of longitude (the "plus" - for directions to the east and the "minus" - for directions to the west) relative to the value of the parameter of the current position of the vehicle as defined in the data block number 7 |
| 10 | Recent vehicle location n-2 (vehicle position n-2) | Integer (whole number) | 3) | About | Variance latitude ("plus" - for the north direction and the "minus" - for the direction south) toward Recent vehicle location n-1 specified in the data block of No. 9 |
| | | Integer (whole number) | | About | Variance longitude ("plus" - for the east direction and the "minus" - for the west direction) with respect to the parameter Recent vehicle location n-1 specified in the data block of No. 9 |
| 11 | Number of passengers (number of passengers) | Integer (whole number) | - | About | The smallest known number of seat belts fastened. This parameter can be set to "0" or not present, if the information on the number of seat belts fastened absent |
| 12 | Optional additional data (optional additional data) | String (string successive sequences) | - | About | The next 103 bytes are coded in accordance with ISO / IEC 8824-1 . |
| 1) 1 Latitude location of the vehicle, certain navigation receiver and marked in accordance with the requirements of section 8 in the format NMEA-0183 [5], in degrees, minutes and fractions of minutes, with the inclusion of the MND is converted to rotary milliseconds and is expressed in hexadecimal. Range , expressed in milliseconds angle: from | | | | | |

minus to plus 324000000 324000000. highest value: 90 ° 00'00, 000 "= 90.60.60, '000 '= 324000.000" milliarcseconds = 324000000 = 0x134FD900. lowest value: minus 90 ° 00'00, 000 "= minus 90.60.60, 000" = minus 324000.000 "= minus 324 million milliarcseconds = 0hESV02700. Example: 48 ° 18'1 .20 "N = {(48.3600) + (18.60) +1,20} "173881.200 =" = 173881200 = 0x0A5D3770.

2) latitude location of the TC value, defined navigation receiver and marked in accordance with the requirements of section 8 in the format NMEA-0183 [5], in degrees, minutes and fractions of minutes, with the inclusion of the MND recalculated angle is expressed in milliseconds and hexadecimal. range is expressed in milliseconds angle: from minus to plus 648000000 648000000. highest value: 180 ° 00'00, 000 "= 180.60.60, 000" = 648000.000 "= 648000000 = milliarcseconds 0x269FB200. lowest value: minus 180 ° 00'00, 000 "= minus 180.60.60, 000" = minus 648000.000 "= minus 648 million milliarcseconds = 0xD9604E00. Example: 11 ° 37'2 .52 "E = {(11.3600) + (37.60) 2.52} "41822.520" = 41822520 = 0h027E2938.

3) expressed in units, 1 unit = 0.1 ", which corresponds to about 3 m range is from minus 512 to plus 511 or minus 51,2 "S to + 51,1" N from the current location.

4) expressed in units, 1 unit = 0.1 ", which corresponds to about 3 m range is from minus 512 to minus 511 or less 51,2 "W to plus 51.1 'E from the current location. Note - in the "Status", the following designations:

- M (mandatory) - a required parameter. There must always be transmitted;
- O (optional) - optional. Can not be transmitted, and its presence is determined by other parameters in the package.

**B.3 ASN.1 representation of MND with standard data identical with eCall (Dense coding)**

```
MSDASN1Module
DEFINITIONS
AUTOMATIC TAGS :: =
BEGIN
- Specification version MND
CurrentId :: = INTEGER (1)
- ECallMessage information is a top-level
- Structure ECallMessage supports only one type of message (msd)
- Expansion at this level are not allowed to provide
- The possibility of directly extracting ID (version format of the data).
```

- Elements:
- Id: MND data format is set to 1
- Msd: Minimum Data Set, which are transmitted by the AU,
- Excluding ID

```
ECallMessage :: = SEQUENCE {
    id INTEGER (0 .. 255)
    msd MSDMessage
}
```

- The message transmitted by the AU (excluding ID)
- Elements:
- MsdStructure: The main structure of MND
- OptionalAdditionalData: Additional information
- Expandable in future versions at this level

```
MSDMessage :: = SEQUENCE {
    msdStructure MSDStructure,
    optionalAdditionalData AdditionalData OPTIONAL,
...
}
```

- The main structure of MND, with the exception of the additional data
- Elements:
- MessageIdentifier: The message ID
- Control: see ControlType
- VehicleIdentificationNumber: see VIN
- VehiclePropulsionStorageType: see VehiclePropulsionStorageType
- Timestamp: timestamp
- VehicleLocation: see VehicleLocation
- VehicleDirection: Direction of movement
- RecentVehicleLocationNI: deviation from the current position
- See VehicleLocationDelta
- RecentVehicleLocationN2: deviation from recentVehicleLocationN1
- See VehicleLocationDelta
- NumberOfPassengers: minimum known number fastened seat belts

```
MSDStructure :: = SEQUENCE {
    messageIdentifier INTEGER (0 .. 255)
    control ControlType,
    vehicleIdentificationNumber VIN,
```

vehiclePropulsionStorageType VehiclePropulsionStorageType,
timestamp INTEGER (0 .. 4294967295)
vehicleLocation VehicleLocation,
vehicleDirection INTEGER (0 .. 255)
recentVehicleLocationN1 VehicleLocationDelta OPTIONAL,
recentVehicleLocationN2 VehicleLocationDelta OPTIONAL,
numberOfPassengers INTEGER (0 .. 255) OPTIONAL,
...
}
- ControlType consists of the following elements:
- AutomaticActivation: true, false
- TestCall: true, false
- PositionCanBeTrusted: true, false
- VehicleType: see VehicleType
ControlType :: = SEQUENCE {
automaticActivation BOOLEAN,
testCall BOOLEAN,
positionCanBeTrusted BOOLEAN,
vehicleType VehicleType
}
- Identification of the type of vehicle
VehicleType :: = ENUMERATED {
passengerVehicleClassM1 (1)
busesAndCoachesClassM2 (2)
busesAndCoachesClassM3 (3)
lightCommercialVehiclesClassN1 (4)
heavyDutyVehiclesClassN2 (5)
heavyDutyVehiclesClassN3 (6)
motorcyclesClassL1e (7)
motorcyclesClassL2e (8)
motorcyclesClassL3e (9)
motorcyclesClassL4e (10)
motorcyclesClassL5e (11)
motorcyclesClassL6e (12)
motorcyclesClassL7e (13)
...

```
}
- VIN
VIN :: = SEQUENCE {
      isowmi PrintableString (SIZE (3))
      (FROM ("A" .. "H" | "J" .. "N" | "P" | "R" .. "Z" | "0" .. "9"))
      isovds PrintableString (SIZE (6))
      (FROM ("A" .. "H" | "J" .. "N" | "P" | "R" .. "Z" | "0" .. "9"))
      isovisModelyear PrintableString (SIZE (1))
      (FROM ("A" .. "H" | "J" .. "N" | "P" | "R" .. "Z" | "0" .. "9"))
      isovisSeqPlant PrintableString (SIZE (7))
      (FROM ("A" .. "H" | "J" .. "N" | "P" | "R" .. "Z" | "0" .. "9"))
}
- VehiclePropulsionStorageType:
- Fuel (energy source) of a vehicle
VehiclePropulsionStorageType :: = SEQUENCE {
      gasolineTankPresent BOOLEAN DEFAULT FALSE,
      dieselTankPresent BOOLEAN DEFAULT FALSE,
      compressedNaturalGas BOOLEAN DEFAULT FALSE,
      liquidPropaneGas BOOLEAN DEFAULT FALSE,
      electricEnergyStorage BOOLEAN DEFAULT FALSE,
      hydrogenStorage BOOLEAN DEFAULT FALSE,
      ...}
- VehicleLocation:
- The current position of the vehicle
- Elements:
- Latitude - set aside 32 bits (4 octets)
- Longitude - set aside 32 bits (4 octets)
VehicleLocation :: = SEQUENCE {
      positionLatitude INTEGER (-2147483648 .. 2147483647)
      positionLongitude INTEGER (-2147483648 .. 2147483647)
}
- VehicleLocationDelta:
- Location of the vehicle before the definition of accident events
VehicleLocationDelta :: = SEQUENCE {
      latitudeDelta INTEGER (-512 .. 511)
      longitudeDelta INTEGER (-512 .. 511)
```

}

- AdditionalData:
- Additional data encoded as a separate definition
- Elements:
- Oid: the identifier of the object that defines the format and purpose of the data
- Data: additional data in accordance with the format specified oid

```
AdditionalData :: = SEQUENCE {
    oid RELATIVE-OID,
    data OCTET STRING
}
END
```

**B.4 The content of MND additional data entered for the "ERA-GLONASS" and not in a standardized eCall (crash severity score)**

B.4.1 Additional data entered into the MND in the "ERA-GLONASS", should be placed in the data block number 12 - optional additional data.

B.4.2 Contents of the data block number 12 to represent the assessment of severity of an accident is shown in Table B.2. Table B.2 - The content of the data block 12 to provide assessment of severity of accidents

| Data block number | Name of the data | Type of data block | Unit | Status | Description of the data |
|---|---|---|---|---|---|
| 12-A0 | OID | Integer | 1 byte | M | The ID of the additional data block containing additional parameters entered for the "ERA-GLONASS" - is set to 11000000 |
| 12-A1 | ID | Integer | 1 byte | M | REQUIRES format additional data MND is set to "1". Subsequent versions have to be compatible with previous versions |

| | | | | | |
|---|---|---|---|---|---|
| 12-A2 | SevereCrash Estimation | BOOLEAN | - | M | SevereCrash Estimation: - TRUE - a substantial likelihood of threat to life and health of people in the cab of the vehicle; - FALSE - an insignificant probability of threat to life and health of people in the cab of the vehicle |
| | TestResultsDef | Sequence bit sequences | - | About | The coding method is defined in B.5. List of types of errors: - the incorrect microphone connection; - non-functional microphone - faulty right speaker; - failure of the left speaker; - faulty speaker; - failure to determine the state of the line ignition - failure BIP; - fault indicator condition; - failure backup battery; - discharged backup battery below an acceptable level; - faulty sensor automatically identify events of an accident; - a violation of the integrity of the software image; - non-functional interface communication module GSM and UMTS; - non-functional GNSS receiver; - lack of integrity (authenticity) defined GNSS receiver navigation and timing parameters (RAIM function); - Downtime (incorrect connection) external antenna GNSS- Downtime (incorrect connection) external antenna GSM and UMTS; - the internal memory of events; - running out of memory to |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | record the profiles of acceleration - other Critical Errors |
| | MobileDef | Integer | 15 byte | About | The coding method defined B.5. Block consists of 6 parameters: egaMSS - network code MCC (0 if not defined); eraMNCSID - code MNC / SID (0 if not defined); eraLACNID - LAC / NID eraCIDBID - Cell ID / Base Station ID (0 if not defined); eraSector - sector number (0 if not defined); eraRSSI - received signal level (minus 150 if not defined) |
| | CrashDef | Sequence bit sequences | | About | The coding method is defined in B.5. List the type of accidents is presented below:crashFront - punch front; crashSide - side impact; crashFrontOrSide - hit from the front or side impact; Rear crash - hit from behind;crashRollover - coup; crashAnotherType - another type of incident |

**B.5 ASN.1 submission of additional data (assessment of the severity of an accident), introduced for the "ERA-GLONASS" (Dense coding)**

```
OptionalAdditionalData :: = SEQUENCE {
    oid BIT STRING (SIZE (8))
    id BIT STRING (SIZE (8))
    SevereCrashEstimation BOOLEAN (SIZE (1))
    MobileDef MobileType OPTIONAL,
    TestResultsDef TestResultsType OPTIONAL,
```

```
        CrashDef CrashType OPTIONAL
        }
    TestResultsType :: = SEQUENCE {
        micConnectionFailure BOOLEAN DEFAULT FALSE,
        micFailure BOOLEAN DEFAULT FALSE,
        rightSpeakerFailure BOOLEAN DEFAULT FALSE,
        leftSpeakerFailure BOOLEAN DEFAULT FALSE,
        speakersFailure BOOLEAN DEFAULT FALSE,
        ignitionLineFailure BOOLEAN DEFAULT FALSE,
        uimFailure BOOLEAN DEFAULT FALSE,
        statuslndicatorFailure BOOLEAN DEFAULT FALSE,
        batteryFailure BOOLEAN DEFAULT FALSE,
        batteryVoltageLow BOOLEAN DEFAULT FALSE,
        crashSensorFailure BOOLEAN DEFAULT FALSE,
        swImageCorruption BOOLEAN DEFAULT FALSE,
        commModulelnterfaceFailure BOOLEAN DEFAULT FALSE,
        gnssReceiverFailure BOOLEAN DEFAULT FALSE,
        raimProblem BOOLEAN DEFAULT FALSE,
        gnssAntennaFailure BOOLEAN DEFAULT FALSE,
        commModuleFailure BOOLEAN DEFAULT FALSE,
        eventsMemoryOverflow BOOLEAN DEFAULT FALSE,
        crashProfileMemory overflow BOOLEAN DEFAULT FALSE,
        otherCriticalFailires BOOLEAN DEFAULT FALSE,
        otherNotCriticalFailures BOOLEAN DEFAULT FALSE
        }
    MobileType :: = SEQUENCE {
        eraMCC INTEGER (0 .. 999)
        eraMNCSID INTEGER (0 .. 99 ... 100 .. 16383)
        eraLACNID INTEGER (0 .. 65535)
        eraCIDBID INTEGER (0 .. 65535)
        eraSector INTEGER (0 .. 15 ... 16 .. 255)
        eraRSSI INTEGER (-150 ... 0)
        }
    CrashType :: = SEQUENCE {
        crashFront BOOLEAN DEFAULT FALSE,
        crashSide BOOLEAN DEFAULT FALSE,
```

crashFrontOrSide BOOLEAN DEFAULT FALSE,
crashRear BOOLEAN DEFAULT FALSE,
crashRollover BOOLEAN DEFAULT FALSE,
crashAnotherType BOOLEAN DEFAULT FALSE
}

## Annex D (informative). Wiring diagram for automotive systems call emergency services, performed in the configuration of additional equipment to the audio system of the vehicle

Annex D
(informative)

D.1 The recommended regimen (example) speaker connectors, performed in the configuration of additional equipment to the audio system of the vehicle is shown in Figure D.1

Figure D.1 - Example of connecting speakers to the audio system of the vehicle

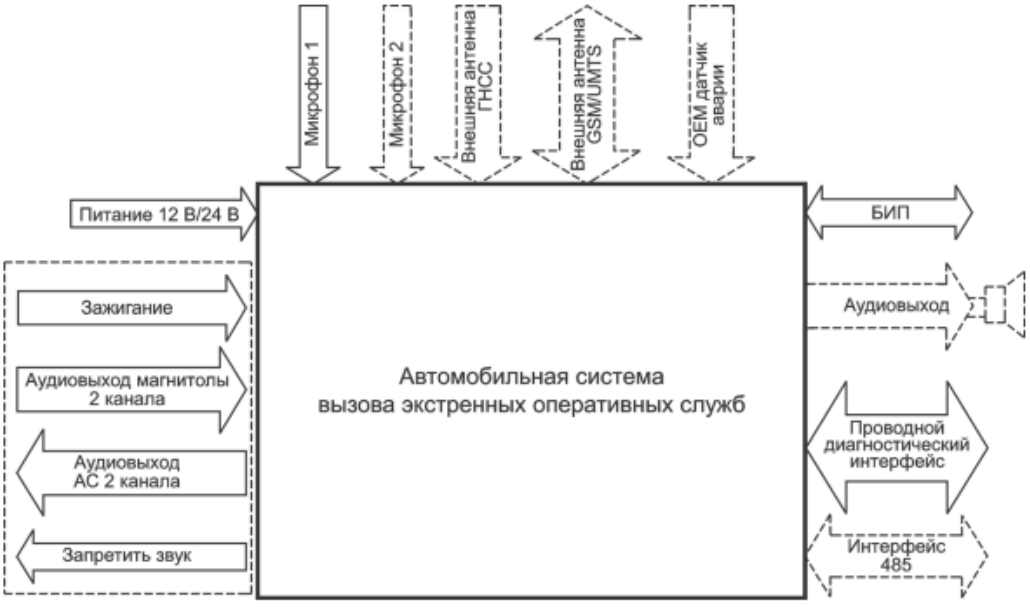



Figure D.1 - Example of connecting speakers to the audio system of the vehicle

D.2 Audio speakers (two front speakers) is connected to the onboard audio system of the vehicle.

D.3 If the vehicle is fitted radio, the audio recorder (2 front speakers) is connected to the audio input of the AU to implement the switching signals within the AU.

D.4 line mute (disable sound) is connected to the radio.

D.5 The following interfaces are optional: - input for the second microphone; - OEM crash sensor (airbag control unit) - wired diagnostic interface; - expansion interface RS485.

D.6 Recommendations for connecting speakers to the onboard sound system of the vehicle, depending on the design of the latter are given in Table D.1. Table D.1

| A possible variant of embodiment of the vehicle audio system | Recommendations for speakers |
|---|---|
| A vehicle with a tape recorder with stereo and audio output, audio system and access to the radio connector connected to the audio system of the vehicle | 1 Connect the receiver to the speakers. 2 Connect the speakers to the audio system.3 Connect the line "disable sound" to the radio |
| A vehicle with a tape recorder with stereo and audio output, audio with no direct access to the connector connecting the radio to the vehicle audio system | 1 Disconnect the wires that connect the radio with the front speakers of the vehicle.2 Connect the receiver to the speakers. 3 Connect the speakers to the audio system.4 Connect the line "disable sound" to the radio |
| A vehicle with no radio and stereo audio output, audio system and access to the radio connector connected to the audio system of the vehicle | 1 Connect the receiver to the speakers. 2 Connect the speakers to the audio system.3 Connect the line "disable sound" to the radio |
| A vehicle with no radio and stereo audio output, audio with no direct access to the connector connecting the radio to the vehicle audio system | Connect the line "disable sound" to the unit, install an additional speaker and connect an additional speaker to the amplified output audio speaker |
| Vehicle without a radio, a sound system and access to the radio connector connected to the audio system of the vehicle | 1 Connect the receiver to the speakers. 2 Connect the speakers to the audio system.3 Connect the line "disable sound" to the radio |
| Vehicle without radio and without audio | Install an additional speaker and connect an additional speaker to the amplified output audio speaker |

## Annex D (informative). The recommendations of the place of the sensor automatic identification event of accident (only for vehicles of category M1)

Annex D
(informative)

The recommendations of the place of the sensor automatic identification event an accident (only for vehicles of category M1)

Diagram 1: From AC system installed in the option configurations, the sensor automatically identify events is recommended to install an accident along the longitudinal axis of the vehicle ( y=0) on the most enhanced seat floor panel away from the deformable parts of the vehicle body. This arrangement provides for the use of the same criteria on impact the right and left sides of the vehicle, which greatly simplifies the configuration of the AU. Recommended places the sensor are shown in Figure E.1 (points A, B, C).

Figure A.1 - Recommended position sensor, the event accident

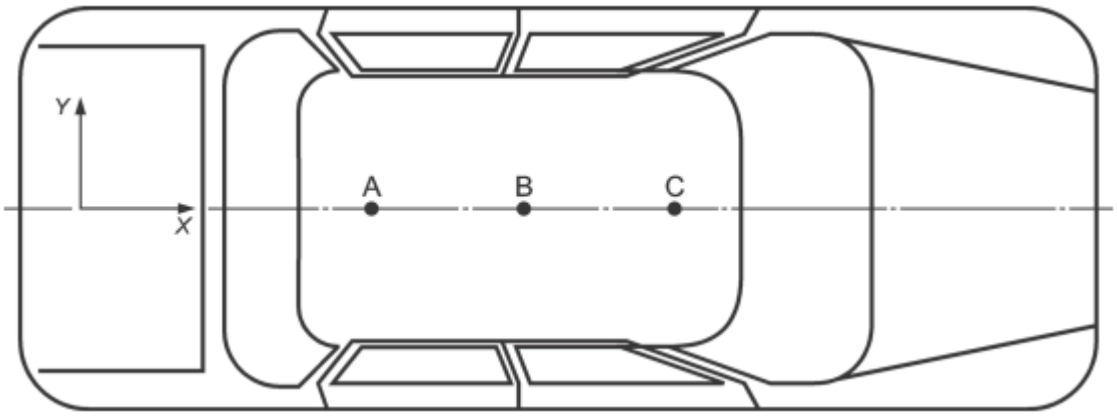



Figure A.1 - Recommended position sensor, the event accident

When choosing the location of the sensor automatically identify events accidents are encouraged to provide sufficient space around the sensor to serious distortion of body elements from damaging the sensor and do not have a negative impact on its performance.

2 for the speakers installed in the standard equipment configuration, installation location, the sensor automatically identify events of accidents determined by the manufacturer of the vehicle.

## Annex E (informative). Recommendations for the implementation and the user interface unit location in the interior of the vehicle (for automotive systems installed in a configuration option)

Annex E

(informative)

E.1 Dimensions BIP should be minimized as much as possible in order to facilitate the installation of the device in the passenger compartment of the vehicle.

E.2 recommended BIP made of materials, texture and color as identical texture and color of the materials used in the manufacture of front panels of the vehicles. If necessary, several options can be created BIP using materials of different textures and colors.

E.3 Do not place in BIP speaker (s), as well as power supplies that are part of the AU, as this increases the overall size of the BIP and makes it difficult to install in the cabin of the vehicle.

F.4 Mount BIP on the front of the vehicle must ensure the safety of persons in the vehicle when the event an accident.

E.5 buttons "Emergency Call" and "Options" should be placed so that the push buttons provided is in a plane perpendicular to the plane of attachment to the vehicle BIP.

## Annex G (informative). Connectors for car system call emergency services in the configuration of the installed additional equipment to the vehicle electrical system of the vehicle. The composition of the signals

Annex G

(informative)

### G.1 main connector for the AC system installed in the configuration of additional equipment to the vehicle electrical system of the vehicle

ZH.1.1 composition signals, recommended for implementation in the connector for connecting speakers to the onboard network of the vehicle, is shown in Table G.1. Table G.1

| Pin Number | Signal Name | Signal direction (relative to AC) | Signal assignment | Signal Status 1) |
|---|---|---|---|---|
| 1 | Ground | Entrance | "Earth" | Yes |
| 2 | Vin + | Entrance | Power 12V or 24V | Yes |
| 3 | CAN L1 | Input-output | CAN 1 (1.5 to 2.5) | Yes 3),5) |
| 4 | uim_4 | Input-output | BIP - 4 signal (for example, "earth" Status Indicator) | No |
| 5 | uim_3 | Input-output | BIP - 3 signal (for example, the status indicator) | No |
| 6 | uim_2 | Input-output | BIP - 2 signal (for example, the button "Options") | No |
| 7 | uim_1 | Input-output | BIP - 1 signal (for example, the button "Emergency Call") | No |
| 8 | ground | Output | The return of "land" BIP | No |
| 9 | J1850- | Input-output | J1850 (OBDII) 3) | No |
| 10 | gpio_1 | Input-output | Universal input / output 1 4) | No |
| 11 | l_line | Input-output | K-Line (OBDII) according to [15] 3) | No |
| 12 | k_line | Input-output | K-Line (OBDII) according to [15] 3) | No |
| 13 | CAN H1 | Input-output | CAN 1 (2.5 to 3.5) | Yes 2),5) |
| 14 | CAN H2 | Input-output | CAN 2 (2.5 to 3.5), OBDII or FMS | No |
| 15 | Umic + | Output | Meals microphone | No |
| 16 | mic + | Entrance | Microphone | No |
| 17 | mic - | Entrance | Microphone | No |
| 18 | Umic- | Output | Meals microphone | No |
| 19 | J1850 + | Input-output | J1850 (OBDII) 3) | No |
| 20 | gpio_2 | Input-output | Universal input / output 2 | No |
| 21 | Ucan/rs485 + | Output | Meals autonomous intelligent sensor | No |
| 22 | USB d + | Input-output | USB data line | No |
| 23 | gpio_3 | Input-output | Universal input / output 3 | No |
| 24 | Vbat + | Input-output | External backup battery | No |
| 25 | CAN L2 | Input-output | CAN 2 (1.5 to 2.5), OBDII or FMS | No |

| | | | | |
|---|---|---|---|---|
| 26 | Uacc + | Output | Meals acceleration sensor | No |
| 27 | ACC_1 | Input-output | The acceleration sensor - signal 1 | No |
| 28 | ACC_2 | Input-output | The acceleration sensor - signal 2 | No |
| 29 | ACC_3 | Input-output | The acceleration sensor - signal 3 | No |
| 30 | Uacc- | Output | Meals acceleration sensor | No |
| 31 | Ucan/rs485- | Output | Meals autonomous intelligent sensor | No |
| 32 | USB d- | Input-output | USB data line | No |
| 33 | gpio_4 | Input-output | Universal input / output 4 | No |
| 34 | Vbat- | Input-output | External backup battery | No |
| 35 | signal_gnd | Entrance | "Land" for the signal L850 (OBDII) 3) | No |
| 36 | radio_mute | Output | Deny sound 2) | Yes 2) |
| 37 | ecall_mode | Output | The "Emergency Call" | No |
| 38 | gnition | Entrance | Line state ignition 5) | Yes 5) |
| 39 | Ground | Entrance | Land | No |
| 40 | NC | | Not used | No |

1) In the "Signal Status" indicates "Yes" if the implementation of the signal in the connector is mandatory, and "No" if the implementation of the signal is not mandatory.

2) In accordance with 6.12 and 6.13 in the ability to disable the vehicle cabin others, nominally established reproducing apparatus for hands-free operation when making an emergency call is a mandatory function of the AU.

To realize this function, or the AC signal 36 used (radio_mute), or the signals 3 and 13 (CAN L, CAN N).

3) If the pin 12 is present in the slot, then the protocol is used in accordance with [15].

If the contact is not in the slot 12, the used protocol J1850 VPW (tracks 19 and 35) or J1850 PWM (pins 9, 19 and 35) according to [16].

4) Pin 10 (gpio_1) recommended for signal connection of an accident, if the signal is implemented in the vehicle.

5) In accordance with 7.3.4, 7.5.3, 7.6.2, 7.7.5, 7.8.8 checking the status of the line vehicle ignition is mandatory for implementation set out in section 7 of the AU

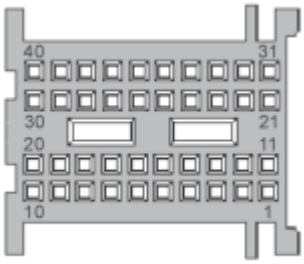
operation modes.

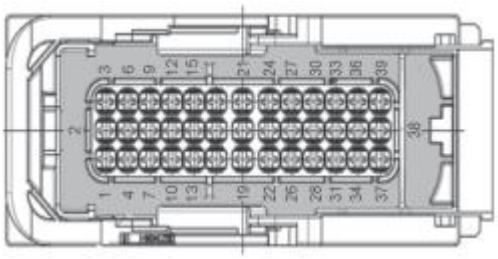
For realization of this procedure is used or a signal 38 (ignition), or the signals 3 and 13 (CAN L1, CAN H1)

Connector installed on the vehicle. Connector contains signals which have to be implemented (required signals), as well as signals which can be used (unnecessary signals) when connected to the AC system TS. mandatory information sign signal when implementing shown in Table G.1. To enable the use of connectors for the microphone, it provided the appropriate signals (pins 15-18). To be able to use a connector for the BIP, the physical interface to connect to the onboard network which CU is not regulated by this standard, the connector is reserved four signals (pins 4-7) . Composition realized signals and the type of USB (USB host, USB device) determines the vehicle manufacturer.

ZH.1.2 Connector speakers to the onboard network TS can be installed by the vehicle manufacturer on the production line to ensure the possibility of a subsequent speaker connectors mounted to the vehicle in the configuration of additional equipment.

ZH.1.3 connectors are recommended for installation on the vehicle for connecting speakers are listed in Table G.2. Table G.2

| Category TC | The main connector for the AC | Connect antenna GNSS | Connect antenna GSM / UMTS |
|---|---|---|---|
| M1/N1 | 953122-1 1)   | FAKRA C  | FAKRA D  |
| M2/M3/N2/N3 | 5-1718321-3 2) | | |

| | | | |
|---|---|---|---|
| |  | | |
| 1) It is assumed connector 953122-1 Series MQS Tyco.<br>2) It is assumed connector 5-1718321-3 AMP MCP Series Tyco. | | | |

**G.2 connectors for connecting external devices to the AC**

**ZH.2.1 Connect external devices using RS 485 bus**

ZH.2.1.1 Composition signals used when using RS 485 bus is shown in Table G.3. Table G.3

| Pin Number | Signal Name | Signal assignment | Signal |
|---|---|---|---|
| 1 | VBAS | 5 V power supply | Output |
| 2 | A | The data line | Input-output |
| 3 | In | The data line | Input-output |
| 4 | GND | "Earth" | Output |

ZH.2.1.2 recommended to use four-wire connector USCAR 347,930,040 Series Mini50 production Molex is shown in Figure G.1.

## Figure G.1 - Recommended connector for the RS485 bus

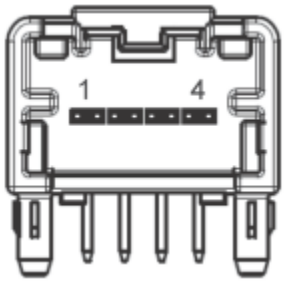



Figure G.1 - Recommended connector for the RS485 bus

ZH.2.1.3 interface to connect to the RS 485 has to support:

a) ModBus RTU protocol to communicate with devices and implement the role of the master in accordance with the following specifications:

1) ModBus application protocol specification. V1.1b;

2) ModBus over Serial Line. Specification and Implementation Guide V1.02;

b) the following configuration: - RS485_BAUD_RATE; - RS485_STOP_BITS; - RS485_PARITY;

c) sending and receiving messages with all the standard function codes defined in the ModBus specification, including support for sending messages such as 1:1 and type 1: N;

d) up to 32 connected peripheral devices, including diagnostic interface if the interface is connected to the diagnostic port RS485.


[1] Technical regulation on safety of wheel vehicles (approved by the Government of the Russian Federation of September 10, 2009 N 720 )

| | | |
|---|---|---|
| [2] | ETSI TS 126 267 (3GPP TS 26.267) | A group of technical specifications Services and System Aspects; transmission of data to the emergency call (eCall); dial modem general description, edition 8 (Technical Specification Group Services and System Aspects; eCall Data Transfer; In-band modem solution; General description, Release 8) |
| [3] | ITU-T R.1100 | Narrowband loud voice in vehicles |
| [4] | ITU-T R.1110 | Broadband loud voice in vehicles |
| [5] | IEC 61162 | The equipment and marine navigation systems and radio communications. Digital interfaces (Maritime navigation and radio communication equipment and systems - Digital interfaces) |
| [6] | UNECE Regulations N 94-01 | Uniform provisions concerning the approval of passenger vehicles with regard to the protection of occupants in frontal collisions, including amendments 1-3 |
| [7] | UNECE Regulations N 95-02 | Uniform provisions concerning the approval of passenger vehicles to protect occupants in the event of a side collision, |

| | | |
|---|---|---|
| | | including the addition of 1 |
| [8] | UNECE Regulations N 66-01 | Uniform provisions concerning the approval of large passenger vehicles with regard to the strength of the upper part of the body |
| [9] | UNECE Regulations 10 N | Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility. |

[10] Terms of use of the subscriber stations (subscriber stations) of mobile radio telephone GSM-900/1800 standard (approved by the Ministry of Information Technologies and Communications of the Russian Federation dated 19 February 2008 N 21 )

[11] Rules for the application of user terminals of mobile radiotelephone communication standard UMTS frequency duplex separation and frequency-Code Division radio channels operating in the frequency range of 2000 MHz (approved by the Ministry of Information Technologies and Communications of the Russian Federation dated 27 August 2007 N 100 )

[12] Rules for the application of user terminals network of mobile radio communication standard UMTS frequency duplex separation and frequency-Code Division radio channels operating in the frequency range of 900 MHz (approved by the Ministry of Information Technologies and Communications of the Russian Federation on October 13, 2011 N 257 )

| | | |
|---|---|---|
| [13] | ISO 2575:2010 / Amd.1: 2011 | Road vehicles. Symbols for controls, indicators and signaling devices. Changing the N 1 (Road vehicles - Symbols for controls, indicators and tell-tales. Amendment 1) |

[14] The Russian system and the numbering plan (approved by the Ministry of Information Technologies and Communications of the Russian Federation of November 17, 2006 N 142 )

| | | |
|---|---|---|
| [15] | ISO 9141-2 | Road vehicles. Diagnostic systems. Part 2. CARB requirements for the exchange of digital information (CARB requirements for interchange of digital information) |
| [16] | SAE J1850 | Data Interface network, Class B (Class In Data Communications Network Interface) |