Proposals for homologation of AECD and Installation in vehicle

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Legal Background

UN R94

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES WITH REGARD TO THE PROTECTION OF THE OCCUPANTS IN THE EVENT OF A FRONTAL COLLISION

UN R95

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES WITH REGARD TO THE PROTECTION OF THE OCCUPANTS IN THE EVENT OF A LATERAL COLLISION

Conclusion:
Tests regarding UN R94 and R95 are intended to check the protection of the occupants.
AECD homologation – Component Approval

Typical bracket
(same fixation on vehicle)

Communication module
Localisation module
In-band modem (or other)
Controls and indicators
MIC and SPEAKER

PHONE COMMUNICATION TESTS
(850 Mhz, 900 Mhz, 1,800 Mhz, 2,100 Mhz)

GNSS COMMUNICATION TESTS
(GPS, Gionass, Galileo, …)

MSD TRANSMISSION
- Fault management
- Content of MSD

EMC TESTS AS ESA
✓ UN R10

MECHANICAL SHOCK
PERFORMANCE and/or FUNCTIONING TESTS
- AUDIO TEST
- PHONE TESTS
- GNSS TESTS
- HMI CHECK
- MANUAL ACTIVATION

Verification of generation of Trigger Signal (in minimum) under the conditions described in UN R94/R95
This can be done
✓ during R94/95 impact tests or
✓ via other measures

AECG without a back-up battery have to demonstrate that after the impact tests of UN R94/R95 on-board energy is still available

EMC TESTS IF COMPONENTS NOT APPROVED AS ESA
✓ UN R10
AEC homologation

- Verification (in minimum) of
  - generation of Trigger Signal during the UN R94/R95 impacts,
  - audio capabilities and MSD transmission during crash test procedure.
  This can also be done via other measures

- AECD without a back-up battery have to demonstrate that after the impact tests of UN R94/R95 on-board energy is still available

Typical bracket (same fixation on vehicle)

- Mechanical impact
- EMC as ESA (UN R10)

EMC TESTS IF COMPONENTS NOT APPROVED AS ESA
  - UN R10

AEC without a back-up battery have to demonstrate that after the impact tests of UN R94/R95 on-board energy is still available

- PHONE COMMUNICATION TESTS
  (850 Mhz, 900 Mhz, 1,800 Mhz 2,100 Mhz)

- GNSS COMMUNICATION TESTS
  (GPS, Glonass, Galileo, …)

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  - Fault management
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- Mechanical impact
- EMC as ESA (UN R10)
Component Approval (Part I)

- Microphone
- GNSS Antenna
- Communication module
- Localisation module
- Interface to vehicle

- Back-up battery

- Phone Antenna

- Communication module
- Localisation module
- Interface to vehicle

- At minimum one loudspeaker
  - OK

- Microphone

- Necessary for voice connection (if mandatory)
STEP 1
Verification of **generation of Trigger Signal**

- For vehicles of category M1 and N1 which are in the scope of R94 and/or R95 verification of generation of a trigger signal to AECD during impact test of R94 and/or R95
- If no backup battery is fitted: Check after impact that the onboard energy is still available

The manufacturer may show with other measures that
- the AECD system is triggered during severe accidents
- if no backup battery is fitted onboard energy is still available
IN VEHICLE PERFORMANCE and/or FUNCTIONING TESTS (Part II)

STEP 2
Verification of installation of AECD

Verification of reception quality for each antenna in-vehicle (phone, GNSS)

Audio functioning

Calibrated emission of phone and GNSS signals (like EMC emission)

Real antennas Installed in vehicle

Vehicle on turn table for execute tests for several directions
STEP 1 & STEP 2 together
Verification of generation of Trigger Signal & installation of AECS

Showing that an emergency call been sent successfully after the impact under R94 and R95
IN VEHICLE PERFORMANCE and FUNCTIONING TESTS

STEP 3
Manual AECD activation

Execute a manual emergency call with:

- real **PSAP** (with 112 or testing number)
- or **PSAP** dedicated to eCall test issue
- or **simulator** of PSAP (mobile network + GNSS + Audio vocal channel)

HMI conformity
✓ ECE121

Vehicles of category M1 and N1 not in the scope of UN R94 and/or R95 have to be equipped (at the minimum) with a manual activation of an emergency call.