**Economic Commission for Europe**

Inland Transport Committee

**World Forum for Harmonization of Vehicle Regulations**

**Working Party on General Safety Provisions**

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Item 9 of the provisional agenda

**UN Regulation No. 116 (Anti-theft and alarm systems)**

 Proposal for the 01 series of amendments to UN Regulation No. 116 (Anti-theft and alarm systems)

 Submitted by the expert from the International Organization of Motor Vehicle Manufacturers[[1]](#footnote-2)\*

The text reproduced below was prepared by the expert from International Organization of Motor Vehicle Manufacturers (OICA) to replace the proposal GRSG/2020/24. The modifications to the current text of UN Regulation No. 116 are marked in bold characters.

 I. Proposal

*Paragraph 5.1.5.,* amend to read:

"5.1.5. "*Key*" means any **~~device~~ mechanical and/or electronic solution** designed and constructed to provide a method of operating a locking system which is designed and constructed to be operated **~~only~~** by that **~~device~~ mechanical and/or electronic solution**.”

Add new paragraph 5.1.7.:

“**5.1.7. “*Digital key*” means a key designed to be transferred to multiple devices by the vehicle user through dedicated processes.**”

Add new paragraph 5.2.16.:

“**5.2.16. In addition digital keys shall comply with the provisions of Annex 11.**”

*Paragraph 6.1.8.,* amend to read:

"6.1.8. "*Key*" means any **~~device~~ mechanical and/or electronic solution** designed and constructed to provide a method of operating a locking system which is designed and constructed to be operated **~~only~~** by that **~~device~~ mechanical and/or electronic solution**.”

Add new paragraph 6.1.13.:

**“6.1.13. “*Digital key*” means a key designed to be transferred to multiple devices by the vehicle user through dedicated processes.**”

*Add new paragraph 6.2.10.*:

“**6.2.10. In addition digital keys shall comply with the provisions of Annex 11.**”

Add new paragraph 7.2.7.:

“**7.2.7. In addition digital keys shall comply with the provisions of Annex 11.**”

*Paragraph 8.1.6.,* amend to read:

"8.1.6. "*Key*" means any **~~device~~ mechanical and/or electronic solution** designed and constructed to provide a method of operating a locking system which is designed and constructed to be operated **~~only~~** by that **~~device~~ mechanical and/or electronic solution**.”

Add new paragraph 8.1.11.:

**“8.1.11. “*Digital key*” means a key designed to be transferred to multiple devices by the vehicle user through dedicated processes.**”

*Add a new paragraph 8.2.11.*, to read:

“**8.2.11. In addition digital keys shall comply with the provisions of Annex 11.**”

*Add a new paragraph 13.3. and 13.4.*, to read:

**“13.3. Transitional Provisions applicable to the 01 series of amendments:**

**13.3.1. As from the official date of entry into force of the 01 series of amendments, no Contracting Party applying this Regulation shall refuse to grant or refuse to accept UN type approvals under this Regulation as amended by the 01 series of amendments.**

**13.3.2. As from 1 September 2022, Contracting Parties applying this Regulation shall not be obliged to accept UN type approvals to the preceding series (00) of amendments, first issued after 1 September 2022.**

**13.3.3. Until 1 September 2022, Contracting Parties applying this Regulation shall continue to accept UN type approvals to the preceding series (00) of amendments to this Regulation, first issued before 1 September 2022.**

**13.3.4. As from 1 September 2024, Contracting Parties applying this Regulation shall not be obliged to accept type approval issued to the preceding series of amendments to this Regulation.**

**13.3.5. Notwithstanding paragraph and 13.3.4., Contracting Parties applying this Regulation shall continue to accept UN type approvals issued according to a preceding series of amendments to this Regulation, for vehicles which are not affected by the provisions introduced with the 01 series of amendments.**

**13.4. General transitional provisions:**

**13.4.1. Contracting Parties applying this Regulation shall not refuse to grant UN type approvals according to any preceding series of amendments to this Regulation or extension thereof. “**

*Add a new Annex 11*, to read:

 “Annex 11

Safety provisions for digital keys

1. **General**

**The purpose of this annex is to specify the requirements for documentation and verification for digital keys used to operate the ‘device to prevent unauthorized use’ and/or the ‘alarm system’ and/or the ‘immobilizer’ of the vehicle.**

1. **Definitions**
	1. **“*Authorization process*” means any method to provide the digital key which can operate the ‘device to prevent unauthorized use’ and/or the ‘alarm system’ and/or the ‘immobilizer’ of the vehicle.**
	2. **“Revocation process” means any method to prevent the digital key to operate the ‘device to prevent unauthorized use’ and/or the ‘alarm system’ and/or the ‘immobilizer’ of the vehicle.**
	3. **“Boundary of functional operation” defines the boundaries of the external physical limits (e.g. distance) within which the digital key is able to operate the ‘device to prevent unauthorized use’ and/or the ‘immobilizer’ of the vehicle.**
2. **Documentation**

**The vehicle manufacturer shall provide the following documentation for type approval:**

* 1. **A description of the authorization process.**
	2. **A description of the revocation process.**
	3. **A description of the boundary of functional operation.**
	4. **A description of the safety measures designed within the digital key revocation process to ensure safe operation of the vehicle.**
1. **Requirements for Safe Operation**
	1. **A digital key shall only be transferred to a device via the authorization process.**
	2. **There shall be a revocation process.**
		1. **Revocation of a digital key shall not result in an unsafe condition.**

**Proposal by Germany during the last Task force:** Evidence shall be shown by an assessment to ISO 26262-2018 (Functional Safety - Road Vehicles), and ISO/PAS 21448 (Safety of the Intended Functionality of ­­road vehicles).

*OICA - Counter Proposal based on UN R100 text (6.15.2.1) for the requirement. UN R 79 has only a requirement for the capability of the technical service, no specific documentation requirement for the product. Proposal aims to open the product requirements to appropriate industry standards as in UN R100:*

 *A risk reduction analysis using appropriate industry standard methodology (for example, IEC 61508, MIL-STD 882E, ISO 26262,* ISO/PAS 21448, *AIAG DFMEA, fault analysis as in SAE J2929, or similar), which documents the risk to vehicle occupants caused by revocation of a digital key and documents the reduction of risk resulting from implementation of the identified risk mitigation functions or characteristics.*

* + 1. **It shall be possible ~~to~~for the user to identify the number of authorized registered digital keys.**

*OICA. English verbage and clarity:* The intent is to provide the number of keys which have completely passed the authorization process, which ends with an registration. Added the word “Authorized” since this is defined with the authorization process.

* 1. **Boundary of functional operation for the device to prevent unauthorized use and the immobilizer:**
		1. **Unlocking of the device to prevent unauthorized use shall require at a minimum an actuation from the interior of the vehicle, or an actuation triggered by an action of the user in close proximity of the vehicle.**

Swedish proposal for clarity: “Unlocking of the device to prevent unauthorized use shall require at a minimum that the digital key is ~~an actuation~~ **~~of the digital key~~** actuated from the interior of the vehicle, or ~~an actuation triggered by~~ an action of the user in close proximity of the vehicle.”

OICA proposes to further clarify:

Unlocking of the device to prevent unauthorized use shall require at least that an authorized registered digital key is detected in the interior of the vehicle, or in close proximity of the vehicle perimeter.

* + 1. **Unsetting of the immobilizer shall require at a minimum an actuation from the interior of the vehicle, or an actuation triggered by an action of the user in close proximity of the vehicle.**

**NL proposal: Unsetting of the immobilizer shall require at a minimum** that the digital key is actuated **from the interior of the vehicle or a close proximity of less than [1m] around the vehicle.**

First OICA would propose reverb for clarity and define the close proximity via a test procedure:

Unsetting of the immobilizer shall require at least that an authorized registered digital key is detected in the interior of the vehicle, or in close proximity of the vehicle perimeter.

Second OICA is not intending to have the immobilizer unset from outside of the vehicle. To cover the full use cases e.g. jacket of on rear seat and the typical circular field of the antennas such use cases will lead to some outside field.

Scenario discussed to argue for the 1 m (driver near the vehicle, theft gets into the vehicle and drives away) is very rare. Most vehicle thefts are done by first steeling the key.

The restriction to a distinct distance is difficult, since the measurement of the distance is dependent on many conditions. Proposal is to restrict the possible conditions and define the close proximity via a test procedure proposed below for the type approval test.

The distance of unsetting of the immobilizer [may] be verified using the following procedure:

The vehicle shall be parked in a secure condition in free field condition, this means engine off and all windows, doors and roof shall be closed.

The vehicle manufacturer will provide a typical user device for test in agreement with the technical service. The digital key device battery state of charge shall be at maximum.

The technical service will define [4] test points around the vehicle perimeter at a distance greater than [1 m]. Distance means the distance between the nearest point of the motor vehicle and the user device.

The user device is placed at each of the test points. During the attempt of engine start the vehicle door shall be closed. If at one of the test points the engine starts, the requirement is not met.

* + 1. **The requirements in paragraph 4.3.1. and paragraph 4.3.2 shall not apply during a remote control manoeuvring as defined in UN Regulation No. 79.**
	1. **Detailed information shall be contained in the owner's manual of the vehicle, or by any other communication means in the vehicle; as a minimum, this information shall include:**
* **the method(s) for authorization of the digital key**
* **the method(s) for revocation of the digital key**
1. **The effectiveness of the system shall not be adversely affected by cyber-attacks, cyber threats and vulnerabilities. The effectiveness of the security measures shall be demonstrated by compliance with UN Regulation No. 155.”**
2. **Verification**

**Verification of the functionality of the digital key shall be conducted with support of manufacturer's documentation as specified in paragraph 3.**

##### **7. Competence of the auditors/assessors**

The assessments under this Annex shall only be conducted by auditors/assessors with the technical and administrative knowledge necessary for such purposes. They shall in particular be competent as auditor/assessor for ISO 26262-2018 (Functional Safety - Road Vehicles), and ISO/PAS 21448 (Safety of the Intended Functionality of road vehicles); and shall be able to make the necessary link with cybersecurity aspects in accordance with UN Regulation No 155 and ISO/SAE 21434). This competence should be demonstrated by appropriate qualifications or other equivalent training records.”

II. Justification

1. Paragraphs 5.1.5., 6.1.8. and 8.1.6., Clarification on the definition of key:Device was interpreted as being the carrier of the key, calling the key a solution clarifies that the key does not need to be a mechanical device. Multiple devices (multiple key types, multiple solutions) are accepted to operate the same locking systems of the devices in the vehicle today (device to prevent unauthorized use, immobilizer, alarm system), removal of « only » removes the confusion on this point.
2. Paragraphs 5.1.7., 6.1.13. and 8.1.11., Addition of definition of digital key: Major differentiator is the possible transfer to multiple devices through a process provided by the vehicle manufacturer. This differentiator is taken as base for the new added definition. It was decided to call this specific electronic solution a “Digital key” to reflect same technology as defined under this term by CCC (Connected Car Consortium).
3. Paragraphs 5.2.16., 6.2.10., 7.2.7. and 8.2.11., includes new additional provisions for digital keys via Annex 11, detailed below.
4. Annex 11 paragraphs 2.1., 3.1. and 4.1.: Digital keys require an authorization process in place.
5. Annex 11 paragraphs 2.2., 3.2., 3.4. and 4.2.: Digital keys require an revocation process in place. Revocation was identified as being the major risk factor for vehicle operation, therefore specific safety measures must be provided to ensure safe operation.
6. Annex 11 paragraphs 2.3., 3.3. and 4.3: Digital keys require the unlocking of the device to prevent unauthorized use and the unsetting of the immobilizer remote operation to be limited.
7. Annex 11 Paragraph 4.4: Digital keys require additional information in the vehicle (e.g. owner’s manual).
8. Annex 11 Paragraph 5: Digital keys require compliance with UN Regulation No. 155 on Cyber Security.
9. Paragraphs 13.3. and 13.4.: Addition of transitional provisions in alignment with European General Safety Revision 2 provision for Cyber Security.

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1. \* In accordance with the programme of work of the Inland Transport Committee for 2020 as outlined in proposed programme budget for 2020 (A/74/6 (part V sect. 20) para 20.37), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate. [↑](#footnote-ref-2)