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SYSTEM ENGINEERING
SOFTWARE DEVELOPMENT
PROCESS & RAMS CONSULTING
VALIDATION & VERIFICATION
EMBEDDED SOFTWARE

"R156: UN Regulation on Software Updates and Software Updates Management Systems",

an overview.

Automotive Spin – 18/11/2021

Contents

- Introduction
- Identification and status of the regulation
- Scope of the regulation
- The regulation split approach
- Requirements on SUMS – in brief
- Assessments, declaration and certification of compliance for SUMS
- Requirements on the vehicle type – in brief
- Assessment of vehicle type
- Marking of vehicles
- RXSWIN
- Conclusions

25 June 2020:
> UN formally adopt two new regulations on
> **Automotive Cybersecurity**

- 775 million consumer vehicles will be connected via telematics or by in-vehicle apps by 2023

- 70% of worldwide new light-duty vehicles and trucks will be shipped with embedded connectivity

- 100 million LOCs in 2020, 300 million LOCs in 2030

25 June 2020:
>
> UN formally adopt two new regulations on
> **Automotive Cybersecurity**

- UNECE (United Nations Economic Commission for Europe)

- WP.29 objective: "to initiate and pursue actions aimed at the worldwide harmonization or development of technical regulations for vehicles."

- GRVA (Groupe de Rapporteurs, Automated and connected Vehicles)

Introduction
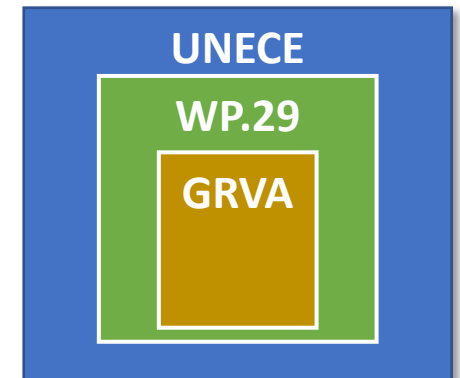
25 June 2020:
     UN formally adopt two new regulations on
     Automotive Cybersecurity

- Managing vehicle cyber risks

- Securing vehicles by design to mitigate risks along the value chain

- Detecting and responding to security incidents across vehicle fleet

R155
UN Regulation
on Cybersecurity
and Cyber Security
Management Systems

- Providing safe and secure software updates, including "Over-the-Air" (O.T.A.) updates.

R156
UN Regulation
on Software Updates
and Software Updates
Management Systems

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Identification and status of the regulation

E/ECE/TRANS/505/Rev.3/Add.155

4 March 2021

Agreement

Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations*

(Revision 3, including the amendments which entered into force on 14 September 2017)

Addendum 155 – UN Regulation No. 156

Date of entry into force as an annex to the 1958 Agreement: 22 January 2021

Uniform provisions concerning the approval of vehicles with regards to software update and software updates management system

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2020/80.

UNITED NATIONS

* Former titles of the Agreement:
Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version);
Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2).

R156

January 2021: entry into force

Introduction timing: **under preparation**

R155

January 2021: entry into force

July 2022: compliance required in the UE for all new vehicle type approvals

July 2024: compliance required in the UE for all new vehicle registrations

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- Scope of the regulation
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- Assessments, declaration and certification of compliance for SUMS
- Requirements on the vehicle type – in brief
- Assessment of vehicle type
- Marking of vehicles
- RXSWIN
- Conclusions

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UN Regulation on Software Updates and Software Updates Management Systems

Contents

- Introduction
- Identification and status of the regulation
- Scope of the regulation
- The regulation split approach
- Requirements on SUMS – in brief
- Assessments, declaration and certification of compliance for SUMS
- Requirements on the vehicle type – in brief
- Assessment of vehicle type
- Marking of vehicles
- RXSWIN
- Conclusions

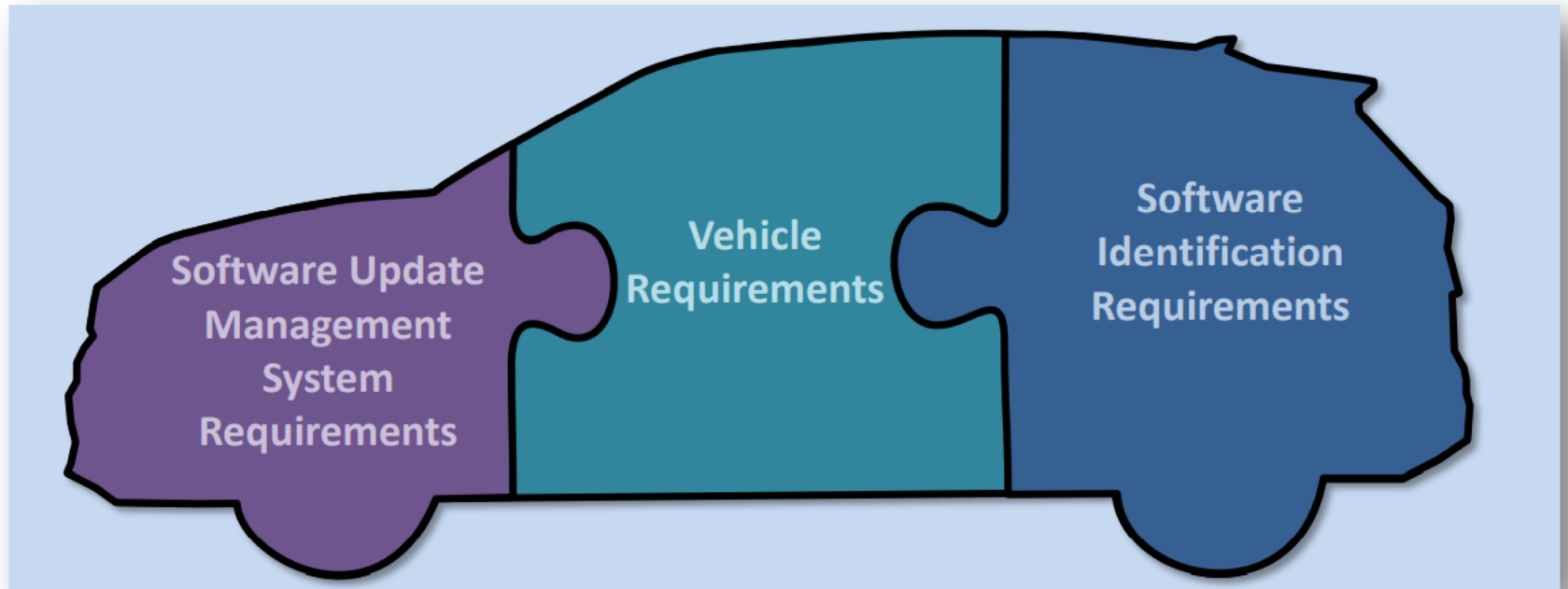**SUMS**

Vehicle type

RXSWIN

Contents

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- Scope of the regulation
- The regulation split approach
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- Configuration management and quality control processes at manufacturer

- Processes for ensuring updates are executed safely and will not affect the safety or certification of vehicles

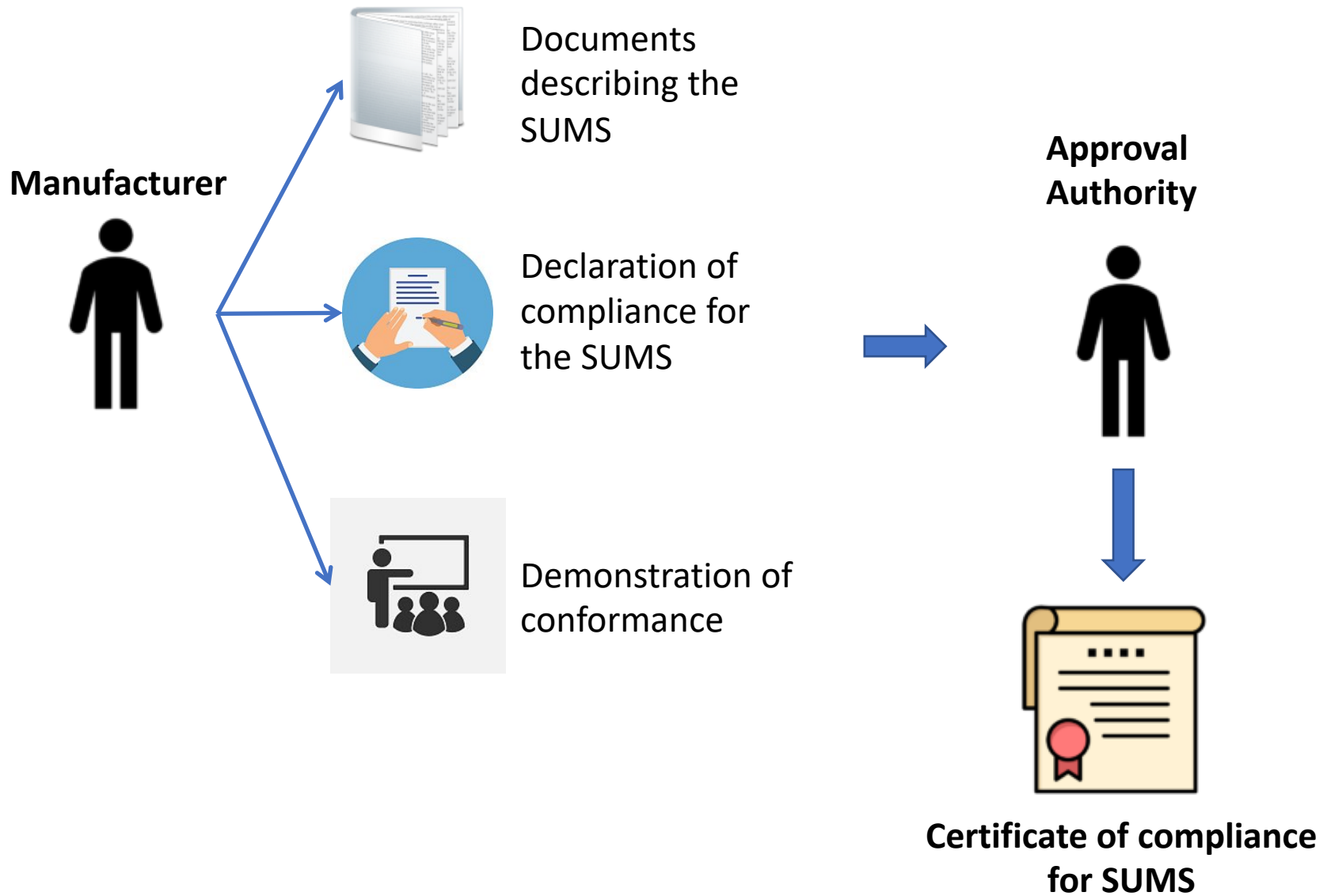- Processes for informing users of updates

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- Requirements on SUMS – in brief
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Documents describing the SUMS

Manufacturer

Declaration of compliance for the SUMS

Approval Authority

Demonstration of conformance

Certificate of compliance for SUMS

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Manufacturer's declaration of compliance with the requirements for Software Update Management System

Manufacturer Name: ....

Manufacturer Address: ....
....

...................(Manufacturer Name) attests that the necessary processes to comply with the requirements for the Software Update Management System laid down in paragraph 7.1 of UN Regulation No. [*This Regulation*] are installed and will be maintained.

Done at: ....(place)

Date: ....

Name of the signatory: ....

Function of the signatory: ....

....

(Stamp and signature of the manufacturer's representative)

- Shall remain valid for a maximum of 3 years

- After 3 years, extension for other 3 years

- May be withdrawn if the requirements of the Regulation are no longer met.

Contents

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- Protect SU delivery mechanism and ensure integrity and authenticity

- Software identification numbers must be protected

- Software identification number is readable from the vehicle.

- Restore function if update fails

- Execute update only if sufficient power

- Ensure vehicle is capable of conducting update

- Ensure safe execution

- Inform users about each update and about their completion.
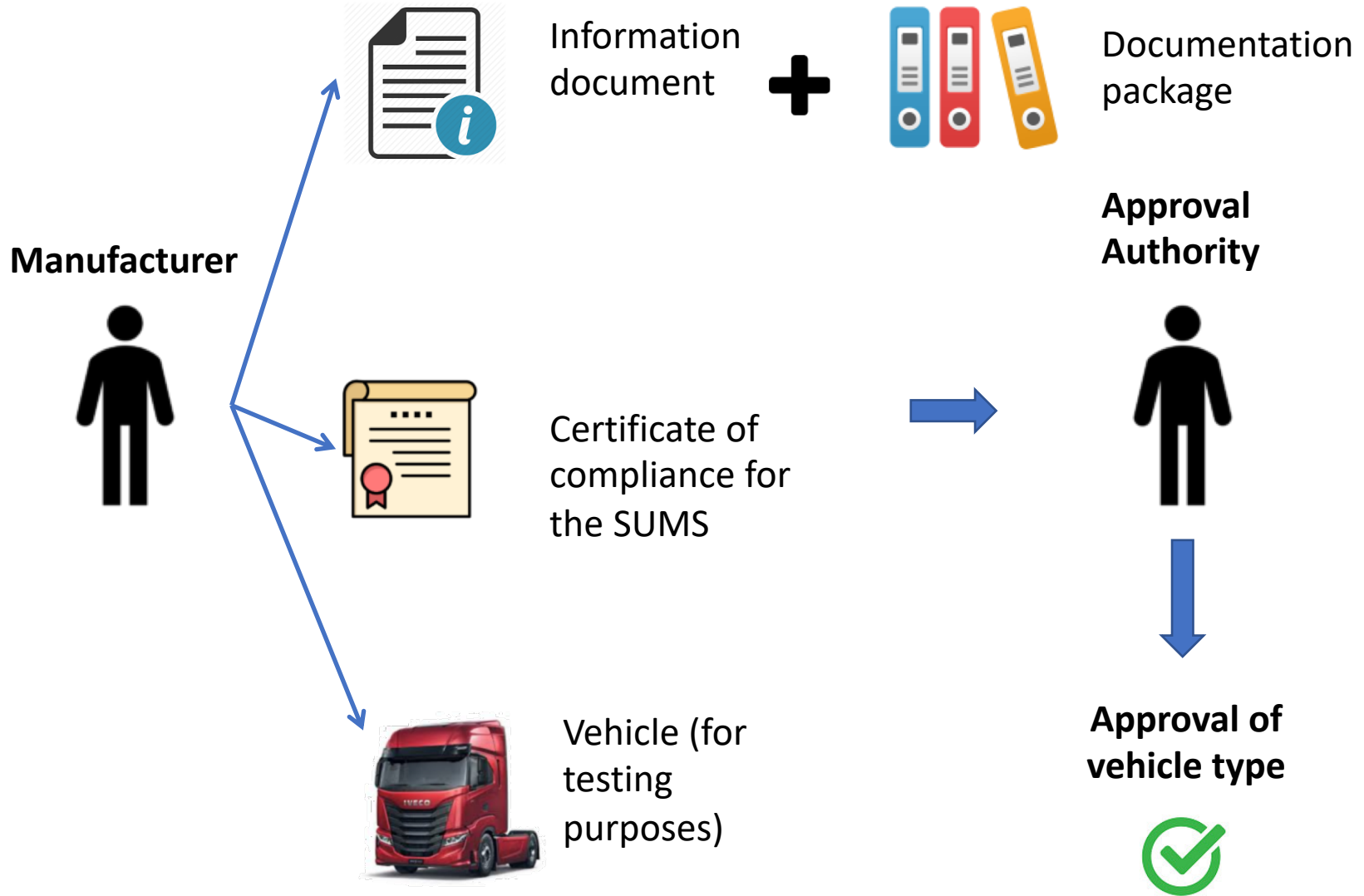
Contents

- Introduction

- Identification and status of the regulation

- Scope of the regulation

- The regulation split approach

- Requirements on SUMS – in brief

- Assessments, declaration and certification of compliance for SUMS

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Manufacturer

Information document

+

Documentation package

Certificate of compliance for the SUMS

Vehicle (for testing purposes)

Approval Authority

Approval of vehicle type

Information document

1. Make (trade name of manufacturer): ....

2. Type and general commercial description(s): ....
(Type is the type to be approved, commercial description refers to the product in which the approved type is used)

3. Means of identification of type, if marked on the vehicle: ....

4. Location of that marking: ....

5. Category(ies) of vehicle: ....

6. Name and address of manufacturer/ manufacturer's representative: ....

7. Name(s) and Address(es) of assembly plant(s): ....

8. Photograph(s) and/or drawing(s) of a representative vehicle: ....

9. Software Updates

9.1. General construction characteristics of the vehicle type:...........................

9.2. The number of the Certificate of Compliance for Software Update Management System: ....

9.3. Security measures.

9.3.1. Documents for the vehicle type to be approved describing that the update process will be performed securely ....

9.3.2. Documents for the vehicle type to be approved describing that the RXSWINs on a vehicle are protected against unauthorized manipulation ....

Security Documentation

9.4. Software updates over the air

9.4.1. Documents for the vehicle type to be approved describing that the update process will be performed safely ....

9.4.2. How a vehicle user is able to be informed about an update before and after its execution..

OTA Documentation

- Approval

- Extension of approval

- Refusal of approval
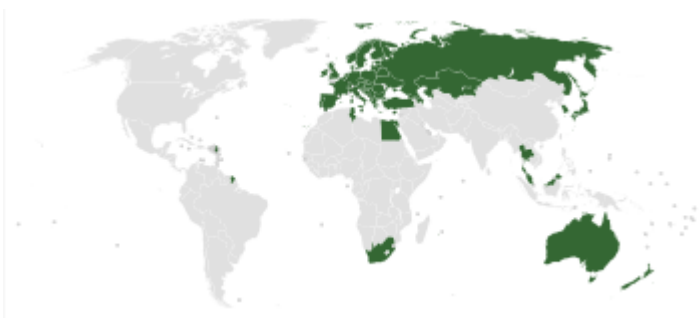
(Maximum format: A4 (210 x 297 mm))

issued by: Name of administration:
....
....
....

E ...¹

Concerning:² Approval granted
Approval extended
Approval withdrawn with effect from dd/mm/yyyy
Approval refused
Production definitively discontinued

of a vehicle type, pursuant to UN Regulation No. [*this Regulation*]
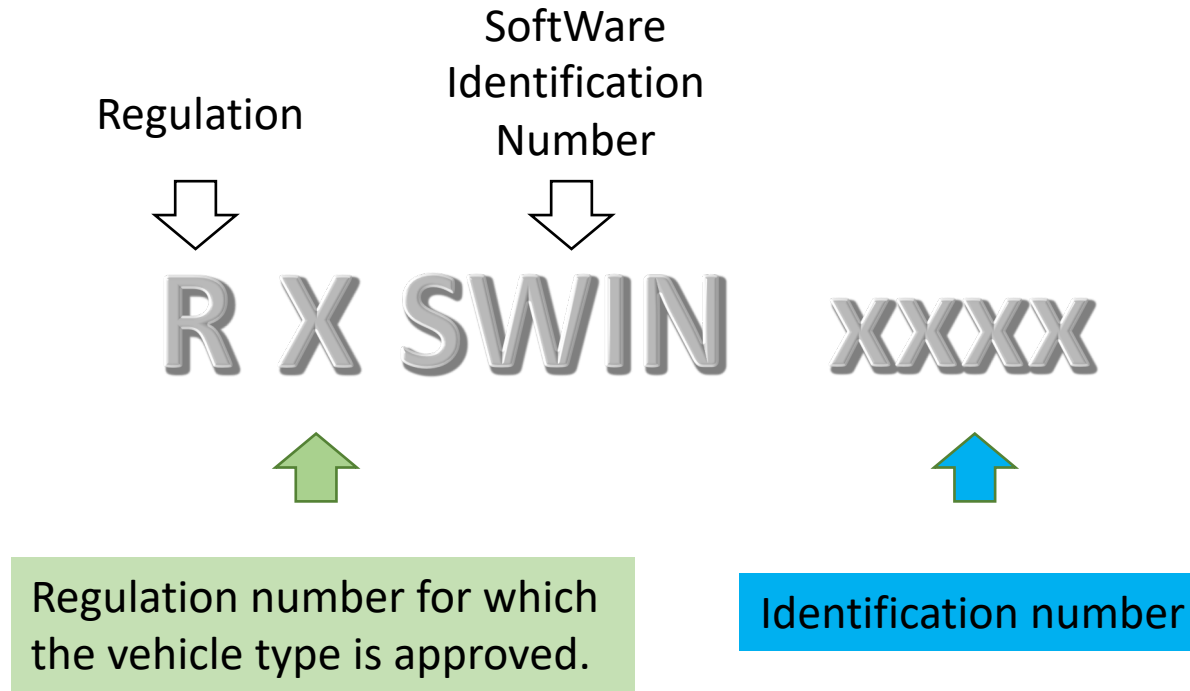
Approval No.: ....

Extension No.: ....

Reason for extension: ....

1. Make (trade name of manufacturer): ....
2. Type and general commercial description(s) ....
3. Means of identification of type, if marked on the vehicle: ....
3.1. Location of that marking: ....
4. Category(ies) of vehicle: ....
5. Name and address of manufacturer / manufacturer's representative: ....
6. Name(s) and Address(es) of the production plant(s) ....
7. Number of the certificate of compliance for software update management system: ...
8. Software updates over the air included (Yes/no): ....
9. Technical Service responsible for carrying out the tests: ....
10. Date of test report: ....
11. Number of test report: ....
12. Remarks: (if any). ....
13. Place: ....
14. Date: ....
15. Signature: ....
16. The index to the information package lodged with the Approval Authority, which may be obtained on request is attached.

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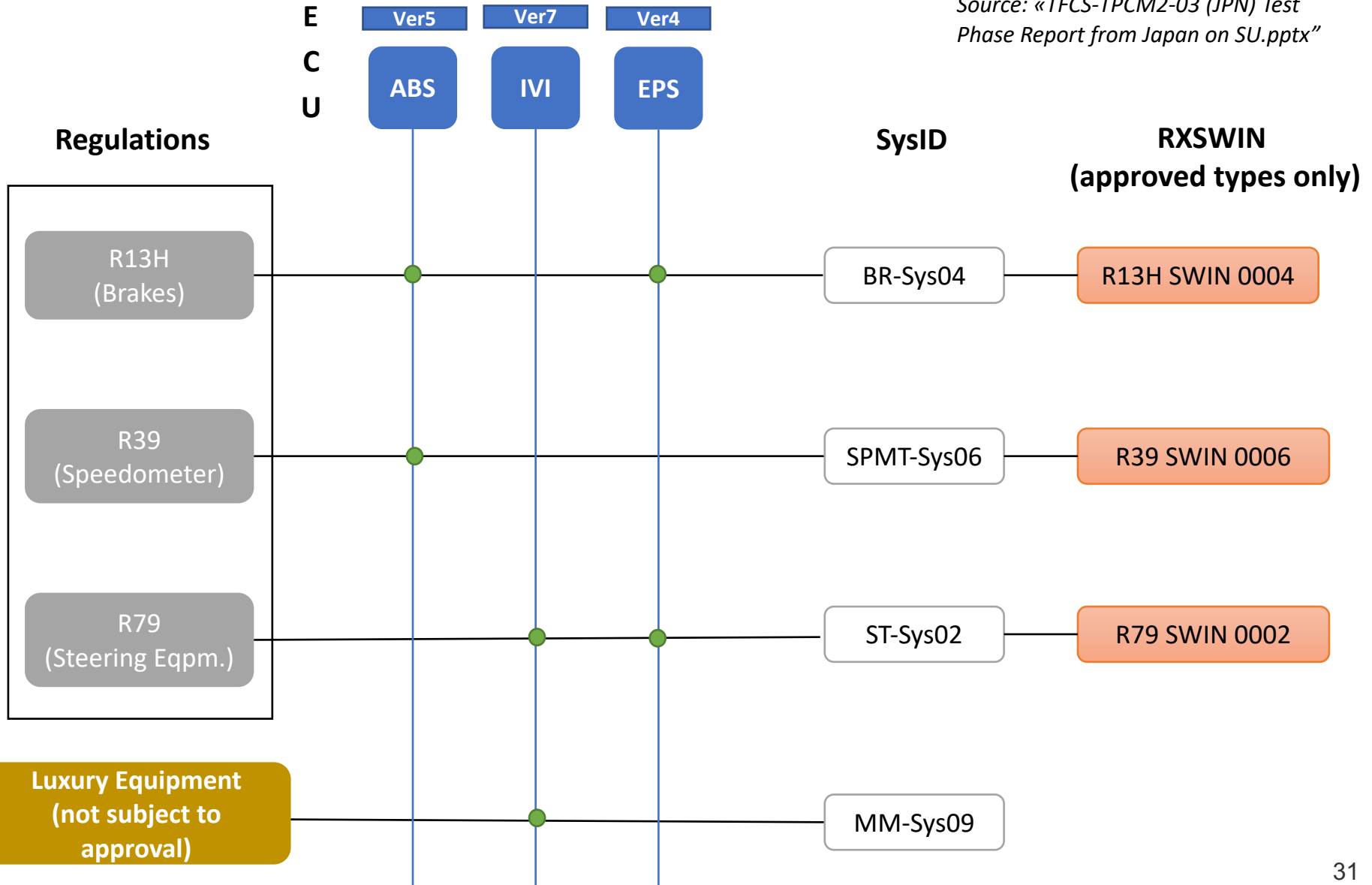- Marking of vehicles

- RXSWIN

- Conclusions

- After a vehicle type is approved, all vehicles conforming to that type shall be marked.

- The mark shall be placed near to the vehicle data plate.
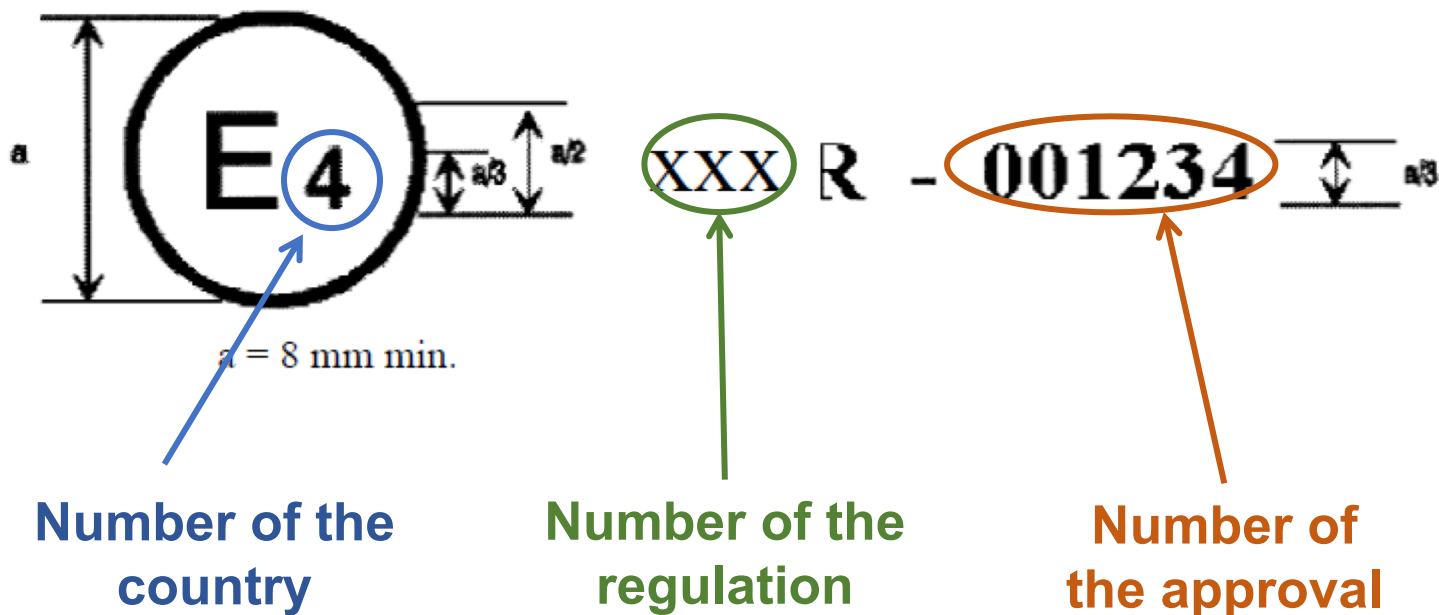
Number of the country   **Number of the regulation**   **Number of the approval**

Contents

- Introduction
- Identification and status of the regulation
- Scope of the regulation
- The regulation split approach
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RXSWIN

Regulation

SoftWare
Identification
Number

⇩   ⇩

R X SWIN   xxxx

⇧   ⇧

Regulation number for which
the vehicle type is approved.

Identification number

- Examples:

  R156 SWIN 0023
  R79 SWIN 0045

- Defined by the **manufacturer** (alpha numerical characters), **unique**.

- Identifies **software versions of all ECUs** on the vehicle which are **relevant** for a certain UN regulation.

- **Changes only** when there is a change in the software which need an extension/renewal of the vehicle type approval.

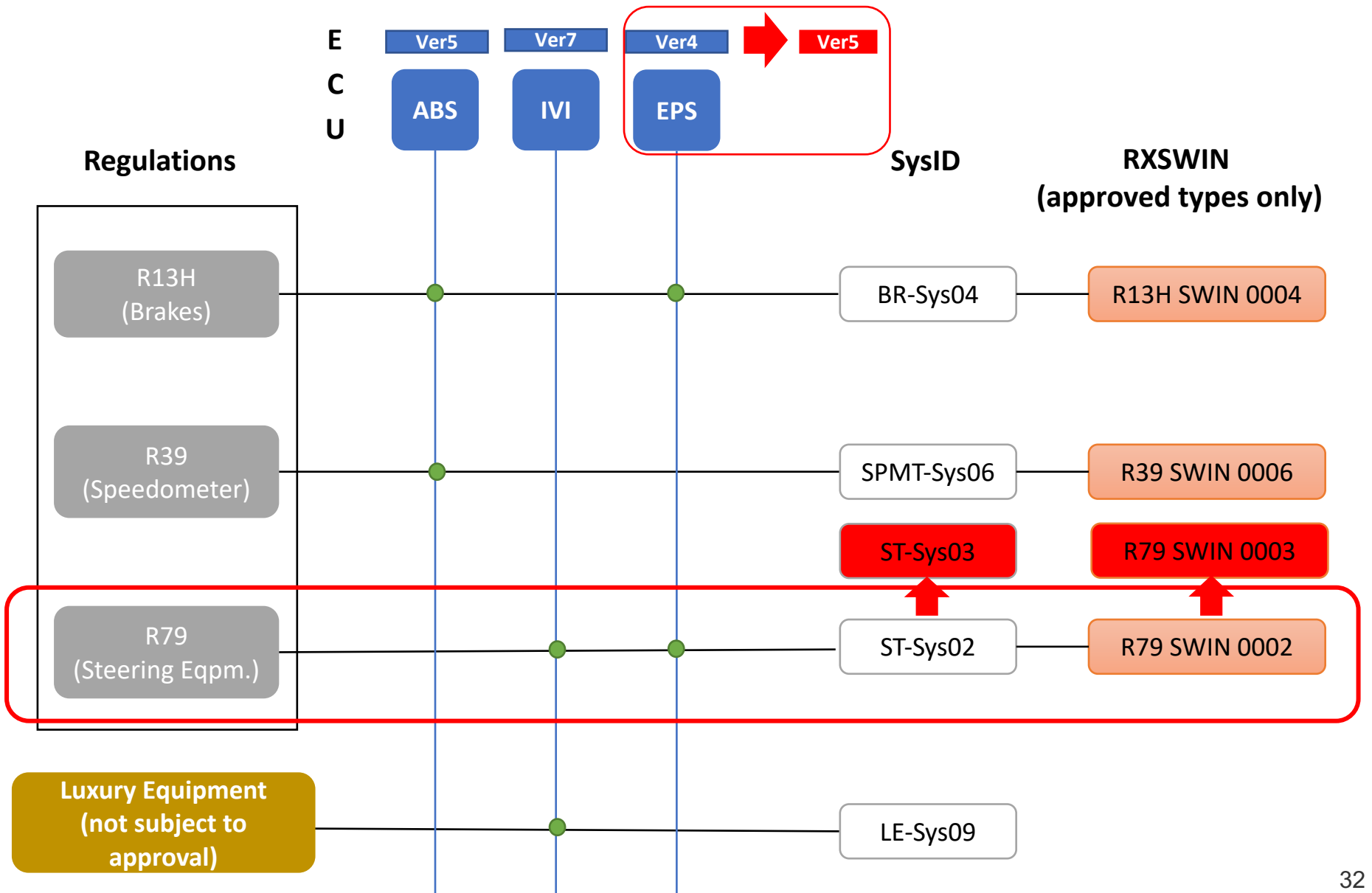**Principle = to trace type approval relevant software modifications.**

- Can be **read** through OBD via diagnostic tools, or at the vehicle manufacturer

- Shall be **protected** against unauthorized modifications.

- It is not mandatory.

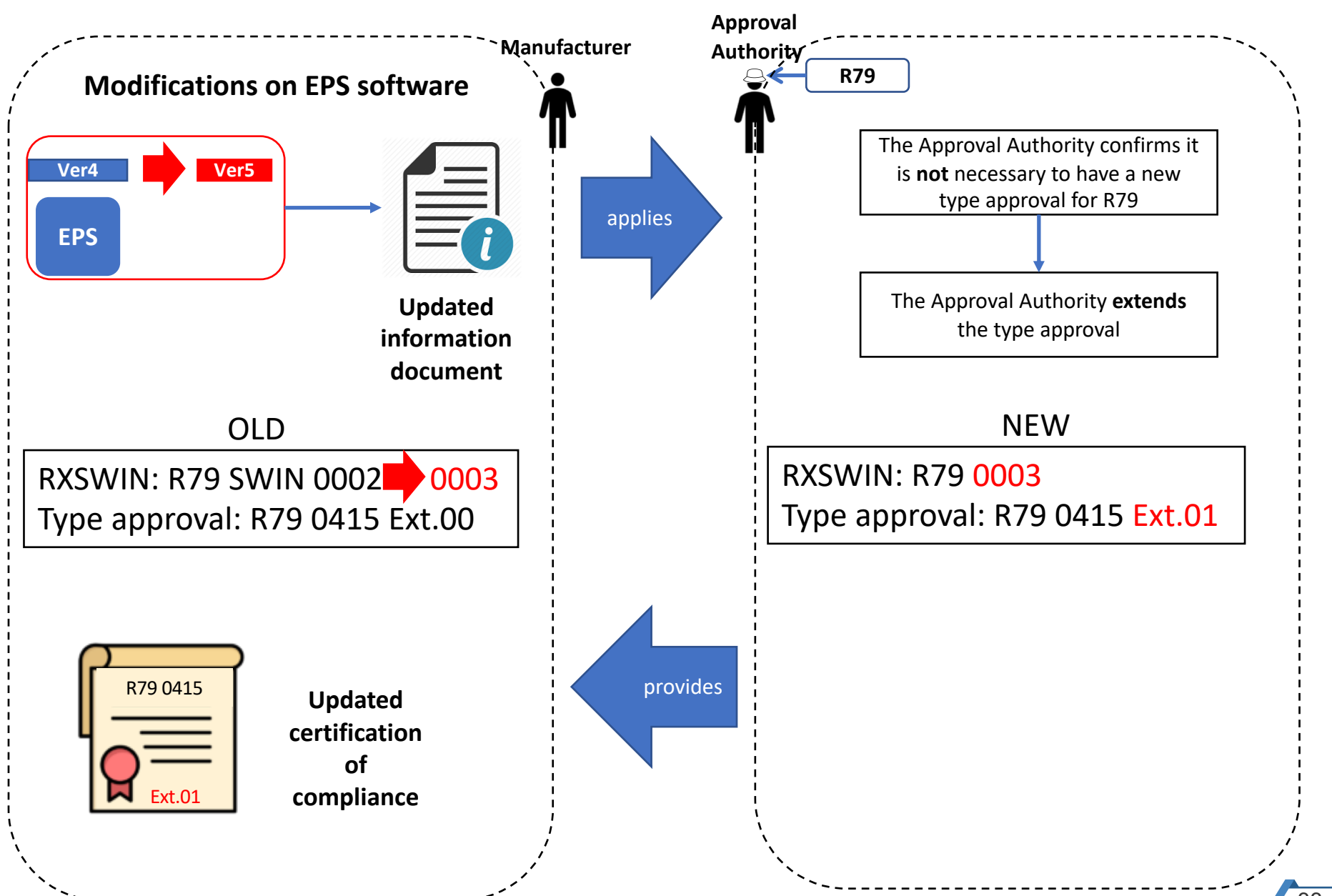# RXSWIN: identifies relevant software/hardware for a UNR

*Source: «TFCS-TPCM2-03 (JPN) Test Phase Report from Japan on SU.pptx"*

RXSWIN: software update

RXSWIN: correlates versions to type approval

Manufacturer

Approval Authority

R79

Modifications on EPS software

Ver4 ➡ Ver5

EPS

Updated information document

applies ➡

The Approval Authority confirms it is **not** necessary to have a new type approval for R79

⬇

The Approval Authority **extends** the type approval

OLD

RXSWIN: R79 SWIN 0002 ➡ 0003
Type approval: R79 0415 Ext.00

NEW

RXSWIN: R79 0003
Type approval: R79 0415 Ext.01

R79 0415

Ext.01

Updated certification of compliance

⬅ provides

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Conclusions

Approval Authority

Thank you!
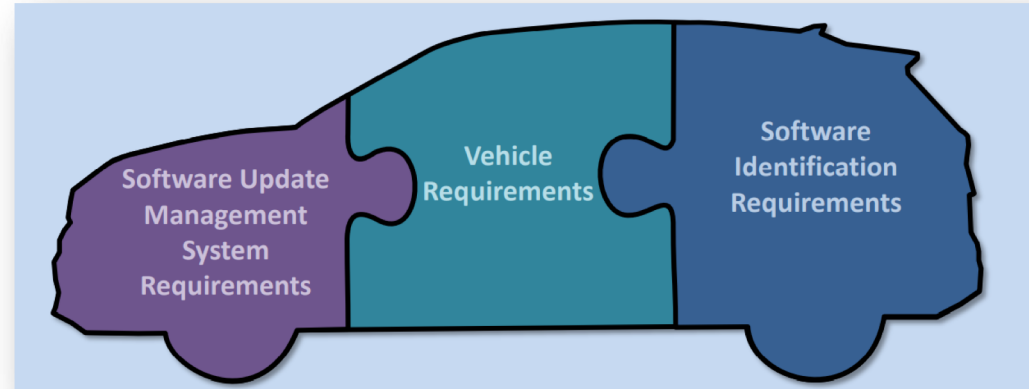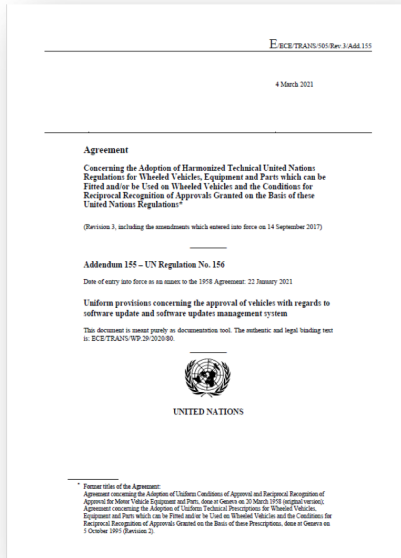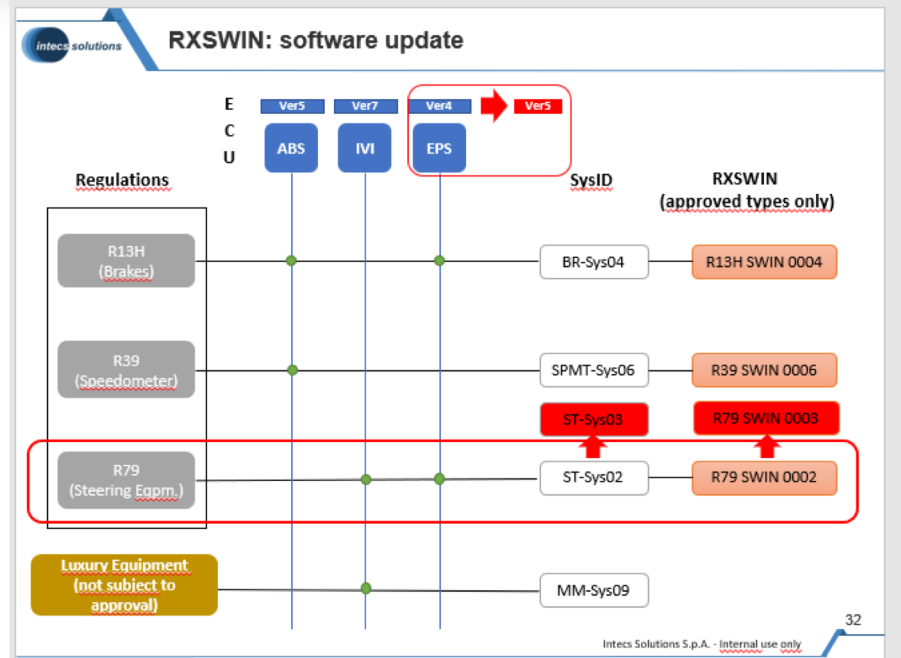
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