

Overview of RXSWIN Requirements in UN-R.156-01 Amendment

ENOMOTO Megumi ¹⁾ NIIKUNI Tetsuya ¹⁾

1) National Agency for Automobile and Land Transport Technology National Traffic Safety and Environment Laboratory, 42-27 Jindaiji-higashimach 7-chome, Chogu, Tokyo, 182-0012, Japan (E-mail: meenomo@shinsa.ntscl.go.jp)

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The introduction of external communication functions in vehicles enabled software updates in the aftermarket and prompted the establishment of UN Regulation No. 156. The regulation enables functional changes to vehicles through software updates in the post-production phase. Such changes may affect regulatory compliance. Therefore, UN-R.156 requires vehicle manufacturers to establish processes to ensure that regulatory compliance is maintained following software updates.

RXSWIN (Regulation X Software Identification Number), defined in UN-R.156, is an identifier for software relevant to a specific UN Regulation, where "X" represents the number of the corresponding UN Regulation. The RXSWIN is incremented when a software change affecting the regulation occurs. Figure 1 shows an example of RXSWIN incrementation. It is assumed that software SW2 and SW3 relevant to UN-R.157 are associated with RXSWIN R157-001. When SW3 is changed from SW3-01 to SW3-02, the RXSWIN is incremented to R157-002 because the change affects UN-R.157. However, when SW3 is changed from SW3-02 to SW3-03, the RXSWIN remains R157-002 because the change does not affect the regulation. Thus, a change in the RXSWIN from its value at vehicle registration indicates that software changes affecting the regulation have been made in the aftermarket.

RXSWIN can therefore be used by approval authorities to independently verify the regulatory compliance of vehicles following software updates in the aftermarket. Figure 2 illustrates the use of RXSWIN for regulatory compliance verification. It is assumed that Approval Authority 1 grants type approval for vehicle type XA of OEM A under UN-R.157 and issues a type approval certificate with RXSWIN R157-001. Subsequently, an extension of the approval is granted with RXSWIN R157-002. In the aftermarket, vehicles of type XA may have either R157-001 or R157-002, including vehicles updated from R157-001 to R157-002 through software updates. By comparing the RXSWIN read from a vehicle in the aftermarket with the RXSWIN recorded in the type approval certificate, Approval Authority 1 can independently verify the regulatory compliance of the vehicle without involvement of OEM A.

To support this approach, the use of RXSWIN, which was optional in the original series of UN-R.156, became mandatory under the 01 series of amendments. Consequently, RXSWIN can be used for regulatory compliance verification of vehicles following software updates in the aftermarket.

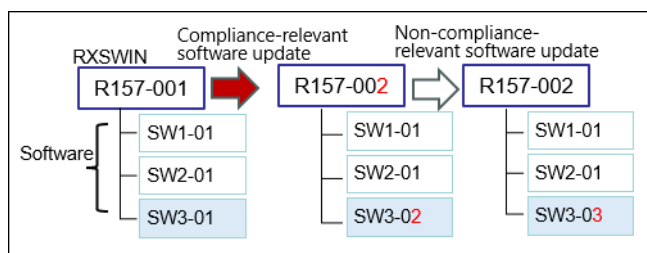


Fig.1 RXSWIN Increment Example

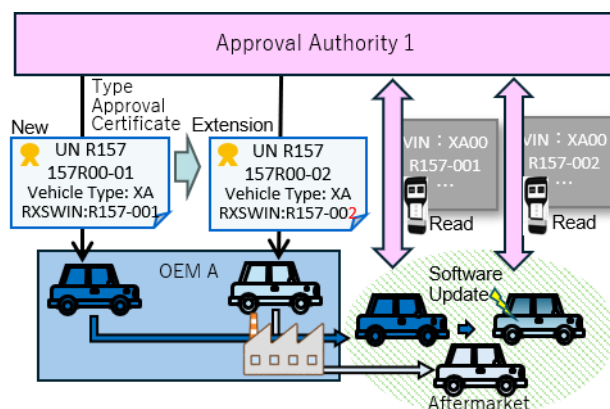


Fig.2 RXSWIN Verification by Approval Authority