Track-testing

1. Identify best practices/procedures that currently exist regarding track-testing.
2. Identify technical resources/tools that still need to be developed (or what externally developed resources should be referenced in the NATM).
3. What are supporting components of the methodology (e.g., dictionary of terms, scenarios from SG1)?
4. There are a large number of international standards, procedures and evaluation methods ~~for L0 ADS and L1 ADS:~~

|  |  |
| --- | --- |
| AEB | UN R131 Uniform provisions concerning the approval of motor vehicles with regard to the Advanced Emergency Braking Systems (AEBS)  UN R152 Uniform provisions concerning the approval of motor vehicles with regard to the Advanced Emergency Braking System (AEBS) for M1 and N1 vehicles |
| FCW | ISO 15623 Intelligent transport systems — Forward vehicle collision warning systems — Performance requirements and test procedures  UN R131/R152 include the requirement of FCW |
| ACC | ISO 15622 Intelligent transport systems — Adaptive Cruise Control systems — Performance requirements and test procedures  ISO 22178 Intelligent transport systems — Low speed following (LSF) systems — Performance requirements and test procedures  ISO 22179 Intelligent transport systems — Full speed range adaptive cruise control(FSRA) systems — Performance requirements and test procedures |
| LKA | ISO 11270 Intelligent transport systems — Lane keeping assistance systems (LKAS) — Performance requirements and test procedures  UN R79 ACSF-B1 of Lane keeping assistant systems |
| LDW | ISO 17361 Intelligent transport systems — Lane departure warning systems — Performance requirements and test procedures  ECE R130 LDWS for large trucks and buses |
| C-NCAP | ~~EUROPEAN~~ CHINA NEW CAR ASSESSMENT PROGRAMME |
| E-NCAP | ~~CHINA~~ EUROPEAN NEW CAR ASSESSMENT PROGRAMME |
| APA | ISO 16787 Intelligent transport systems — Assisted Parking System(APS)— Performance requirements and test procedures  UN R79 ACSF-A of Remote-control parking systems |
| BSD | ISO 17387 Intelligent transport systems — Lane change decision aid systems (LCDAS) — Performance requirements and test procedures |
| …… | …… |

1. The performance of the test equipment needs further optimization, and the main optimization points are as follows

<JAPAN Comment>

* We believe it is necessary to prepare the necessary equipment according to the test purpose and ODD of ADS.
* Exp；　ALKS　case；　Straight　road、Curve　road
* Highway chauffer；　Straight road, Curve road, Lane-change situation,

Merging road, Brunch road, etc

* It can be used for validate “Simulation model”

1. Accurate measurement of longitudinal distance and TTC inside the curve
2. Accurate positioning in the tunnel
3. Normal operation of test equipment in special weather, especially in rain and snow
4. Measure the transverse distance between the two vehicles, especially the distance deviation within the curve

Real-world testing

1. **Identify best practices/procedures that currently exist regarding real-world testing?**

In ADAS/AD field, there is no certification practice that currently exist regarding real-world testing. But OEMs and suppliers have test their products in real world for researching and development.

And in vehicle emission field, there are some practices regarding real-world testing. The real-world driving test of pollutant discharge is a mandatary certification test with specified equipment. The test lasts 90~120 minutes which is divided into urban area, suburban area and high-way area by vehicle speed.

1. **Identify technical resources/tools that still need to be developed (or what externally developed resources should be referenced in the NATM).**

In real-world testing, technical tools shall continuously work for many hours. So the operational stability is necessary. To automatically test and judge, the technical tools shall be more intelligent.

<JAPAN Comment>

* We would like to define “High-Level Purpose” for “Real-world testing.
* We believe we should have the necessary tools in line with FRAV requirements
* Reference ; FRAV-08-09

1. **ADS should drive safely.**

*This starting point aims to focus attention on the performance of an ADS as the driver of the vehicle. The intention is to enumerate performance elements nominally within the control of the driver.*

* 1. **The ADS should perform the entire Dynamic Driving Task.**
     1. The ADS should control the longitudinal and lateral motion of the vehicle.
     2. The ADS should recognize the ODD conditions and boundaries of the ODD of its feature(s).
     3. The ADS should detect, recognize, classify, and prepare to respond to objects and events in the traffic environment.
  2. **The ADS should respect traffic rules.**
  3. **The ADS should interact safely with other road users.**
  4. The ADS should adapt its behavior in line with safety risks.
  5. **The ADS should adapt its behavior to the surrounding traffic conditions.**
  6. The ADS behavior should not be the critical factor in the causation of a collision.

We believe 1.1, 1.2, 1.3, and 1.5 may be main focus point for “Real-world testing”

1. **What are supporting components of the methodology (e.g., dictionary of terms, scenarios from SG1)?**

The assessment criteria and the methodology of testing routine selection are essential supporting components.