

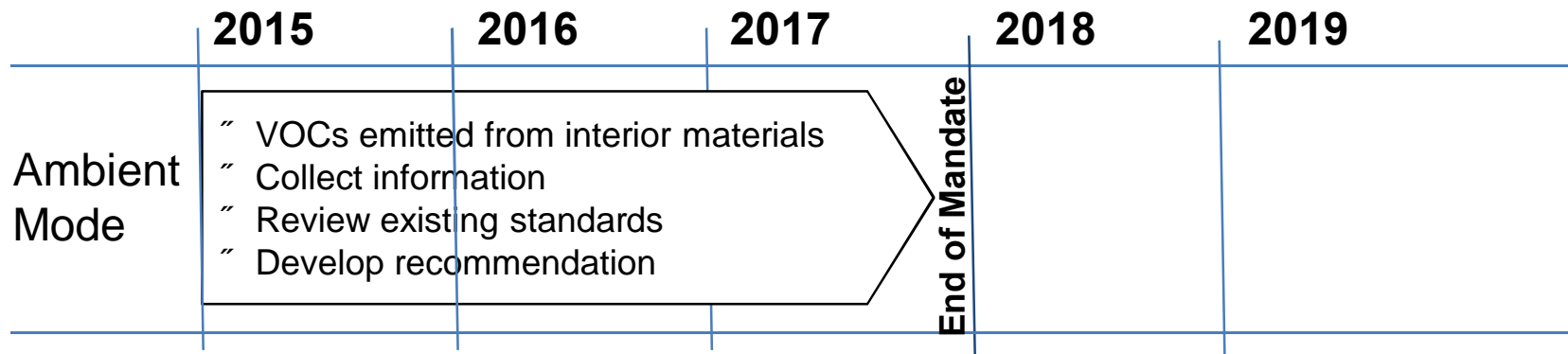
- Comparison of Test Mode in VIAQ

- “ Ambient Mode is suitable to measure VOCs emitted from the Interior materials.
- “ Driving Mode is useful for the measure of the vehicle's HVAC system and etc.

| Items              | Ambient Mode   | Driving Mode  |
|--------------------|--|---|
| Occurrence of time | Early stage of vehicle life                                      | Whole vehicle life<br>(Real-life driving condition)                     |
| Main Factor        | VOCs emitted from Interior materials                             | Exhaust gases, VOCs, Air pollution,<br>Passenger breath & contamination |
| Relevant Materials | Interior materials   | HVAC, A/C, IAQ<br>Interior materials, In cabin air filter,              |
| Test factor        | Manufactured date,<br>Temperature,<br>Door closed time           | Driving test mode,<br>A/C setting condition                             |
| Ref. Standard      | Korea standards<br>China standards<br>ISO 12219-1 (Ambient mode) | Russian standard<br>ISO 12219-1(Driving mode)                           |

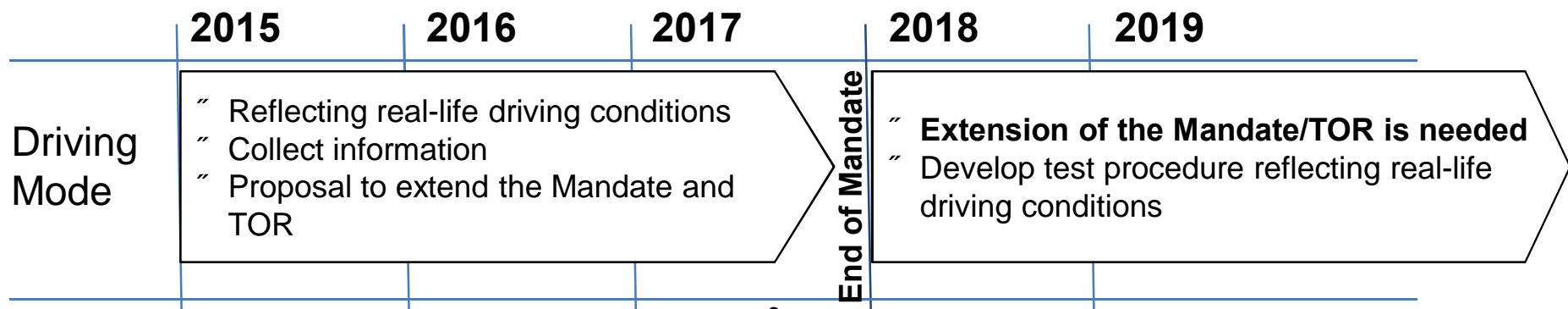
- Proposal for Future Work

- Ambient Mode for VOCs emitted from interior materials



- Driving Mode (If necessary, mandate is needed)

- ✓ Driving mode as a parallel work item on going discussion.



- Work Item 1 : Test Measurement Modes

- Background

- “ Decide on test mode suitable for the interior air emission to proceed with

- “ Korean and Chinese and ISO standards all have the ambient mode in common

- Proposal : To use Ambient mode in the harmonized test procedure,  
To develop the Driving mode on-going discussion as a parallel work item

- “ Ambient mode is suitable for assessing VOCs emitted from interior materials

- “ Driving mode is related to Real-life driving conditions (e.g. HVAC system, In Cabin Air filter and Outside air quality)

- Work Item 2 : Target Measurement Substances

- Background

- “ Target measurement substance is required.

- “ So many relevant substances with regard to Interior air quality. (e.g. VOCs, TVOC, PAHs, HAPs, Particulate Matter(PM), Odorõ ), Fogging

- Proposal : 8 substances to be measured based on ambient mode

- “ From the ToR document, Harmonized test procedures for the measurement of interior VOCs taking into account existing standards (Korean and Chinese standards)

## 2. Objective

ECE/TRANS/WP.29/GRPE/70

- 2.1 The informal working group (IWG) on VIAQ will have an open structure which will enable the exchange of information and experiences on relevant regulations, policy measures and standardization efforts.
- 2.2 Internationally, several different standards already exist but the exact methods of measurements and pollutant emission requirements are still not defined under the 1958 Agreement or 1998 Agreement. **The objective of this proposal is to develop a recommendation** (R.E.3, S.R.1 or a new Mutual Resolution) concerning the protection of passengers from **VOCs emitted by interior materials** used for the construction of vehicles.
- 2.3 The recommendation (R.E.3, S.R.1 or a new Mutual Resolution) **shall include provisions and harmonized test procedures for the measurement of interior VOCs taking into account existing standards.**
- 2.4 The IWG shall conduct comprehensive studies for the existing individual contents regarding management of interior air quality of vehicles. It shall draft a new recommendation to provide drivers and passengers with better driving environments for vehicles, also enabling more cost-effective management for the vehicle industry through unification of standards and measurement methods.

## ➤ International Status on VIAQ Standards

### KOREA



- ✓ Automobile Management Act Article 33-3, 18 Dec. 2012  
(Newly Manufactured Vehicle Indoor Air Quality Management)
- ✓ Ministry of Land, Infrastructure and Transportation Notification No. 2007-539, 5 June 2007)  
"Newly Manufactured Vehicle Indoor Air Quality Management Standard"

### CHINA



- ✓ HJ/T 400-07 December 2007 "Determination of Volatile Organic Compounds and Carbonyl Compounds in Cabins of Vehicles"
- ✓ GB/T 27630-2011 01 March 2012 "Guideline for air quality assessment of Passenger car"

### JAPAN(JAMA)



- ✓ Japan Automobile Manufacturers Association (JAMA) leads IAQ Research
- ✓ JAMA Report No.98 & JASO Z125-09 Road vehicles . Interior . Measurement methods of diffused volatile organic compounds(VOC)

### ISO

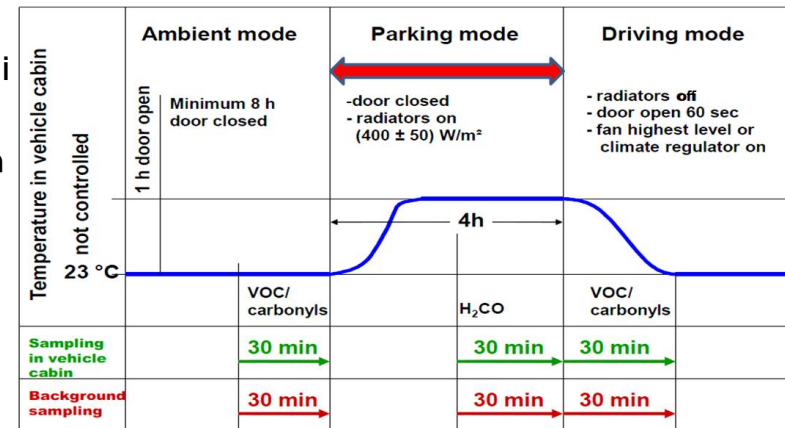


- ✓ ISO 12219-1:2012 "Interior air of road vehicles -- Part 1:Whole vehicle test chamber . Specification and method for the determination of volatile organic compounds in cabin interiors"

## ➤ Comparison of the VIAQ Test Methods

|            |  |                      |                   |                   |
|------------|--|----------------------|-------------------|-------------------|
| Time       | Temp stabilize<br>Min 12.hr                | Ventilation<br>30min | Close door<br>2hr | Sampling<br>15min |
| Cabin Temp | $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ |                      |                   |                   |

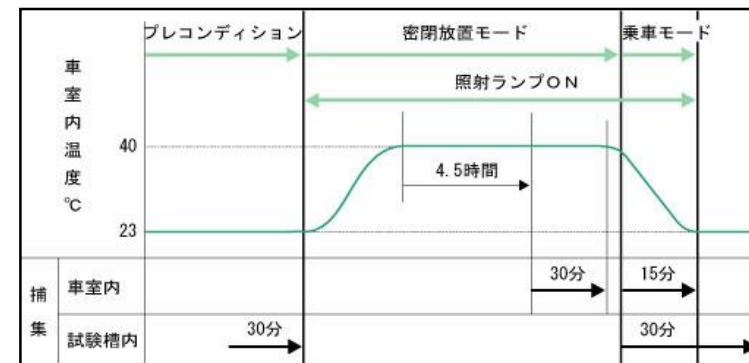
<KOREA VIAQ Test Method>



<ISO 12219-1 VIAQ Test Method>

|            |  |                        |                   |
|------------|--|------------------------|-------------------|
| Time       | Ventilation<br>30min<br>max 6hr or less  | Close door<br>min 16hr | Sampling<br>30min |
| Cabin Temp | $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$<br>$50\% \pm 10\%$<br>Ambient Air Flow $\leq 0.3\text{m/s}$ |                        |                   |

<CHINA VIAQ Test Method>



<JAPAN(JAMA) VIAQ Test Method>

## ➤ Comparison of vehicle indoor air quality limit

- “ Vehicle Indoor Air Quality limit values are different in various countries
- “ There are no VIAQ limit values in ISO-12219

| Substances (unit : $\mu\text{g}/\text{m}^3$ ) | Korea   | China   | JAPAN (JAMA) | ISO-12219 |
|---|---------|---------|--------------|-----------|
| Formaldehyde                                  | 210     | 100     | 100          | –         |
| Benzene                                       | 30      | 110     | –            | –         |
| Toluene                                       | 1,000   | 1,100   | 260          | –         |
| Ethyl Benzene                                 | 1,000   | 1,500   | 3,800        | –         |
| Xylene  | 870     | 1,500   | 870          | –         |
| Styrene                                       | 220     | 260     | 220          | –         |
| Acetaldehyde                                  | –       | 50      | 48           | –         |
| Acrolein                                      | 50      | 50      | –            | –         |
| Total   | 7 types | 8 types | 9 types*     | –         |

\* JAPAN(JAMA) : Tetra decane  $330 \mu\text{g}/\text{m}^3$ , Di-n-butyl phthalate  $220 \mu\text{g}/\text{m}^3$ , Di-2-ethylhexyl phthalate  $120 \mu\text{g}/\text{m}^3$