**F.3) VEHICLE SUBSYSTEM TEST PROCEDURE**

For testing the vehicle subsystem Revolusys proposed 3 different test procedures:

* Test of proximity sensor
* Test of vehicle’s top speed and start-stop cases
* Weight capacity of the vehicle

*-Test Procedure for Proximity Sensor*

Vehicle uses ultrasonic proximity sensor ( HC-SR04) for distance measurement. For testing the proximity sensor, distance will be fixed and for that fixed distance, 100 measurement samples will be taken (there will be 250 ms time delay between each sample.) After measuring for that particular distance, mean and standard deviation of the measurements will be calculated. Then, distance will be changed, and same procedure will be repeated. Distance values are indicated as follows: 3 cm, 5 cm, 7 cm, 10 cm, 15 cm, 20 cm, 30 cm, 50 cm and 150 cm.

Since vehicle can approach to the terminal at most 5 cm, it is good to stop the vehicle with some margin which corresponds to stopping 5cm to 10 cm away from the terminal. Therefore, measurements should be precise enough for 5-15 cm range. As a summary, this test investigates the precision of the measurement for various distances and high precision is expected for 5-15 cm range.

*-Test Procedure for Vehicle’s Movement*

Driving the vehicle at its top speed is aimed to meet the time requirement:

* + *The average velocity of the vehicle shouldn’t be lower than 25 cm/sec for the maximum distance case (1.5 meters).*

For testing the speed of the vehicle, it will be driven at its top speed for ???? seconds and travelled distance will be measured. Then, average speed will be calculated.

Also, driving the vehicle at its top speed can affect the start-stop cases of the vehicle (i.e. it may not start or stop properly). At this test procedure, it will be also investigated

*-Test Procedure for Vehicle’s Weight Capacity*

Vehicle’s weight capacity has a crucial importance on the robustness of the system and it also affects the top speed of the vehicle. Vehicle has a multi-layered design to decrease the stress on it. Each layer is made from 3mm plexiglass. For testing the robustness of the vehicle, certain amount of load will be placed on each layer and twisting will be checked if there will be any.