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## **Section 5.60. Transportation Network Measurement Systems – Tentative Code**

This tentative code has a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final code. Officials wanting to conduct an official examination of a device or system are advised to see paragraph G-A.3. Special and Unclassified Equipment.

(Tentative Code Added 2017)

### **A. Application**

**A.1. General.** – This code applies to a transportation network measurement system used in connection with a digital network that determines the actual time elapsed and/or distance travelled during a network-arranged ride to calculate a fare for transportation services.

**Note:** The fare is calculated by software services residing on the transportation network company servers using data transmitted by the indicating elements present in the vehicle, which are running software applications or services supplied by the transportation network company. The measurement data is generated from sources not physically connected to the vehicle (e.g., a navigation satellite system such as GPS and/or other location services).

**A.2. Exceptions.** – This code does not apply to the following:

- (a) Any system that charges a flat rate or fixed charge, and/or does not use a measurement of actual time elapsed or distance travelled to calculate a fare for transportation services.
- (b) Odometers on vehicles that are rented or hired on a distance basis. (Also see Section 5.53. Odometers.)
- (c) Taximeters. (Also see Section 5.54. Taximeters.)
- (d) Any system where the fare is calculated by equipment located in the vehicle.

**A.3. Additional Code Requirements.** – In addition to the requirements of this code, transportation network measurement systems shall meet the requirements of Section 1.10. General Code.

### **S. Specifications**

**S.1. Design of Indicating and Recording Elements.** – Indicating and recording elements shall provide indications and recorded representations that are clear, definite, accurate, and easily read under any conditions of normal operation of the device(s).

All indicating and recording elements used in a transportation network measurement system shall operate correctly while using the online-enabled technology application service provided by the transportation network company.

**S.1.1. General Indicating Elements.** – A transportation network measurement system shall include, as a minimum:

- (a) an indicating element used by a transportation network company driver that displays information and facilitates the measurements during a network-arranged ride to calculate a fare for transportation services; and
- (b) an indicating element used by a transportation network company rider that displays information that allows the rider to review the current rate(s) for the transportation service and to request a ride.

**S.1.2. General Recording Elements.** – A transportation network measurement system shall be capable of:

- (a) recording all information necessary to generate a receipt specified in S.1.10. Receipt;
- (b) providing information to transportation network company drivers, including, but not limited to, a summary of rides given as specified in S.1.11. Driver’s Summary; and
- (c) providing a copy of all metrological data required by law to a weights and measures jurisdiction with statutory authority.

**S.1.3. Identification.** – All transportation network measurement system indicating elements shall display for the purposes of identification the following information:

- (a) the name, initials, or trademark of the transportation network measurement system manufacturer, distributor, or developer; and
- (b) the current version or revision identifier of the software application service provided by the transportation network company running on the indicating elements identified in S.1.1. General Indicating Elements.
  - (1) The version or revision identifier shall be prefaced by words or an abbreviation that clearly identifies the number as the required version or revision.
  - (2) Abbreviations for the word “Version” shall, as a minimum, begin with the letter “V” and may be followed by the word “Number.” Abbreviations for the word “Revision” shall, as a minimum, begin with the letter “R” and may be followed by the word “Number.” The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.).

**S.1.4. Location of Identification Information.** – The information required by S.1.3. Identification shall be accessible through an easily recognized menu and, if necessary, a submenu or other appropriate means. Examples of menu and submenu identification include, but are not limited to, “Help,” “About,” “System Identification,” “Weights and Measures Identification,” or “Identification.”

**S.1.5. Display of Rates and Additional Charges.** – The transportation network measurement system shall be designed to make available to transportation network company riders the rate(s) for transportation services before the beginning of a network-arranged ride. The system shall be capable of providing an explanation of the basis for calculating a fare including, if applicable, the base fare, rates for time and distance, and the amount of a booking fee, platform fee, or other similar service fee, before a rider submits the request for a network-arranged ride.

**S.1.6. Fare Estimates.** – The transportation network measurement system shall be capable of displaying a fare estimate to the transportation network company rider before a request for a network-arranged ride is made.

**S.1.7. Actuation of Measurement System.** – Following the initiation of a network-arranged ride by the transportation network company driver, and prior to the conclusion of that network-arranged ride, the transportation network measurement system shall only indicate and/or record measurements resulting from the movement of the vehicle or by the time mechanism.

**S.1.8. Fare Adjustment.** – *A transportation network measurement system shall be designed with:*

- (a) *a “time off” mechanism and a “distance off” mechanism provided for the transportation network system driver to render the measurement of time and distance either operative or inoperative during the ride; or*

- (b) *the capability to make post-transaction fare adjustments to reduce the amount of the fare, provided the system creates a record of all location and time data from the time the ride request was accepted by the transportation network company driver.*

*[Nonretroactive as of January 1, 2018]*

**S.1.9. Fare Identification and Other Charges.**

**S.1.9.1. Fare Identification.** – Fare indications shall be identified by the word “Fare” or by an equivalent expression when displayed on the transportation network company system receipt required by S.1.10 Receipt. Values shall be defined by suitable words or monetary signs.

**S.1.9.2. Other Charges.** – Other charges shall be indicated as separate line items when displayed on the receipt required by S.1.10. Receipt. Other charges shall be identified using an appropriate descriptive term, including but not limited to “Booking Fee,” “Tolls,” “Airport Pickup/Drop-off Surcharge” or an equivalent expression. Values shall be defined by suitable words or monetary signs.

**S.1.10. Receipt.** – A transportation network measurement system shall issue a printed or electronic receipt to a transportation network company rider. This receipt shall include as a minimum the following:

- (a) date of the start of the trip;
- (b) unique identifying information sufficient for the transportation network company to identify the transaction, or other identifying information as specified by the statutory authority;
- (c) start and end time of trip, total time of trip (maximum increment of one second), and if applicable, the total elapsed time during any time-off period;
- (d) distance traveled, maximum increment of 0.01 km or 0.01 mi;
- (e) the associated fare in \$;
- (f) other charges where permitted shall be identified and itemized;
- (g) total charge in \$;
- (h) the start and end addresses or locations of the trip;
- (i) a map showing the route taken; and
- (j) a means to obtain transportation network company rider assistance.

**S.1.11. Driver’s Summary.** – A transportation network measurement system shall be capable of providing a summary of the driver’s activity regarding network-arranged rides. The summary shall include, but not be limited to, the following information about each ride:

- (a) date and time for start of trip;
- (b) unique identifying information sufficient for the transportation network company to identify the transaction, or other identifying information as specified by the statutory authority;
- (c) total time of trip, maximum increment of one second;
- (d) distance traveled, maximum increment of 0.01 km or 0.01 mi;
- (e) the total fare received;

- (f) other charges where permitted; and
- (g) a means to obtain transportation network company driver assistance.

## **S.2. Provision for Sealing.**

**S.2.1. System Security.** – Adequate provision shall be made to provide security for a transportation network measurement system. The system shall be designed to:

- (a) protect the integrity of metrological data and algorithms used to compute fares from such data against unauthorized modification using industry-standard technological protection mechanisms such as data encryption; and
- (b) use software-based access controls or equivalent technological protections that limit access to metrological data and algorithms used to compute fares from such data only to authorized persons.

**S.2.2. System Audit.** – The transportation network measurement system shall be designed in a manner that permits officials having statutory authority to verify compliance with this transportation network measurement system code.

**S.2.3. Change Tracking.** – Changes made by the manufacturer, distributor, or developer of a transportation network measurement system to any algorithms or code, which have a metrological effect, shall be logged and recorded. The period covered by this change record is not required to exceed one year.

**S.3. Provision for Trip Data Loss.** – If a portion of the trip data is lost due to power or signal interruption by the transportation network company driver's indicating element, the transportation network measurement system shall be capable of determining the information needed to complete any transaction in progress at the time of the power or signal loss.

**S.3.1. Intermittent Trip Data Loss.** – When the location services signal is lost intermittently during a prearranged ride (e.g., traveling through a tunnel), but recovered prior to the end of the ride, the transportation network measurement system shall be capable of calculating an accurate fare in accordance with T.1. Tolerance Values.

**S.3.2. Significant Trip Data Loss.** – When the location services signal is lost for a significant portion of the network-arranged ride, the transportation network measurement system shall provide for alternative fare structures.

**Note:** Significant trip data loss refers to instances when the location services signal is lost to the extent the transportation network measurement system is not capable of calculating an accurate fare in accordance with T.1. Tolerance Values using actual time and actual distance, or when the signal is not regained by the end of the ride.

**S.3.3. Alternative Fare Structures.** – If the transportation network measuring system is not using actual time and actual distance for a particular trip (e.g., zone-based fares, signal loss), that portion of the fare not based on actual time and actual distance is not subject to this code. Charges not based on actual time and actual distance measurements may be based on the terms of service.

## **N. Notes**

### **N.1. Distance Tests.**

**N.1.1. Test Methods.** – To determine compliance with distance tolerances, distance test(s) of a transportation network measurement system shall be conducted. The distance test(s) shall consist of a road test unless safety or other practical concerns prohibit road testing. A transfer standard test may be performed in the absence of a road test. At least one test shall be of a length sufficient to exceed the minimum fare.

**N.1.1.1. Road Test.** – The test consists of operating the conveyance over a precisely measured course calibrated to a traceable linear measure of at least one mile in length

**N.1.1.2. Transfer Standard Test.** – The test consists of operating the conveyance over an unmeasured course while using a calibrated transfer standard, such as a fifth-wheel, to measure the distance travelled.

**Note:** Field examinations of transportation network measurement systems need not include testing of all individual devices used as driver/passenger indicating elements in connection with the service provided. It is considered sufficient that a representative sample of various indicating elements be incorporated in testing to verify proper operation of the system.

### **N.1.2. Test Procedures.**

**N.1.2.1. Test Length.** – All tests must be at least one mile in length. If a measured course or testing equipment is not readily available that will enable a test of a length sufficient to exceed the minimum fare, after completing the testing specified in N.1.1. Test Methods, an additional unmeasured test may be conducted. The purpose of this additional unmeasured test is to verify compliance with S.1.10. Receipt.

**N.1.2.2. Additional Tests.** – If during testing a transportation network measurement system produces a measurement that does not comply with the tolerance values in T.1.1. Distance Tests, a minimum of three additional tests shall be conducted at the same location where all test variables are reduced to the greatest extent practicable to verify the system's ability to repeat transaction indications. Repeatability testing performed in excess of these three additional tests is done at the discretion of the official with statutory authority.

To verify system-wide noncompliance, tests for variability shall be conducted, including a minimum of three consecutive tests of varying lengths, locations, and/or environmental conditions.

### **N.1.3. Test Conditions.**

**N.1.3.1. General.** – Except during type evaluation, all tests shall be performed under the conditions that are considered usual and customary within the location(s) where the system is normally operated as deemed necessary by the statutory authority.

**N.1.3.2. Roads.** – All tests shall be conducted on public roads.

**N.1.3.3. Testing for Environmental Influences.** – During type evaluation, the distance test may include a route traveled by the vehicle that will expose the system to conditions that could contribute to the loss of, or interference with, the location service's signal. This may include:

- (a) objects that may obstruct or reflect signals such as tall buildings/structures, forestation, tunnels, etc.;
- (b) routes that do not follow a straight-line path;
- (c) significant changes in altitude; and
- (d) any other relevant environmental conditions.

**N.2. Time Test.** – A transportation network measurement system, which determines time elapsed, shall be tested for compliance with the tolerances values specified in T.1.2. Time Tests, using a certified, traceable standard.

## T. Tolerances

**T.1. Tolerance Values.** – The tolerances will be as specified in T.1.1. Distance Tests and T.1.2. Time Tests. (The following proposed tolerance values will be confirmed based on performance data evaluated by the NIST U.S. National Work Group on Taximeters before the transportation network measurement systems code becomes a permanent code.)

**T.1.1. Distance Tests.** – Maintenance and acceptance tolerances shall be as follows:

- (a) On Overregistration: 2.5 %
- (b) On Underregistration: 2.5 %

**T.1.2. Time Tests.** – Maintenance and acceptance tolerances shall be as follows:

- (a) On Overregistration: 5 seconds or 0.5 %, whichever is greater
- (b) On Underregistration: 5 seconds or 0.5 %, whichever is greater

**T.2. Tests Using Transfer Standards.** – To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

## UR. User Requirements

**UR.1. System Indications.** – The indicating elements identified in S.1.1. General Indicating Elements shall display indications and information in a manner such that they can be conveniently read by the user of the device, computer, website, or online-enabled technology application service.

**UR.1.1. Statement of Rates.** – The transportation network company rider shall be able to view the basis for calculating the fare including, if applicable, the base fare, rates for time and distance, and the amount of a booking fee, platform fee, or other similar service fees.

**UR.2. Change Tracking.** – Upon request by an official having statutory authority, the transportation network company shall provide an explanation of changes that are logged pursuant to S.2.3. Change Tracking requirement during the time period covered by the request. Any such request shall be answered within two business days, unless extended by the official having statutory authority. Records provided pursuant to S.2.3. Change Tracking shall be treated as confidential and proprietary to the extent permitted by any applicable law.

**UR.3. System Installation and Operation.** – The transportation network company driver shall use the indicating elements identified in S.1.1.(a) General Indicating Elements in accordance with the requirements of the manufacturer, distributor, or developer.

**UR.4. Fare Estimates.** – Estimates for fare charges shall be provided by the transportation network measurement system when requested by the transportation network company rider and following the input of a final destination for the trip being requested. The recipient of the fare estimate shall be able to access information about the fare estimate, including key variables that may lead to discrepancies between actual fare charged and the fare estimate provided as required by law.

**UR.5. Determination of Total Charges When Location Service Data Is Lost.** – At the conclusion of the trip, the transportation network company shall disclose to the transportation network measurement service rider and driver the manner in which total charges are determined when there is significant data loss from location services.



## Appendix D. Definitions

### D

**digital network.** – An online-enabled technology application service, website, or system offered or used by a transportation network company that enables a transportation network company rider to arrange a network-arranged ride with a transportation network company driver. [5.60]

### N

**network-arranged ride.** – The provision of transportation by a transportation network company driver to a transportation network company rider, or other persons selected by the transportation network company rider, arranged through a digital network. [5.60]

### T

**transportation network company.** – An entity that uses a digital network to connect transportation network company riders with transportation network company drivers who provide network-arranged rides, and offers or provides a transportation network measurement system, subject to an agreement or terms of service between the transportation network company and transportation network company rider or driver. [5.60]

**transportation network company driver.** – An individual authorized by the transportation network company to access the digital network and receive connections to transportation network company riders for the purpose of providing network-arranged rides. [5.60]

**transportation network company rider.** – An individual who has obtained an account with a transportation network company and uses the transportation network company’s digital network to connect with a transportation network company driver who can offer or provide a network-arranged ride to the transportation network company rider or other persons selected by the transportation network company rider. [5.60]

**transportation network measurement system.** – The information technology infrastructure and services offered or used by a transportation network company that receives data collected through a digital network and calculates a fare for a network-arranged ride. [5.60]

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