

## Annexure-1

### 1. RFID TAG (for information only)

The Tags shall be essentially non-transferable RFID transponders designed to be used in conjunction with compatible Transceivers and are meant to identify the vehicle for ETC application.

#### 1.1 General

Sr.	Parameter	Particular
1	Power	Tags are Passive
2	Frequency	UHF 860 MHZ to 960 MHZ as per EPC Gen 2 standards
3	Data Transfer Rate	At least 512 kbps under ideal conditions & 64 to 512 kbps under field conditions
4	Protocol	EPC Gen 2, ISO 18000-6C
5	Dimensions (including the substrate/backing)	Maximum area occupied on the windshield shall be 50 Sq. cm.
6	Material	Plastic substrate with printed antenna
7	Physical printing of Tag ID on the Tag	The Tag ID shall be physically printed on the Tag using the Hexadecimal numbering system and shall be adequately clear for easy visual recognition
8	Tamper Proof RFID Label	The tags should be RFID Tamper Proof Label specially designed for tagging directly to a surface, such as Glass (windshield) of an automobile. Any attempt to rip or tamper the label (tag) should result in disabling the functionality of the tags to ensure a unique one to one relationship between the tag and the vehicle thereby preventing unauthorized tag removal and transfers. Such features of the RFID label should result in following

		<p>actions:-</p> <ol style="list-style-type: none"> <li>1. Destroy or Damage the Antenna</li> <li>2. Break the chip-antenna connection.</li> </ol> <p>The manufacturing process, construction of tags and associated materials should ensure reliable tamper indication even when sophisticated tamper methods of Mechanical Attack (e.g. Razor Blades, Knives etc.), Chemical Attack (using Corrosives, Solvents etc.) and Thermal Attacks are &amp; employed.</p>
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### 1.2 Environmental

Sr.	Parameter	Particular
1	Relative Humidity	95% Condensing
2	Operating Temperature	-20°C to 80°C ambient
3	Storage Temperature	-40°C to 100°C

### 1.3 Installation

Sr.	Parameter	Particular
1	Location	The RFID Tag shall be installed at a fixed location on the inside of the Windshield of the vehicle. *
2	Installation mechanism	<p>The RFID Tag shall have a self-adhesive backing with which it can be fixed to inside of the windshield. The adhesive shall be such that</p> <ul style="list-style-type: none"> <li>• It allows reliable and accurate reading of the Tag by the Transceiver located at a specified distance.</li> <li>• The RFID chip and/ or the antenna get irreparably damaged when an attempt is made to remove the</li> </ul>

		<p>installed Tag from the windshield by any means. Detailed functionality is given in point No. 8 of Para 3.2.1 of this document.</p> <p>The tamper proof attribute will be tested from accredited testing organization before taking delivery</p>
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\*location to be optimized for each class of vehicle during trials

#### 1.4 Memory

Sr.	Parameters	Particulars
1	Tag Memory (minimum)	Unique Tag ID – 96 bits, User memory – 512 bits
2	Data Retention	10 Years minimum with UV protection for normal sunlight exposure and ambient temperature of 45 Deg C