

Table 4: Criteria for the Performance of Active Electronic Seals

<p>Specifications of Hardware</p>	<ol style="list-style-type: none"> 1. The names or marks of the firms and the serial numbers should be printed on the distinct location of the main body of an active electronic seal. The characters and patterns of the printing should be legible and easy to distinguish. The passive electronic seal must be designed to be affixed to the hasp for sealing or the assigned hasp of the door of a container or a bonded truck. If this active electronic seal is a bolt seal, its length must be no more than 21 cm after sealing and a necessary part for cutting should also be prepared in advance. 2. Active electronic seals must be used outdoors for all day. (Waterproof, high temperature resistance and shockproof are required while being affixed to container trucks or bonded trucks on road.) 3. Active electronic seals must be capable of accepting GPS (Global Positioning System) signal. An active electronic seal should also have an operational interface for wireless communication signal to lock or unlock the seal. 4. The duration of the embedded battery of an active electronic seal must be no less than the longest domestic travel time of land transportation (10 hours). During the duration, this active electronic seal must be able to actively and formally receive or emit wireless communication signal.
<p>Specifications of Wireless Signal Transmission</p>	<ol style="list-style-type: none"> 1. The range of operational frequency of an active electronic seal includes 2.4GHz band for short distance, and 2G, 2.5G, 3G, 3.5G or higher generation bands for long distance telecom network service provided by domestic first class telecommunications operators. The 2.4GHz band should be involved in the Industrial, Scientific and Medical Band and be in accordance with the laws and regulations promulgated by

	<p>authority of communication (The National Communications Commission, NCC). A certification issued by NCC to approve the active electronic seal is also required.</p> <ol style="list-style-type: none">2. The emission and reception of the wireless communication signal of an active electronic seal should adopt the encryption standards of Advanced Encryption Standard 128bits, which transmitted signal to electronic seal monitoring system confidentially. The encryption mechanism should have a product key which can be modified by software for the demand of the electronic seal monitoring system of the Customs.3. An active electronic seal should be able to receive GPS signal. This active electronic seal should also be able to emit and receive the signal which band includes 2.4GHz band for short distance, and 2G, 2.5G, 3G, 3.5G or higher generation bands for long distance telecom network service provided by domestic first class telecommunications operators actively, so as to achieve functions of real-time communication in long distance and being locked and unlocked remotely.4. An active electronic seal should be able to emit wireless communication signal to the electronic seal monitoring system of the Customs actively. The content and format of this signal should include at least the items as described below:<ol style="list-style-type: none">(1) Longitude and latitude located by GPS;(2) Identification code (so-called secret code);(3) Abnormal condition of the seal.<p>(Please refer to the website of electronic seal monitoring system of Customs Administration for precise information.)</p>5. The operation of active electronic seals can be set for short distance communication merely by field Customs as required. Long distance communication may be set optional for the management of field Customs.
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Specifications of Appearance	<ol style="list-style-type: none">1. The main body of self-prepared active electronic seals should be in any color other than blue.2. The visible serial number (ordinary code) of each self-prepared active electronic seal should be printed or etched on the surface of the seal. The first two numbers of the serial number should be alphabets, and the code of these alphabets of each firm is controlled by Customs Administration. The last eight numbers of the serial number are Arabic numerals. (The type and the length of the code could be changed as required.)3. The self-prepared active electronic seal should have visible indicator lamps to display the conditions of locking. After locking or unlocking, users can differentiate the condition via significant signal of this active electronic seal. (Please refer to the website of electronic seal monitoring system of Customs Administration for precise information.)
Specifications of Locking and Unlocking	<ol style="list-style-type: none">1. During the transportation of a container or a bonded truck, the self-prepared active electronic seal should be able to detect and sense any kind of condition which will possibly change or influence the condition of locking.2. While being locked or unlocked, the self-prepared active electronic seal should be able to transmit corresponding information to the electronic seal monitoring system of the Customs in real time, and to receive the order from monitoring system to execute task of unlocking.3. The unlocking function of the self-prepared active electronic seal should be compatible with the devices of unlocking section of the electronic seal monitoring system. When the active electronic seal is in the operational dimension of the reader, the unlocking section should be automatically executed. The time for an active electronic seal to be locked or unlocked must be no more than 5 seconds.

	<p>4. While being broken or destroyed, the self-prepared active electronic seal should be able to send alerts to the electronic seal monitoring system of the Customs immediately.</p> <p>5. A self-prepared active electronic seal must be locked or unlocked in the assigned places of customs clearance sites. Locking and unlocking active electronic seals must be operated by the electronic seal monitoring system or handheld devices of the Customs. Using other handheld devices to lock and unlock active electronic seals is strictly prohibited.</p>
<p>Specifications of On-site Dataflow Connection Test</p>	<p>5. When conducting the on-site dataflow connection test, the active electronic seal must be limited to be read by active RFID readers implemented by the Customs. If a self-prepared active electronic seal is not locked firmly, this seal should not be read by RFID readers. Meanwhile, if an active electronic seal is broken (e.g. cut) after being affixed, a mechanism for users to distinguish the difference between the conditions before and after destruction should be enforced.</p> <p>2. The length for readers to accept the signal after the self-prepared active electronic seal has been locked to the hasp of the door of a container or a bonded truck. While using readers implemented by the Customs, this length should be no more than 30m.</p> <p>3. To certify the compatibility of the locking/unlocking function of the self-prepared active electronic seal and the electronic seal monitoring system of the Customs, an on-site dataflow connection test should be conducted in customs clearance sites. The successful rate of unlocking must be more than 95%.</p> <p>4. Steps of the on-site dataflow connection test of active electronic seal are as described below:</p> <p>(1) The appearance of the seal to verify the compliance with these Criteria shall be inspected and relevant certificates must be</p>

	<p>examined.</p> <p>(2) After executing the distribution operation in the monitoring system by the staff, lock the self-prepared active electronic seal to the hasp of the container door which located at the sensitive dimension of the reader. (The distance is about 30m to the reader)</p> <p>(3) The staff shall inspect whether the locking information sent out by the seal can be accepted by the monitoring system or not and confirm the seal can be firmly locked in 5 seconds. The staff shall also inspect whether the visible indicator lamps of the seal can display the condition of locking or not. The condition of locking displayed by the visible indicator lamps should be clearly differentiated with the condition of unlocking.</p> <p>(4) After locking the seal, the staff shall confirm that the encrypted (by AES 128 bits mechanism) information which includes GPS longitude and latitude and conditions of seal actively emitted by the seal can be accepted by the monitoring system.</p> <p>(5) The staff shall confirm that when the container truck arrives the destination which refers to the sensitive dimension of the reader, the monitoring system can display the arriving time, automatically unlock the seal in 5 seconds and display the condition of unlocking. The condition of unlocking should be clearly differentiated with the condition of locking.</p> <p>(6) The two active electronic seals for test should be locked to a container truck in a monitoring area which has been established with the active electronic seal monitoring system. The container truck with locking seal should be moved back and forth for 10 times following the above step 2 to 5. If the seal cannot meet any requirement of the above steps more than</p>
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	two times during the test, this active electronic seal would be failed to pass the on-site dataflow connection test. (except factors not attributable to the seal)
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