

Table 3: Criteria for the Performance of Passive Electronic Seals

Specifications of International Standards	<p>Passive electronic seals should be compliant with a communication protocol containing a unique identification code. Once securely affixed to the designated containers or other transportation vehicles specified by customs, it can be read by smartphones with Android or iOS operating systems and built-in NFC functionality, or by high-frequency reading devices compliant with ISO/IEC 15693 or ISO/IEC 14443A or B standards, enabling contactless reading of the passive electronic seal's unique identification code for monitoring purposes.</p>
Specifications of Hardware	<ol style="list-style-type: none"> 1. The forms of passive electronic seals which are dedicated to be affixed to sea containers are limited to bolt seals and cable seals. The mechanical security of these passive electronic seals should be compliant with CNS 17712 standards for high-security seal. A legible method should be adopted for users to distinguish high-security seal, for example, the pattern of “H” should be marked or printed in the main body of seal. 2. The names or marks of the firm and the serial numbers should be printed on the distinct location of the main body of a passive 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 passive 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. If this passive electronic seal is a cable seal, the length of the steel cable available for cutting after sealing should be between 15 and 30 cm, with a diameter between 0.15 and 0.6 cm, and the overall volume of the bolt seal should be less than 9 cm × 7 cm

	<p>× 2 cm (length × width × thickness).</p> <p>3. Passive 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.)</p> <p>4. The bolt seal should be compliant with the following requirements that once the pin has been inserted into the bush, the shaft of a pin and the base section of a bush should not be able to be whirled or twisted over one circle (360°) in opposite direction without using tools, and if the bolt seal is forcibly whirled or twisted by tools which resulted in any difference of circumstances of whirling after damage, the malicious tampering will leave significant evidences or marks for visual inspection.</p>
Specifications of Embedded IC of Electronic Seal	<p>1. The unique identification code of the embedded chip in the passive electronic seal should be read by readers operated at the frequency 13.56MHz.</p> <p>2. The length of the unique identification code of the chip in the passive electronic seal must be no less than 32 bits, and it cannot be modified or rewritten. The unique identification code must be unique and consistent with the serial numbers.</p>
Specifications of Appearance	<p>The visible serial number of each self-prepared passive electronic seal should be printed or etched on the surface of the seal. The first three numbers of the serial number should be alphabets, and the code of these alphabets of each firm is controlled by Customs Administration. The last seven numbers of the serial number are Arabic numerals that must not be duplicated. (The type and the length of the code could be changed as required.)</p>
Specifications of Static Test	<p>1. After the passive electronic seal is securely affixed, its unique identification code can be read using a smartphone with Android or iOS operating systems and built-in NFC</p>

	<p>functionality. The reading distance should be greater than 1 cm, and the serial number obtained from the reading must match the serial number indicated on the exterior of the seal.</p> <p>2. Before the passive electronic seal is securely affixed, it should not be readable using a smartphone with Android or iOS operating systems and built-in NFC functionality. Additionally, after being securely affixed, if it is damaged (e.g., cut), it should have a mechanism to detect and distinguish the difference before and after the damage. The testing method is as follows:</p> <p>(1) Difference in Seal Status Before and After Securing: Before the passive electronic seal is securely affixed, it should not be readable using a smartphone with Android or iOS operating systems and built-in NFC functionality. After securely affixing the passive electronic seal, the testing personnel should attempt to read it again using a smartphone with Android or iOS operating systems and built-in NFC functionality. Any difference between the reading results before and after securing the seal should be confirmed.</p> <p>(2) Read Distance Test: When using a smartphone with Android or iOS operating systems and built-in NFC functionality to read the passive electronic seal, the reading distance should be greater than 1 cm for the unique identification code to be displayed normally.</p> <p>(3) Confirm Serial Number and Unique Identification Code Matching Table: Use a smartphone with Android or iOS operating systems and built-in NFC functionality to read the passive electronic seal after it has been securely sealed. Compare the displayed unique identification code data with the serial number data on the seal's exterior, ensuring they match the matching table.</p>
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	<p>(4) Differences in Status Before and After Sealing and Damage:</p> <p>After the passive electronic seal is securely sealed, use a smartphone with Android or iOS operating systems and built-in NFC functionality to sequentially read the status before and after cutting the bolt (or cable), confirming that there is a difference in the reading results.</p> <p>3. Each test batch consists of 20 passive electronic seals, and all of them must complete the testing steps. If more than 2 seals do not meet the specifications during the testing process, the testing should be stopped, and the batch should be considered as disqualified.</p>
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