Freevision Gateway Reader

Antenna Specification Document

一、 Summarize

This specification document provides detailed information on the geometric dimensions and electrical parameters of the two antennas equipped for the Freevision Gateway Reader, serving as a basis for equipment design, integration, and performance verification.

二、 Antenna 1 (125KHz RFID reader antenna)

（一） geometric dimensioning
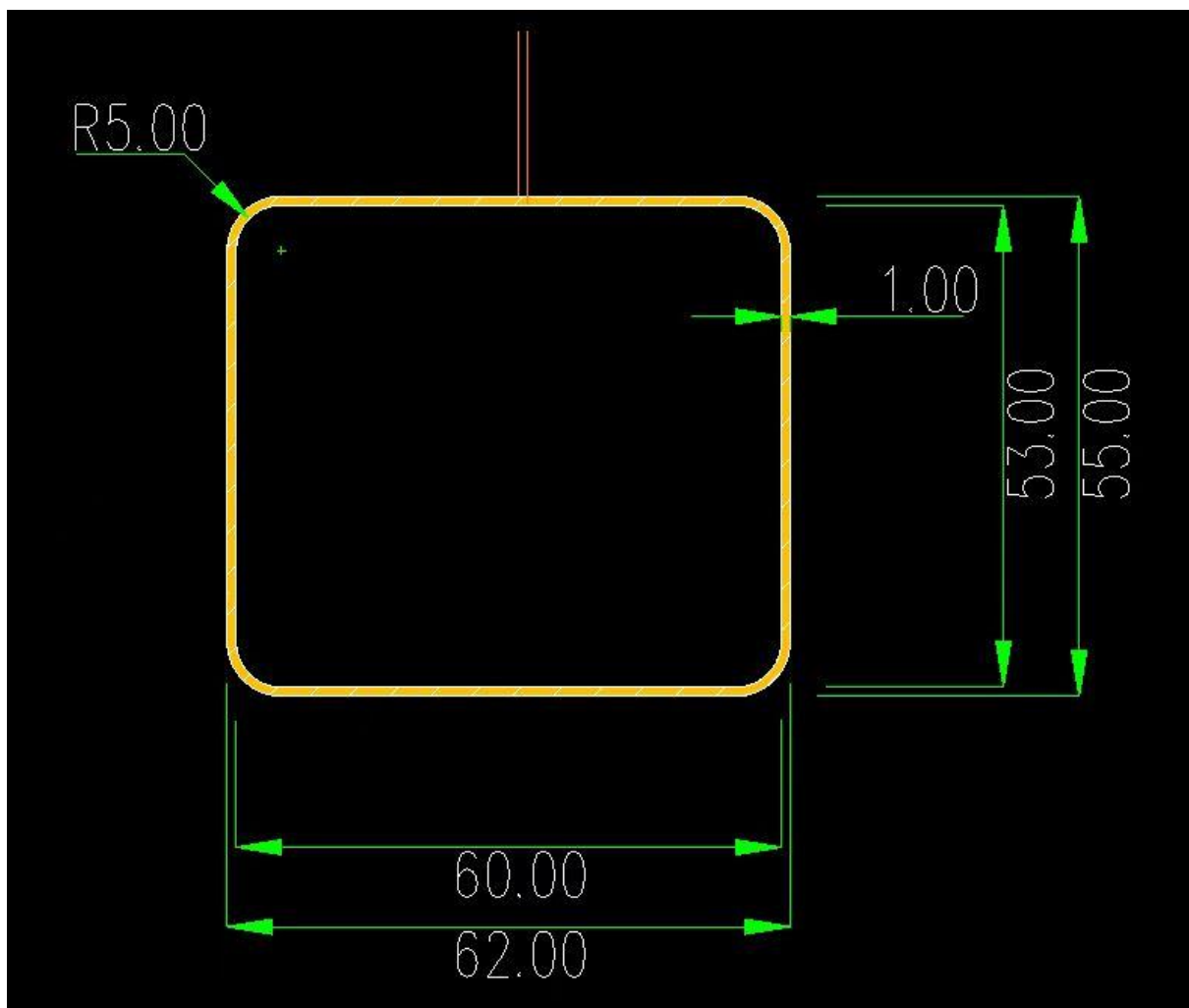
1. **Shape outline:** It is a square structure with rounded corners. The radius of the rounded corners is R = 5.00mm.

2. **Overall dimensions**：

    1. The length direction of the outer contour (including the border)： 62.00mm ；

    2. Width direction of the outer contour (including the border)： 55.00mm ；

    3. Internal effective area length： 60.00mm ；

    4. Internal effective area width： 53.00mm ；

    5. Border Thickness (Single Side)： 1.00mm 。

（二）Key Explanation

This antenna is mainly designed to be compatible with 125kHz identification cards and related functions. By working in coordination with the 125kHz low-frequency module circuit of the card reader, it enables the reception and transmission of signals, and completes operations such as card identification and mobile credential interaction.
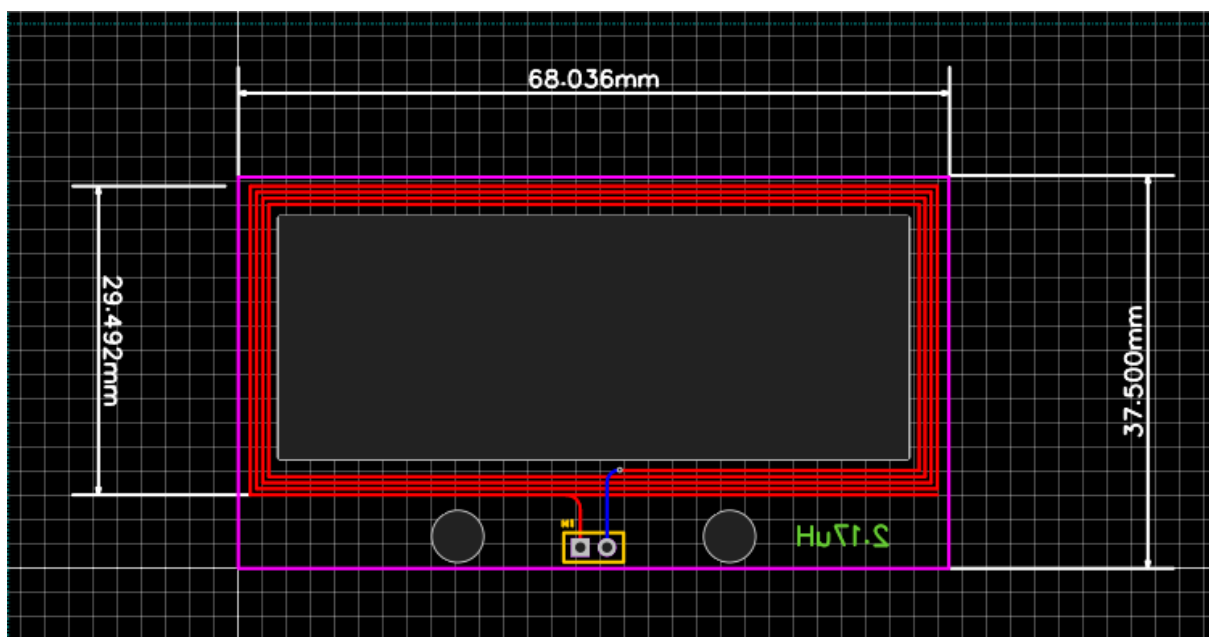
Manufacturing method: Copper wire winding

Antenna inductance: 1.62 mH

Wire diameter: 0.09 mm

三、Antenna 2 (PCB Antenna)

（一）geometric dimensioning

1. **Overall outer frame**：

    1. Length：68.036mm；

    2. Width：37.900mm；

2. **Internal coil area**：

    1. Length：65.7mm；

    2. Width：29.492mm；

3. **Auxiliary structure: Two large circular mounting holes are configured at the bottom for the antenna fixation. The H1 interface is compatible with the motherboard circuit connection.**

（二）electric parameter

1. **Coil parameters**：

    1. Number of turns（Turns）：4 Circuit;

    2. Wire width（Width）：0.33mm；

    3. Wire spacing（Spacing）：0.254mm；

    4. Wire thickness（Thickness）：35um；

2. **Medium layer（Substrate）**：

    1. Relative Electrical Permittivity, ε_r：4.6；

    2. Thickness，h：1.0mm;

3. **Performance parameters**：

    1. Segmentation Mode：Vertical;

    2. Segments：16；

    3. Equivalent Inductance：2.17uH（@13.56MHz）。

（三）Function Adaptation

Mainly used for the radio frequency functions related to the NFC dual-interface Tag (such as specific NFC interactions, etc., which need to be confirmed in conjunction with the overall design of the card reader), by means of the coil structure and electrical parameters, achieve stable radio frequency signal coupling and processing.

四、 General Instructions

1. **Installation and Integration:** The two antennas must be installed strictly according to the geometric dimensions and the mechanical structure requirements of the equipment, ensuring a reliable connection with the circuit board of the card reader and guaranteeing the quality of signal transmission.

2. **Performance Verification:** During the production and debugging stages of the equipment, based on the antenna parameters, the identification distance, signal stability and other indicators under the corresponding working frequencies (such as 125kHz, 13.56MHz, etc.) need to be verified to ensure that they meet the functional requirements of the access control reader.

3. **Environmental Adaptability:** The performance of the antenna is affected by environmental factors (such as metal interference, temperature, humidity, etc.). In practical applications, it is necessary to consider the interference of the installation environment on the antenna, and in case of necessity, shielding and protective measures should be taken.

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