CLAIMS

1. A communication system comprising:

a plurality of first communication control devices constituting a mesh network connected between a first device and a network communication network; ~~and~~

a second communication control device connected between a second device and the network communication network; and

a data memory storing a key and a certificate to indicate that each of the first communication control devices is authenticated,

the first communication control devices each including:

a wireless communication unit configured to perform wireless communication; and

a controller configured to, when receiving data to be transmitted via the wireless communication unit from the first device to the second device, determine a communication path in the mesh network to transmit the data to the network communication network from the first communication control device that receives the data, perform mutual authentication with the second communication control device communicating via the communication path and the network communication network, and thereafter transmit encrypted data obtained by encrypting the data to the second

communication control device.

~~2. The communication system according to claim 1~~, wherein the controller of the first communication control device that receives the data from the first device encrypts the data to be transmitted from the first device to the second device using a common key determined by the mutual authentication with the second communication control device, the controller being configured to perform mutual authentication among the first communication control devices in the communication path based on the key and the certificate stored in the data memory, wherein

when the communication path in the mesh network has been determined, the controller performs mutual authentication among the first communication control devices in the communication path, and communicates with the second communication control device via the communication path and the network communication network, after the mutual authentication among the first communication control devices in the communication path succeeds.

2~~3~~. The communication system according to claim 1, wherein the controller acquires device-specific information from the first device via the wireless communication unit, and receives the data to be transmitted from the first device to the second device, after authentication with the

device-specific information succeeds.

~~4. The communication system according to any one of claims 1 to 3, wherein~~

~~when the communication path in the mesh network has been determined, the controller performs mutual authentication among the first communication control devices in the communication path, and communicates with the second communication control device via the communication path and the network communication network, after the mutual authentication among the first communication control devices in the communication path succeeds.~~

3~~5~~. A communication system comprising:

a plurality of first communication control devices constituting a mesh network connected between a first device and a network communication network; ~~and~~

a second communication control device connected between a second device and the network communication network; and

a data memory storing a key and a certificate to indicate that each of the first communication control devices is authenticated,

the first communication control devices each including:

a wireless communication unit configured to

perform wireless communication; and

a controller configured to, when receiving encrypted data obtained by encrypting data to be transmitted from the second device to the first device, from the second communication control device, determine a communication path in the mesh network to transmit the data to the first device from the first communication control device that receives the encrypted data, perform mutual authentication between one of the first communication control devices at an end of the communication path and the second communication control device, and thereafter transmit the encrypted data acquired from the second communication control device via the network communication network to the first communication control device~~.~~

~~6. The communication system according to claim 5~~, wherein the controller of the first communication control device at the end of the communication path decrypts the encrypted data using a common key determined by mutual authentication with the second communication control device, and transmits the decrypted data to the first device, the controller being configured to perform mutual authentication among the first communication control devices in the communication path based on the key and the

certificate stored in the data memory,~~.~~

~~7. The communication system according to claim 5 or 6,~~ wherein when the communication path in the mesh network has been determined, the controller performs mutual authentication among the first communication control devices in the communication path, and performs communication via the communication path, after the mutual authentication among the first communication control devices in the communication path succeeds.