（様式 5）

指導教員 承認印	

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学位（博士）論文要旨

(Doctoral thesis abstract)

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論 文 題 目 (Title)	低姿勢スーパーディレクティブアンテナに関する研究 (A Study on Low-profile Superdirective Antenna)

論文要旨（2000 字程度）
(Abstract(400 words))
※欧文・和文どちらでもよい。但し、和文の場合は英訳を付すこと。
(in English or in Japanese)

In this paper, the author proposes an antenna for IoT (Internet of Things) terminals.

In Chapter 1, the background of the study, the purpose of the study, and the composition of this paper are shown.

In Chapter 2, the problems of conventional low-profile antennas such as patch antenna, planar inverted F-antenna, and dipole antenna with reflector are identified.

In Chapter 3, the basic configuration of the proposed antenna and its characteristics are shown. This antenna has a simple structure using a radiator and a reflector. By placing the radiator close to the reflector, both low profile and unidirectional property are achieved. As an example, the distance between the radiator and the reflector, that is, the antenna height was 5 mm (0.033λ @ 2GHz).

By using an asymmetric dipole antenna as the radiator, the radiation resistance was not reduced and impedance matching was obtained without a matching circuit. The experimental gain at 2 GHz was 6.1 dBi and the F/B ratio was 18.3 dB. Furthermore, it was clarified by numerical simulation that the influence of this antenna from the human head and the metal plate is very small.

In Chapter 4, the bandwidth characteristic of the prototype antenna proposed in Chapter 3 is improved using the principle of self-complementarity. This antenna achieves constant input impedance by changing the radiator to a monopole notch antenna, and obtains impedance matching without a matching circuit by changing the shape of the monopole antenna from straight to

T-shaped.

In the experimental results with the antenna height of 3 mm (0.020λ @ 2 GHz), the VSWR ≤ 2 bandwidth was 6 %. This is twice as much as the prototype antenna.

In Chapter 5, the prototype antenna proposed in Chapter 3 is multibanded for the purpose of WLAN (Wireless Local Area Network) applications that support two frequency bands, 2.4 GHz and 5 GHz. In order to obtain multiband characteristics, a method of loading a trap circuit on the antenna element is used. Here, the antenna dimensions are 62 mm × 25 mm × 3 mm (0.50λ × 0.20λ × 0.024λ @ 2.4GHz).

In the experimental results, the radiation pattern was unidirectional and the gain was 3.0 dBi at 2.44 GHz, 5.3 dBi at 5.25 GHz, and 5.8 dBi at 5.6 GHz.

In Chapter 6, the conclusion of this study is shown. In addition, future issues and prospects are shown with concrete examples.

（英訳）※和文要旨の場合(400 words)