



TECHNOLOGY

Enhancing Cellular Device Privacy Through Physical Layer Identification

OVERVIEW

Background

As the use of wireless network technology has become commonplace with devices such as cellular phones and tablets, a need for protecting user privacy has become evident. Prior research has shown that in GSM-based networks, an attacker can snoop on transmissions between a user and a communication point and determine a user's temporary ID, which allows the attacker to determine if a user is still in a given area or not by sending requests to the end user's device. Researchers at the University of Maryland have discovered that LTE (Long Term Evolution) networks can be exploited in the same manner, potentially compromising the location privacy of users on current generation wireless networks. Current possible ways to mitigate this type of attack include encrypting the control signals transmitted to end users or sending out additional control signals, both of which reduce available bandwidth for data and increase battery consumption for end user devices.

Innovative Technology

Researchers at the University of Maryland have developed a signal processing technique that embeds a unique user ID into a transmitted signal in a way that allows a device to determine if a transmitted signal is intended for a specific device, but also prevents an attacker from learning the unique user ID. The unique ID is present in the physical layer in the end user's device and is embedded in the paging message sent by a transmission tower. Multiple unique IDs can be superimposed over a signal paging message. The unique ID is transmitted at a lower power relative to the paging message, which allows a user to detect its presence in the message, but prevents an attacker from decoding it. Since the signal is modulated and is at a lower power compared to the paging message, there is a minimal chance of interference resulting in a user device being unable to decode the paging message. Signal noise prevents an attacker from learning the information about a unique ID and thus allows end users enhanced privacy.

Advantages

- Enhances user location privacy in cellular networks, prevents snooping
- Requires minimal computation by user devices, saving battery life and transmission bandwidth
- Can be introduced incrementally using existing infrastructure
- Increases available bandwidth for data transmission

Applications

- LTE based wireless networks
- Also applicable to GSM, WCDMA, and WiMAX wireless networks
- Network security

CONTACT INFO

UM Ventures

0134 Lee Building

7809 Regents Drive

College Park, MD 20742

Email: umdtechtransfer@umd.edu

Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Microelectronics
- Information Technology

EXTERNAL RESOURCES

- [US Patent 9,585,009](#)

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