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Enable and Disable 5G Based on Application Identifier

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ENABLE AND DISABLE 5G BASED ON APPLICATION IDENTIFIER

Abstract

A communication device, otherwise known as a user equipment (UE) (e.g., a smartphone) may be configured to support various radio access technologies, which may include fourth generation (4G) such as Long-Term Evolution (LTE) or LTE-Advanced (LTE-A), as well as fifth generation (5G) New Radio (NR) (e.g., millimeter wave (mmW)). The UE may be configured to support various types of applications (e.g., social media applications, video streaming applications, and the like) using one or more radio access technologies (e.g., 4G or 5G). As demand for efficiency increases, it may be desirable to reduce power consumption for the UE (e.g., increase battery life), while providing higher reliability and lower latency for applications running on the UE using one or more radio access technologies.

Background

A UE may be configured to operate according to one or multiple radio access technologies, for example, 4G or 5G, to improve reliability or lower latency, or both, for applications running on the UE. The UE may, in some cases, operate in 5G over 4G to increase a data throughput for the applications running on the UE. However, operating in 4G over 5G may have unfavorable implications such as increased latency for the applications running on the UE. In addition, the UE may experience an increase in power utilization when operating in 5G compared to 4G. The following relates to reducing power consumption for the UE when operating in 5G.

Description

Figure 1 shows an example of a UE, which may be configured to reduce power consumption when operating in 5G. The UE may be configured with a list of applications (also referred to as a "whitelist") to decrease the power consumption of the UE. For example, the UE may operate in 5G when running an application that is part of the whitelist. Additionally or alternatively, the UE may be configured with another list of applications (also referred to as a "blacklist") to decrease the power consumption of the UE. For example, the blacklist may include certain applications (e.g., short message service (SMS)-related applications) that do not require 5G. Both the whitelist and the blacklist may be stored in local memory of the UE.

UE

4G Module   **5G Module**

Memory

WHITELIST

Application 1 – APPID1
Application 2 – APPID2
Application 3 – APPID3
.
.
.
Application M – APPIDM

BLACKLIST

Application 4 – APPID4
Application 5 – APPID5
Application 6 – APPID6
.
.
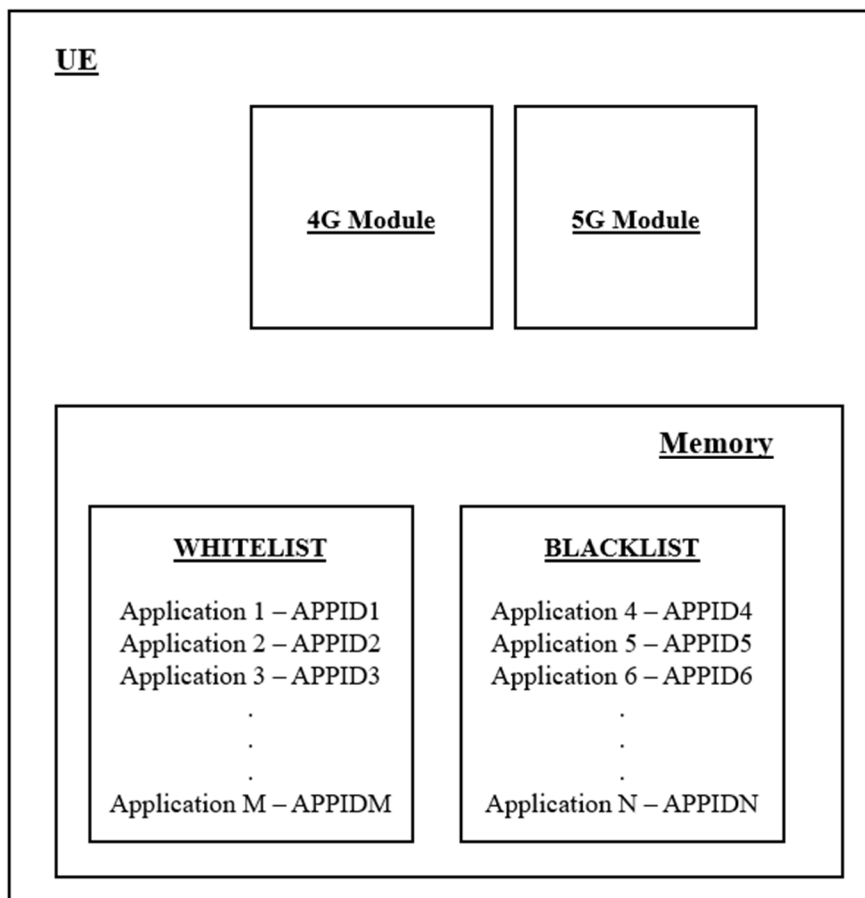.
Application N – APPIDN

FIG. 1

Applications that are part of the whitelist may be applications that have higher throughput, lower latency, and higher reliability requirements. For example, an application in the whitelist may be a mobile hotspot application that may necessitate higher throughput, lower latency, and higher reliability requirements. Other examples of applications include file download applications, gaming applications, video streaming applications, etc. Applications that are part of the blacklist may be applications that have lower throughput, higher latency, and lower reliability requirements (e.g., SMS-related applications).

The UE may, in some cases, be configured to classify (e.g., assign) applications into certain categories. Examples of categories may include a streaming category, a gaming category, and the like. The whitelist or the blacklist, or both, may be designed to be modifiable. For example, a user of the UE may add or remove certain applications to or from the whitelist or the blacklist, or both. For example, a user of the UE may add or remove certain applications to or from the whitelist or the blacklist, or both, via an interface (e.g., a graphical user interface (GUI)) of the UE.

In some examples, the UE may determine whether an application belongs to the whitelist or the blacklist based in part on an application identifier associated with the application. For example, each application in the whitelist or the blacklist may correspond to an application identifier. The UE may thus determine whether an application is in the whitelist or the blacklist using the application identifier associated with the application.

Once the UE has identified that an application belongs to the whitelist or the blacklist, the UE may be configured to transmit a message to a network device, such as a base station or a core network, to enable or disable 5G operations for the UE. For example, the UE may transmit a message (e.g., a tracking area update (TAU) message) to the base station or the core network

requesting to enable or disable 5G capabilities for the UE. Alternatively, the UE may be configured to enable (e.g., turn ON) or disable (e.g., turn OFF) a 5G module of the UE. In some examples, the UE may be configured to enable (e.g., turn ON) or disable (e.g., turn OFF) a 4G module of the UE depending on enabling or disabling the 5G module of the UE. In some examples, the UE may enable or disable a mmW module when reporting a corresponding channel quality indicator (CQI) or a reference signal received power (RSRP) to the base station or the core network. In some other examples, the UE may be configured to enable (e.g., turn ON) or disable (e.g., turn OFF) a 5G module of the UE when an application corresponds to a certain category, as described above, and as a result the UE may transmit a respective message (e.g., a TAU message) to the base station or the core network to enable or disable 5G capabilities for the UE. As such, the UE may switch from operating in 5G to operating in 4G by deactivating the 5G module and activating the 4G module.

Therefore, the UE may enable and disable 5G operations when running an application that is part of the whitelist or the blacklist. The UE may, as a result, experience increased battery life, while providing higher reliability and lower latency for applications running on the UE when operating in 4G or 5G.

References

1.   U.S. Patent Publication No. 2019/0342937 A1, the entire content of which is hereby incorporated by reference.

2.   U.S. Patent Publication No. 2018/0332659 A1, the entire content of which is hereby incorporated by reference.