

information may be a random access preamble sent by the UE to the base station in step A.

[00172] Cancellation condition 3: the UL-grant allocated by the base station is received on the PDCCH and first preset response information sent by the base station in the contention based random access procedure is not received.

[00173] In an embodiment of the present disclosure, the first preset response information may be a response RAR to the Random Access-Radio Network Temporary Identifier (RA-RNTI), and the response RAR is sent by the base station to the UE. The RAR to the RA-RNTI includes UL-grant.

[00174] Cancellation condition 4: the UL-grant allocated by the base station is received on the PDCCH, and the second preset sending information in the contention based random access procedure is not sent to the base station.

[00175] In an embodiment of the present disclosure, the second preset sending information may be MSG3 sent by the UE to the base station in step D.

[00176] In embodiments of the present disclosure, if the UE receives the UL-grant allocated by the base station to the UE through the PDCCH before the time node corresponding to any step before the random access procedure is completed, the UE can immediately terminate the contention based random access procedure, so as to reduce signaling overhead and save system resources.

[00177] In a second case, the UE receives the UL-SCH resource allocated by the base station before the random access procedure is completed. The preset random access cancellation condition may include any one of the following:

[00178] First Cancellation Condition: a target uplink shared channel resource is monitored. The target uplink shared channel resource may be a valid uplink shared channel resource provided by the base station. In an embodiment, the target uplink shared channel resource is an uplink shared channel resource provided by the base station before responding to the contention based random access request.

[00179] That is, before the contention based random access procedure is completed, if the UE monitors the UL-SCH resources allocated to the UE by the base station, the UE may use the currently monitored available UL-SCH resources to send a BSR to the base station to request uplink transmission resources, and there is no need to request the base station to allocate uplink transmission resources for the UE through the contention based random access method. Accordingly, the above-mentioned contention based random access procedure can be cancelled.

[00180] Second Cancellation Condition: the target uplink shared channel resource is

preset random access trigger condition is satisfied;

[00232] if the preset random access trigger condition is satisfied, trigger a contention based random access request;

[00233] before a contention based random access procedure is completed, determine whether a preset random access cancellation condition is satisfied; and

[00234] if the preset random access cancellation condition is satisfied, cancel the contention based random access procedure, wherein the preset random access cancellation condition includes at least detecting valid uplink resource information.

[00235] According to embodiments of the present disclosure, there is provided a method for requesting an uplink transmission resource. The method includes:

[00236] after triggering an uplink resource Scheduling Request (SR), in response to a preset random access trigger condition, triggering a contention based random access request;

[00237] before completing a contention based random access procedure, in response to a preset random access cancellation condition, cancelling the contention based random access procedure, wherein the preset random access cancellation condition comprises at least:

[00238] the target uplink shared channel resource is monitored and second preset transmission information in the contention random access procedure is not sent to a base station, wherein the target uplink shared channel resource is valid uplink share channel resource provided by the base station.

[00239] According to embodiments of the present disclosure, the method further includes:

[00240] after determining a Buffer Status Report (BSR) to be transmitted, in response to a preset SR trigger condition, triggering the uplink resource SR, wherein the preset SR trigger condition comprises that there is no available uplink shared channel (UL-SCH) resource and there is no configured UL-grant within a first preset time interval.

[00241] According to embodiments of the present disclosure, the method further includes:

[00242] in response to an available UL-SCH resource received or the UL-grant configured within the first preset time interval, sending data and/or the BSR to be transmitted to a base station by using the available UL-SCH resource or an uplink transmission resource indicated by the UL-grant.

[00243] According to embodiments of the present disclosure, in response to the preset random access trigger condition, triggering a contention based random access request includes:

[00244] in response to no valid physical uplink control channel (PUCCH) resource configured for transmitting the uplink resource SR at any time, or no available UL-SCH resource and no UL-grant configured within a preset time interval, triggering the contention based random access request.

[00245] According to embodiments of the present disclosure, in response to the preset random access trigger condition, triggering a contention based random access request includes:

[00246] in response to at least one valid physical uplink control channel (PUCCH) resource configured for transmitting the uplink resource SR, or no available UL-SCH resource and no UL-grant configured within a preset time interval, determining whether a total number of times for sending the uplink resource SR exceeds a preset threshold; and

[00247] in response to the total number of times for sending the uplink resource SR exceeding the preset threshold, triggering the contention based random access request.

[00248] According to embodiments of the present disclosure, the method further includes:

[00249] in response to there is an available UL-SCH resource or UL-grant configured within a preset time interval, cancelling the uplink resource SR which is in a pending state.

[00250] According to embodiments of the present disclosure, the preset random access cancellation condition comprises any one of the following cases that:

[00251] a UL-grant allocated by a base station is received on a physical downlink control channel (PDCCH);

[00252] the UL-grant allocated by the base station is received on the PDCCH, and first preset transmission information in the contention based random access procedure is not sent to the base station;

[00253] the UL-grant allocated by the base station is received on the PDCCH, and first preset response information sent by the base station in the contention based random access procedure is not received; and

[00254] the UL-grant allocated by the base station is received on the PDCCH, and second preset transmission information in the contention based random access procedure is not sent to the base station.

[00255] According to embodiments of the present disclosure, the preset random access cancellation condition comprises any one of the following cases that:

[00256] a target uplink shared channel resource is monitored, wherein the target uplink shared channel resource is an uplink shared channel resource provided by the base station before responding to the contention based random access request;

[00257] the target uplink shared channel resource is monitored and first preset transmission information in the contention random access procedure is not sent to the base station;

[00258] the target uplink shared channel resource is monitored and first preset response information sent by the base station in the contention based random access procedure is not received; and

[00259] the target uplink shared channel resource is monitored and second preset transmission information in the contention random access procedure is not sent to the base station.

[00260] According to embodiments of the present disclosure, the method further comprises:

[00261] configuring the preset SR trigger condition according to SR trigger configuration information sent by a base station.

[00262] According to embodiments of the present disclosure, the method further comprises:

[00263] configuring the preset random access trigger condition according to random access trigger configuration information sent by a base station.

[00264] According to embodiments of the present disclosure, the method further comprises:

[00265] configuring the preset random access cancellation condition according to access cancellation configuration information sent by a base station.

[00266] According to embodiments of the present disclosure, the first preset time interval and/or the preset time interval is a basic information transmission unit in a New Radio (NR) system.

[00267] According to embodiments of the present disclosure, there is provided a device for requesting an uplink transmission resource. The device is applied in a user terminal and includes:

[00268] a memory;

[00269] a processor for storing instructions;

[00270] wherein the processor is configured to:

[00271] after trigger an uplink resource Scheduling Request (SR), in response to a preset random access trigger condition, trigger a contention based random access request;

[00272] before complete a contention based random access procedure, in response to a preset random access cancellation condition, cancel the contention based random access

procedure, wherein the preset random access cancellation condition comprises at least:

[00273] the target uplink shared channel resource is monitored and second preset transmission information in the contention random access procedure is not sent to a base station, wherein the target uplink shared channel resource is valid uplink share channel resource provided by the base station.

[00274] According to embodiments of the present disclosure, the processor is further configured to:

[00275] after determine a Buffer Status Report (BSR) to be transmitted, in response to a preset SR trigger condition, trigger the uplink resource SR, wherein the preset SR trigger condition comprises that there is no available uplink shared channel (UL-SCH) resource and there is no configured UL-grant within a first preset time interval.

[00276] According to embodiments of the present disclosure, the processor is configured to:

[00277] in response to no valid physical uplink control channel (PUCCH) resource configured for transmitting the uplink resource SR at any time, or no available UL-SCH resource and no UL-grant configured within a preset time interval, trigger the contention based random access request.

[00278] According to embodiments of the present disclosure, the processor is configured to:

[00279] in response to at least one valid physical uplink control channel (PUCCH) resource configured for transmitting the uplink resource SR, or no available UL-SCH resource and no UL-grant configured within a preset time interval, determine whether a total number of times for sending the uplink resource SR exceeds a preset threshold; and

[00280] in response to the total number of times for sending the uplink resource SR exceeding the preset threshold, trigger the contention based random access request.

[00281] According to embodiments of the present disclosure, the processor is further configured to:

[00282] in response to there is an available UL-SCH resource or UL-grant configured within a preset time interval, cancel the uplink resource SR which is in a pending state.

[00283] According to embodiments of the present disclosure, the preset random access cancellation condition comprises any one of the following cases that:

[00284] a UL-grant allocated by a base station is received on a physical downlink control channel (PDCCH);

[00285] the UL-grant allocated by the base station is received on the PDCCH, and first

preset transmission information in the contention based random access procedure is not sent to the base station;

[00286] the UL-grant allocated by the base station is received on the PDCCH, and first preset response information sent by the base station in the contention based random access procedure is not received; and

[00287] the UL-grant allocated by the base station is received on the PDCCH, and second preset transmission information in the contention based random access procedure is not sent to the base station.

[00288] According to embodiments of the present disclosure, the preset random access cancellation condition comprises any one of the following cases that:

[00289] a target uplink shared channel resource is monitored, wherein the target uplink shared channel resource is an uplink shared channel resource provided by the base station before responding to the contention based random access request;

[00290] the target uplink shared channel resource is monitored and first preset transmission information in the contention random access procedure is not sent to the base station;

[00291] the target uplink shared channel resource is monitored and first preset response information sent by the base station in the contention based random access procedure is not received; and

[00292] the target uplink shared channel resource is monitored and second preset transmission information in the contention random access procedure is not sent to the base station.

[00293] According to embodiments of the present disclosure, the processor is further configured to:

[00294] configure the preset SR trigger condition according to SR trigger configuration information sent by a base station.

[00295] FIG. 11 is a block diagram of a device 1100 for requesting an uplink transmission resource according to an exemplary embodiment. As shown in FIG. 11, the device 1100 may be a terminal, for example, the device 1100 may be a mobile phone, a computer, a digital broadcast terminal, a messaging device, a gaming console, a tablet, a medical device, exercise equipment, a personal digital assistant, a wearable device such as a smart watch, smart glasses, a smart bracelet, smart running shoes, and the like.

[00296] Referring to FIG. 11, the device 1100 may include one or more of the following components: a processing component 1101, a memory 1104, a power component 1106, a

multimedia component 1108, an audio component 1110, an input/output (I/O) interface 1112, a sensor component 1114, and a communication component 1116.

[00297] The processing component 1102 typically controls overall operations of the device 1100, such as the operations associated with display, telephone calls, data communications, camera operations, and recording operations. The processing component 1102 may include one or more processors 1120 to execute instructions to perform all or part of the steps in the above described methods. Moreover, the processing component 1102 may include one or more modules which facilitate the interaction between the processing component 1102 and other components. For instance, the processing component 1102 may include a multimedia module to facilitate the interaction between the multimedia component 1108 and the processing component 1102.

[00298] The memory 1104 is configured to store various types of data to support the operation of the device 1100. Examples of such data include instructions for any applications or methods operated on the device 1100, contact data, phonebook data, messages, pictures, video, etc. The memory 1104 may be implemented using any type of volatile or non-volatile memory devices, or a combination thereof, such as a static random access memory (SRAM), an electrically erasable programmable read-only memory (EEPROM), an erasable programmable read-only memory (EPROM), a programmable read-only memory (PROM), a read-only memory (ROM), a magnetic memory, a flash memory, a magnetic or optical disk.

[00299] The power component 1106 provides power to various components of the device 1100. The power component 1100 may include a power management system, one or more power sources, and any other components associated with the generation, management, and distribution of power in the device 1100.

[00300] The multimedia component 1108 includes a screen providing an output interface between the device 1100 and the user. In some embodiments, the screen may include a liquid crystal display (LCD) and a touch panel (TP). If the screen includes the touch panel, the screen may be implemented as a touch screen to receive input signals from the user. The touch panel includes one or more touch sensors to sense touches, swipes, and gestures on the touch panel. The touch sensors may not only sense a boundary of a touch or swipe action, but also sense a period of time and a pressure associated with the touch or swipe action. In some embodiments, the multimedia component 1108 includes a front camera and/or a rear camera. The front camera and the rear camera may receive an external multimedia datum while the device 1100 is in an operation mode, such as a photographing mode or a video mode. Each of the front camera and the rear camera may be a fixed optical lens system or have focus and optical zoom capability.

[00301] The audio component 1110 is configured to output and/or input audio signals. For example, the audio component 1110 includes a microphone (“MIC”) configured to receive an external audio signal when the device 1100 is in an operation mode, such as a call mode, a recording mode, and a voice recognition mode. The received audio signal may be further stored in the memory 1104 or transmitted via the communication component 1116. In some embodiments, the audio component 1110 further includes a speaker to output audio signals.

[00302] The I/O interface 1112 provides an interface between the processing component 1102 and peripheral interface modules, such as a keyboard, a click wheel, buttons, and the like. The buttons may include, but are not limited to, a home button, a volume button, a starting button, and a locking button.

[00303] The sensor component 1114 includes one or more sensors to provide status assessments of various aspects of the device 1100. For instance, the sensor component 1114 may detect an open/closed status of the device 1100, relative positioning of components, e.g., the display and the keypad, of the device 1100, a change in position of the device 1100 or a component of the device 1100, a presence or absence of user contact with the device 1100, an orientation or an acceleration/deceleration of the device 1100, and a change in temperature of the device 1100. The sensor component 1114 may include a proximity sensor configured to detect the presence of nearby objects without any physical contact. The sensor component 1114 may also include a light sensor, such as a CMOS or CCD image sensor, for use in imaging applications. In some embodiments, the sensor component 1114 may also include an accelerometer sensor, a gyroscope sensor, a magnetic sensor, a pressure sensor, or a temperature sensor.

[00304] The communication component 1116 is configured to facilitate communication, wired or wirelessly, between the device 1100 and other devices. The device 1100 can access a wireless network based on a communication standard, such as WiFi, 2G, or 3G, or a combination thereof. In one exemplary embodiment, the communication component 1116 receives a broadcast signal or broadcast associated information from an external broadcast management system via a broadcast channel. In one exemplary embodiment, the communication component 1116 further includes a near field communication (NFC) module to facilitate short-range communications. For example, the NFC module may be implemented based on a radio frequency identification (RFID) technology, an infrared data association (IrDA) technology, an ultra-wideband (UWB) technology, a Bluetooth (BT) technology, and other technologies.

[00305] In exemplary embodiments, the device 1100 may be implemented with one or more application specific integrated circuits (ASICs), digital signal processors (DSPs), digital

signal processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), controllers, micro-controllers, microprocessors, or other electronic components, for performing the above described methods.

[00306] In exemplary embodiments, there is also provided a non-transitory computer-readable storage medium including instructions, such as the memory 1104 including instructions executable by the processor 1120 in the device 1100, for performing the above-described methods for request an uplink transmission resource according to any one of FIG. 1 to FIG. 4. For example, the non-transitory computer-readable storage medium may be a ROM, a RAM, a CD-ROM, a magnetic tape, a floppy disc, an optical data storage device, and the like.

[00307] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed here. This application is intended to cover any variations, uses, or adaptations of the invention following the general principles thereof and including such departures from the present disclosure as come within known or customary practice in the art. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

[00308] It will be appreciated that the present invention is not limited to the exact construction that has been described above and illustrated in the accompanying drawings, and that various modifications and changes can be made without departing from the scope thereof. It is intended that the scope of the invention should only be limited by the appended claims.

WHAT IS CLAIMED IS:

1. A method for requesting an uplink transmission resource, wherein the method is applied in a user terminal and comprises:

after triggering an uplink resource Scheduling Request (SR), in response to a preset random access trigger condition, triggering a contention based random access request;

before completing a contention based random access procedure, in response to a preset random access cancellation condition, cancelling the contention based random access procedure, wherein the preset random access cancellation condition comprises at least that a target uplink shared channel resource is monitored and second preset transmission information in the contention based random access procedure is not sent to a base station, wherein the target uplink shared channel resource is a valid uplink shared channel resource provided by the base station, and the second preset transmission information is MSG3.

2. The method according to claim 1, wherein, in response to the preset random access trigger condition, triggering the contention based random access request comprises:

if there is no valid physical uplink control channel (PUCCH) resource configured for transmitting the uplink resource SR at any time, and there is no available UL-SCH resource and there is no configured UL-grant within a preset time interval, triggering the contention based random access request.

3. The method according to claim 1, further comprising:

if there is an available UL-SCH resource or configured UL-grant within a preset time interval, cancelling the uplink resource SR which is in a pending state.

4. The method according to claim 1, wherein the preset random access trigger condition is configured according to random access trigger configuration information sent by the base station.

5. A device for requesting an uplink transmission resource, wherein the device is applied in a user terminal and comprises:

a random access trigger module configured to, after an uplink resource Scheduling Request (SR) is triggered, in response to a preset random access trigger condition, trigger a contention based random access request;

an access cancellation module configured to, before a contention based random access procedure is completed, in response to a preset random access cancellation condition, cancel the contention based random access procedure, wherein the preset random access cancellation condition comprises at least that a target uplink shared channel resource is monitored and second preset transmission information in the contention based random access procedure is not sent to a base station, wherein the target uplink shared channel resource is a valid uplink shared channel resource provided by the base station, and the second preset transmission information is MSG3.

6. The device according to claim 5, wherein the random access trigger module is configured to:

if there is no valid physical uplink control channel (PUCCH) resource configured for transmitting the uplink resource SR at any time, and there is no available UL-SCH resource and there is no configured UL-grant within a preset time interval, trigger the contention based random access request.

7. The device according to claim 5, further comprising:

an SR cancellation module configured to, if there is an available UL-SCH resource or configured UL-grant within a preset time interval, cancel the uplink resource SR which is in a pending state.

8. The device according to claim 5, wherein the preset random access trigger condition is configured according to random access trigger configuration information sent by the base station.

9. A non-transitory computer-readable storage medium having computer instructions stored thereon, wherein when the instructions are executed by a processor, steps in the method according to any one of claims 1 to 4 are performed.

10. A device for requesting an uplink transmission resource, comprising:
a processor; and
a memory for storing instructions executable by the processor;
wherein the processor is configured to:
after trigger an uplink resource Scheduling Request (SR), in response to a preset random access trigger condition, trigger a contention based random access request;
before a contention based random access procedure is completed, in response to a preset random access cancellation condition, cancel the contention based random access procedure, wherein the preset random access cancellation condition comprises at least that a target uplink shared channel resource is monitored and second preset transmission information in the contention based random access procedure is not sent to a base station, wherein the target uplink shared channel resource is a valid uplink shared channel resource provided by the base station, and the second preset transmission information is MSG3.