

CLAIMS

1. A method for wireless communication, the method comprising:
 - receiving, by a user equipment, a downlink assignment for a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the downlink assignment is scrambled with a random access-radio network temporary identifier (RA-RNTI) that is calculated at least in part based on an index of a single uplink;
 - receiving, by the user equipment from a base station, the MAC RAR PDU, wherein the MAC RAR PDU includes one or more RARs, each of the one or more RARs being associated with the single uplink, wherein the MAC RAR PDU is associated with the RA-RNTI, wherein the MAC RAR PDU further includes a backoff indicator associated with the single uplink;
 - determining, by the user equipment, that the MAC RAR PDU is associated with the RA-RNTI based on the downlink assignment;
 - determining, by the user equipment, the backoff indicator is associated with the single uplink based on the RA-RNTI associated with the MAC RAR PDU;
 - backing off, by the user equipment, from performing a random access procedure for accessing the single uplink for a time period based on the backoff indicator; and
 - performing, by the user equipment, the random access procedure for accessing the single uplink after the time period.

2. The method of claim 1, wherein the downlink assignment is received on a physical downlink control channel (PDCCH), and the MAC RAR PDU is received on a physical downlink shared channel (PDSCH).

3. A method for wireless communication, the method comprising:
 - receiving, by a user equipment from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of RARs associated with a plurality of uplinks, wherein for each uplink of the plurality of uplinks, RARs of the plurality of RARs associated with the uplink are grouped together in the MAC RAR PDU into a segment of a plurality of segments without a RAR of another uplink mixed in between, and wherein each segment is accordingly associated with one

uplink of the plurality of uplinks, wherein the MAC RAR PDU includes a plurality of backoff indicators each associated with the one of the plurality of segments, each of the plurality of backoff indicators being positioned in the MAC RAR PDU relative to a position in the MAC RAR PDU of its associated segment;

determining, by the user equipment, a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a position of the first backoff indicator in the MAC RAR PDU relative to a position of a first segment of the plurality of segments in the MAC RAR PDU associated with the first uplink;

backing off, by the user equipment, from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and

performing, by the user equipment, the random access procedure for accessing the first uplink after the time period.

4. The method of claim 3, wherein the first backoff indicator is positioned at the beginning of the first segment.

5. The method of claim 3, wherein the first backoff indicator is positioned at one of the back of or within the first segment.

6. The method of claim 3, wherein each of the plurality of segments are ordered in the MAC RAR PDU based on an index of its associated uplink.

7. A method for wireless communication, the method comprising:

receiving, by a user equipment from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of MAC subheaders, each of the plurality of MAC subheaders including a different backoff indicator of a plurality of backoff indicators, each of the plurality of MAC subheaders further including an indicator of a different uplink of a plurality of uplinks;

determining, by the user equipment, a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a first MAC subheader of the plurality of MAC subheaders including the first backoff indicator and an

indicator of the first uplink, wherein the first MAC subheader includes a reserved field, wherein the indicator of the first uplink is included in the reserved field;

backing off, by the user equipment, from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and

performing, by the user equipment, the random access procedure for accessing the first uplink after the time period.

8. The method of claim 7, wherein each of the plurality of MAC subheaders further including an indicator of a different uplink of a plurality of uplinks comprises each of the plurality of MAC subheaders further including an index of a different uplink of a plurality of uplinks.

9. A user equipment comprising:

a memory; and

a processor coupled to the memory, the processor being configured to:

receive a downlink assignment for a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the downlink assignment is scrambled with a random access-radio network temporary identifier (RA-RNTI) that is calculated at least in part based on an index of a single uplink;

receive, from a base station, the MAC RAR PDU, wherein the MAC RAR PDU includes one or more RARs, each of the one or more RARs being associated with the single uplink, wherein the MAC RAR PDU is associated with the RA-RNTI, wherein the MAC RAR PDU further includes a backoff indicator associated with the single uplink;

determine that the MAC RAR PDU is associated with the RA-RNTI based on the downlink assignment;

determine the backoff indicator is associated with the single uplink based on the RA-RNTI associated with the MAC RAR PDU;

back off from performing a random access procedure for accessing the single uplink for a time period based on the backoff indicator; and

perform the random access procedure for accessing the single uplink after the time period.

10. The user equipment of claim 9, wherein the downlink assignment is received on a physical downlink control channel (PDCCH), and the MAC RAR PDU is received on a physical downlink shared channel (PDSCH).
11. A user equipment comprising:
 - a memory; and
 - a processor coupled to the memory, the processor being configured to:
 - receive, from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of RARs associated with a plurality of uplinks, wherein for each uplink of the plurality of uplinks, RARs of the plurality of RARs associated with the uplink are grouped together in the MAC RAR PDU into a segment of a plurality of segments without a RAR of another uplink mixed in between, and wherein each segment is accordingly associated with one uplink of the plurality of uplinks, wherein the MAC RAR PDU includes a plurality of backoff indicators each associated with the one of the plurality of segments, each of the plurality of backoff indicators being positioned in the MAC RAR PDU relative to a position in the MAC RAR PDU of its associated segment;
 - determine a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a position of the first backoff indicator in the MAC RAR PDU relative to a position of a first segment of the plurality of segments in the MAC RAR PDU associated with the first uplink;
 - back off from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and
 - perform the random access procedure for accessing the first uplink after the time period.
12. The user equipment of claim 11, wherein the first backoff indicator is positioned at the beginning of the first segment.
13. The user equipment of claim 11, wherein the first backoff indicator is positioned at one of

the back of or within the first segment.

14. The user equipment of claim 11, wherein each of the plurality of segments are ordered in the MAC RAR PDU based on an index of its associated uplink.

15. A user equipment comprising:

a memory; and

a processor coupled to the memory, the processor being configured to:

receive, from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of MAC subheaders, each of the plurality of MAC subheaders including a different backoff indicator of a plurality of backoff indicators, each of the plurality of MAC subheaders further including an indicator of a different uplink of a plurality of uplinks;

determine a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a first MAC subheader of the plurality of MAC subheaders including the first backoff indicator and an indicator of the first uplink, wherein the first MAC subheader includes a reserved field, wherein the indicator of the first uplink is included in the reserved field;

back off from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and

perform the random access procedure for accessing the first uplink after the time period.

16. The user equipment of claim 15, wherein each of the plurality of MAC subheaders further including an indicator of a different uplink of a plurality of uplinks comprises each of the plurality of MAC subheaders further including an index of a different uplink of a plurality of uplinks.

17. A non-transitory computer readable medium having instructions stored thereon for causing a user equipment to perform a method for wireless communication, the method

comprising:

receiving, by the user equipment, a downlink assignment for a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the downlink assignment is scrambled with a random access-radio network temporary identifier (RA-RNTI) that is calculated at least in part based on an index of a single uplink;

receiving, by the user equipment from a base station, the MAC RAR PDU, wherein the MAC RAR PDU includes one or more RARs, each of the one or more RARs being associated with the single uplink, wherein the MAC RAR PDU is associated with the RA-RNTI, wherein the MAC RAR PDU further includes a backoff indicator associated with the single uplink;

determining, by the user equipment, that the MAC RAR PDU is associated with the RA-RNTI based on the downlink assignment;

determining, by the user equipment, the backoff indicator is associated with the single uplink based on the RA-RNTI associated with the MAC RAR PDU;

backing off, by the user equipment, from performing a random access procedure for accessing the single uplink for a time period based on the backoff indicator; and

performing, by the user equipment, the random access procedure for accessing the single uplink after the time period.

18. A non-transitory computer readable medium having instructions stored thereon for causing a user equipment to perform a method for wireless communication, the method comprising:

receiving, by the user equipment from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of RARs associated with a plurality of uplinks, wherein for each uplink of the plurality of uplinks, RARs of the plurality of RARs associated with the uplink are grouped together in the MAC RAR PDU into a segment of a plurality of segments without a RAR of another uplink mixed in between, and wherein each segment is accordingly associated with one uplink of the plurality of uplinks, wherein the MAC RAR PDU includes a plurality of backoff indicators each associated with the one of the plurality of segments, each of the plurality of backoff indicators being positioned in the MAC RAR PDU relative to a position in the MAC RAR PDU of its associated segment;

determining, by the user equipment, a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a position of the first backoff indicator in the MAC RAR PDU relative to a position of a first segment of the plurality of segments in the MAC RAR PDU associated with the first uplink;

backing off, by the user equipment, from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and

performing, by the user equipment, the random access procedure for accessing the first uplink after the time period.

19. A non-transitory computer readable medium having instructions stored thereon for causing a user equipment to perform a method for wireless communication, the method comprising:

receiving, by the user equipment from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of MAC subheaders, each of the plurality of MAC subheaders including a different backoff indicator of a plurality of backoff indicators, each of the plurality of MAC subheaders further including an indicator of a different uplink of a plurality of uplinks;

determining, by the user equipment, a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a first MAC subheader of the plurality of MAC subheaders including the first backoff indicator and an indicator of the first uplink, wherein the first MAC subheader includes a reserved field, wherein the indicator of the first uplink is included in the reserved field;

backing off, by the user equipment, from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and

performing, by the user equipment, the random access procedure for accessing the first uplink after the time period.

20. A user equipment comprising:

means for receiving a downlink assignment for a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the downlink assignment is scrambled with a random access-radio network temporary identifier (RA-RNTI) that is calculated at least in

part based on an index of a single uplink;

means for receiving, from a base station, the MAC RAR PDU, wherein the MAC RAR PDU includes one or more RARs, each of the one or more RARs being associated with the single uplink, wherein the MAC RAR PDU is associated with the RA-RNTI, wherein the MAC RAR PDU further includes a backoff indicator associated with the single uplink;

means for determining that the MAC RAR PDU is associated with the RA-RNTI based on the downlink assignment;

means for determining the backoff indicator is associated with the single uplink based on the RA-RNTI associated with the MAC RAR PDU;

means for backing off, by the user equipment, from performing a random access procedure for accessing the single uplink for a time period based on the backoff indicator; and

means for performing, by the user equipment, the random access procedure for accessing the single uplink after the time period.

21. A user equipment comprising:

means for receiving, from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of RARs associated with a plurality of uplinks, wherein for each uplink of the plurality of uplinks, RARs of the plurality of RARs associated with the uplink are grouped together in the MAC RAR PDU into a segment of a plurality of segments without a RAR of another uplink mixed in between, and wherein each segment is accordingly associated with one uplink of the plurality of uplinks, wherein the MAC RAR PDU includes a plurality of backoff indicators each associated with the one of the plurality of segments, each of the plurality of backoff indicators being positioned in the MAC RAR PDU relative to a position in the MAC RAR PDU of its associated segment;

means for determining a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a position of the first backoff indicator in the MAC RAR PDU relative to a position of a first segment of the plurality of segments in the MAC RAR PDU associated with the first uplink;

means for backing off from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and

means for performing the random access procedure for accessing the first uplink after the time period.

22. A user equipment comprising:

means for receiving, from a base station, a media access control (MAC) random access response (RAR) protocol data unit (PDU), wherein the MAC RAR PDU includes a plurality of MAC subheaders, each of the plurality of MAC subheaders including a different backoff indicator of a plurality of backoff indicators, each of the plurality of MAC subheaders further including an indicator of a different uplink of a plurality of uplinks;

means for determining a first backoff indicator of the plurality of backoff indicators is associated with a first uplink of the plurality of uplinks based on a first MAC subheader of the plurality of MAC subheaders including the first backoff indicator and an indicator of the first uplink, wherein the first MAC subheader includes a reserved field, wherein the indicator of the first uplink is included in the reserved field;

means for backing off from performing a random access procedure for accessing the first uplink for a time period based on the first backoff indicator; and

means for performing the random access procedure for accessing the first uplink after the time period.