SYSTEMS AND METHODS FOR PUBLIC CHANNELS AND SIGNALS

TECHNICAL FIELD

The disclosure relates generally to wireless communications, including but not limited to systems and methods for public channels and signals.

BACKGROUND

The standardization organization Third Generation Partnership Project (3GPP) is currently in the process of specifying a new Radio Interface called 5G New Radio (5G NR) as well as a Next Generation Packet Core Network (NG-CN or NGC). The 5G NR will have three main components: a 5G Access Network (5G-AN), a 5G Core Network (5GC), and a User Equipment (UE). In order to facilitate the enablement of different data services and requirements, the elements of the 5GC, also called Network Functions, have been simplified with some of them being software based, and some being hardware based, so that they could be adapted according to need.

SUMMARY

The example embodiments disclosed herein are directed to solving the issues relating to one or more of the problems presented in the prior art, as well as providing additional features that will become readily apparent by reference to the following detailed description when taken in conjunction with the accompany drawings. In accordance with various embodiments, example systems, methods, devices and computer program products are disclosed herein. It is understood, however, that these embodiments are presented by way of example and are not limiting, and it will be apparent to those of ordinary skill in the art who read the present disclosure that various modifications to the disclosed embodiments can be made while remaining within the scope of this disclosure.

In a first aspect, the present disclosure provides a method comprising: determining, by a wireless communication node, a configuration for a resource configuration set scheduled in a cross-division duplex (XDD) slot, wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an

uplink direction, remapping, by the wireless communication node, one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, to a region in the XDD slot;; and sending, by the wireless communication node to a wireless communication device, the configuration.

In a second aspect, the present disclosure provides a method comprising: receiving, by a wireless communication device from a wireless communication node, a configuration, wherein the configuration is for a resource configuration set scheduled in a cross-division duplex (XDD) slot, wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an uplink direction, wherein one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, are remapped to a region in the XDD slot.

In a third aspect, the present disclosure provides a wireless communication node, comprising: at least one processor configured to: determine a configuration for a resource configuration set scheduled in a cross-division duplex (XDD) slot, wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an uplink direction, remap one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, to a region in the XDD slot;; and send, via a transmitter to a wireless communication device, the configuration.

In a fourth aspect, the present disclosure provides a wireless communication device, comprising: at least one processor configured to: receive, via a receiver from a wireless

communication node, a configuration, wherein the configuration is for a resource configuration set scheduled in a cross-division duplex (XDD) slot, wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an uplink direction, wherein one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, are remapped to a region in the XDD slot.

At least one example is directed to a system, method, apparatus, or a non-transitory computer-readable medium for supporting and/or co-existence with public/common signal(s) and/or channel(s), for instance. In one example, a wireless communication node (e.g., base station) may determine a configuration for a resource configuration set scheduled in a cross-

CLAIMS

What is claimed is:

1. A method comprising:

determining, by a wireless communication node, a configuration for a resource configuration set scheduled in a cross-division duplex (XDD) slot,

wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an uplink direction;

remapping, by the wireless communication node, one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, to a region in the XDD slot;

and

sending, by the wireless communication node to a wireless communication device, the configuration.

2. The method of claim 1, comprising:

sending, by the wireless communication node to the wireless communication device via a signaling, an indication of a time duration and a transmission direction of the frequency band of the XDD slot.

3. The method of claim 2, wherein the indication includes a bitmap of N bits, and T time domain units for the time duration that is partitioned into N groups corresponding to the N bits,

where each of the N bits indicates a transmission direction of a corresponding one of the N groups, and

where N and T are each a positive integer value.

4. The method of claim 3, wherein the indication further includes another bitmap of M bits, and F frequency domain units of the frequency band that is partitioned into M groups corresponding to the M bits,

where each of the M bits indicates a transmission direction of a corresponding one of the M groups, and

where M and F are each a positive integer value.

5. The method of claim 2, wherein the indication includes N bits, and T time domain units for the time duration that is partitioned into G groups, and F frequency domain units,

where each of G sets of bits from a most significant byte (MSB) of the N bits have a one-to-one-mapping with the G groups, and

where N, T and G are each a positive integer value.

6. The method of claim 2, wherein the indication includes N bits, and T time domain units for the time duration, and F frequency domain units for the frequency band that is partitioned into G groups,

where each of G sets of bits from a most significant byte (MSB) of the N bits have a one-to-one-mapping with the G groups, and

where N, T and G are each a positive integer value.

7. The method of claim 1, wherein the one or more resource units of the resource configuration set are to be remapped or excluded according to an indication associated with the configuration.

8. A method comprising:

receiving, by a wireless communication device from a wireless communication node, a configuration,

wherein the configuration is for a resource configuration set scheduled in a cross-division duplex (XDD) slot,

wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an uplink direction,

wherein one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, are remapped to a region in the XDD slot.

9. A wireless communication node, comprising:

at least one processor configured to:

determine a configuration for a resource configuration set scheduled in a cross-division duplex (XDD) slot,

wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an uplink direction;

remap one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, to a region in the XDD slot;

and

send, via a transmitter to a wireless communication device, the configuration.

10. A wireless communication device, comprising:

at least one processor configured to:

receive, via a receiver from a wireless communication node, a configuration,

wherein the configuration is for a resource configuration set scheduled in a cross-division duplex (XDD) slot,

wherein the XDD slot comprises one or more frequency domain resources in a downlink direction and one or more frequency domain resources in an uplink direction,

wherein one or more resource units of the resource configuration set that overlap with a frequency band in the XDD slot that is of a different transmission direction as the resource configuration set, are remapped to a region in the XDD slot.

11. The wireless communication device of claim 10, wherein the resource configuration set includes at least one of: a control resource set 0 (CORESET0), a downlink initial bandwidth part (BWP), an uplink initial BWP, a downlink BWP, or an uplink BWP.

12. The wireless communication device of claim 10, wherein each of the one or more resource units comprises a resource element (RE), a resource block (RB), a RB group (RBG), a physical RB (PRB), or a control channel element (CCE).

13. The wireless communication device of claim 10, wherein all resource units of the resource configuration set or at least the one or more resource units of the resource configuration set that overlap with the frequency band, are to be migrated or remapped to one or more other frequency bands in the XDD slot overlapping with the resource configuration set that are of a same transmission direction as the resource configuration set.

14. The method of claim 8, wherein the resource configuration set includes at least one of: a control resource set 0 (CORESET0), a downlink initial bandwidth part (BWP), an uplink initial BWP, a downlink BWP, or an uplink BWP.

15. The method of claim 8, wherein each of the one or more resource units comprises a resource element (RE), a resource block (RB), a RB group (RBG), a physical RB (PRB), or a control channel element (CCE).

16. The method of claim 8, wherein all resource units of the resource configuration set or at least the one or more resource units of the resource configuration set that overlap with the frequency band, are to be migrated or remapped to one or more other frequency bands in the XDD slot overlapping with the resource configuration set that are of a same transmission direction as the resource configuration set.

17. The method of claim 8, wherein all resource units of the resource configuration set or at least the one or more resource units of the resource configuration set that overlap with the frequency band, are to be migrated or remapped to one or more other frequency bands in the XDD slot that are of a same transmission direction as the resource configuration set.

18. The method of claim 8, wherein the one or more resource units of the resource configuration set that overlap with the frequency band, are to be migrated or remapped to one or more other frequency bands in the XDD slot that are of a same transmission direction as the resource configuration set, corresponding to a next available time domain region in the XDD slot.

19. The method of claim 8, wherein the one or more resource units of the resource configuration set that overlap with the frequency band, are to be remapped or excluded, and a transmission based on the resource configuration set is mapped to remaining resource units of the resource configuration set.

20. The method of claim 1, wherein remapping the one or more resource units to the region in the XDD slot includes: in response to the resource configuration set being a control resource set 0 (CORESET0), the one or more resource units of the CORESET0, which overlap with the frequency band in the XDD slot that is of the different transmission direction as the CORESET0, are unallocated for the CORESET0 or are remapped to the region in the XDD slot.

21. The method of claim 8, wherein remapping the one or more resource units to the region in the XDD slot includes: in response to the resource configuration set being a control resource set 0 (CORESET0), the one or more resource units of the CORESET0, which overlap with the frequency band in the XDD slot that is of the different transmission direction as the CORESET0, are unallocated for the CORESET0 or are remapped to the region in the XDD slot.