

The communication system and associated devices typically operate in accordance with a given standard or specification which sets out what the various entities associated with the system are permitted to do and how that should be achieved. Communication protocols and/or parameters which shall be used for the connection are also typically defined. One example of a communications system is UTRAN (3G radio). Other examples of communication systems are the long-term evolution (LTE) of the Universal Mobile Telecommunications System (UMTS) radio-access technology and so-called 5G or New Radio (NR) networks. NR is being standardized by the 3rd Generation Partnership Project (3GPP).

Summary

In a first aspect there is provided an apparatus, said apparatus comprising at least one processor; and

at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to at least:

provide first sidelink control information using a first sidelink control channel and at least second sidelink control information using a second sidelink control channel, wherein the first sidelink control information comprises at least an indication of resource allocation for an associated physical sidelink shared channel, wherein data traffic is transmitted over the associated physical sidelink shared channel, and wherein the second sidelink control information comprises at least information for decoding the associated physical sidelink shared channel.

In an aspect, there is an apparatus comprising:

at least one processor; and

at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to at least:

receive first sidelink control information using a first sidelink control channel and at least second sidelink control information using a second sidelink control channel, wherein the first sidelink control information comprises at least an indication of resource allocation for an associated physical sidelink shared channel, wherein data traffic is transmitted over the associated physical sidelink shared channel, and wherein the second sidelink control

information comprises at least information for decoding of the associated physical sidelink shared channel. In an aspect, there is a method comprising:

providing first sidelink control information using a first sidelink control channel and at least second sidelink control information using a second sidelink control channel, wherein the first sidelink control information comprises at least an indication of resource allocation for an associated physical sidelink shared channel, wherein data traffic is transmitted over the associated physical sidelink shared channel, and wherein the second sidelink control information comprises at least information for decoding of the associated physical sidelink shared channel.

In an aspect, there is method comprising:

receiving first sidelink control information using a first sidelink control channel and at least second sidelink control information using a second sidelink control channel, wherein the first sidelink control information comprises at least an indication of resource allocation for an associated physical sidelink shared channel, wherein data traffic is transmitted over the associated physical sidelink shared channel, and wherein the second sidelink control information comprises at least information for decoding of the associated physical sidelink shared channel.

In an aspect, there is a non-transitory computer-readable storage medium storing program instructions for causing an apparatus to perform at least the following:

providing first sidelink control information using a first sidelink control channel and at least second sidelink control information using a second sidelink control channel, wherein the first sidelink control information comprises at least an indication of resource allocation for an associated physical sidelink shared channel, wherein data traffic is transmitted over the associated physical sidelink shared channel, and wherein the second sidelink control information comprises at least information for decoding of the associated physical sidelink shared channel.

In an aspect, there is a non-transitory computer-readable storage medium storing program instructions for causing an apparatus to perform at least the following:

receiving first sidelink control information using a first sidelink control channel and at least second sidelink control information using a second sidelink control channel, wherein the first sidelink control information comprises at least an indication of resource allocation for an associated physical sidelink shared channel, wherein data traffic is transmitted over the associated physical sidelink shared channel, and wherein the second sidelink control

information comprises at least information for decoding of the associated physical sidelink shared channel.

In an embodiment, there is an apparatus comprising means for providing first control information using a first control channel and at least second control information using a second control channel, wherein the first control information comprises at least an indication of resource reservation for an associated data channel and the second control information comprises at least transmission format information for the associated data channel, wherein the associated data channel comprises periodic or aperiodic data traffic.

The apparatus may comprise means for providing the first control information and the second control information using the second control channel.

The first control information may comprise at least one of an indication of data periodicity, data packet information indicating quality of service requirement, resource reservation information and resource allocation information.

The second control information may comprise at least one of modulation and coding scheme (MCS) information, multi-antenna transmission related information and destination address information.

At least one of the first control information and the second control information may comprise at least one of data packet retransmission information and demodulation reference configuration information for the associated data channel.

The apparatus may comprise means for, when the associated data channel comprises periodic data traffic and there is no data transmission in a current period, providing first control information using the first control channel, wherein the first control information comprises an indication of the absence of data transmission in the current period.