CLAIMS

1. A circuit arrangement for a wireless cellular network, the circuit arrangement comprising:

a determiner configured to determine a priority value of each packet of a plurality of packets based on at least a position of a video frame in a group of pictures (GOP) and a type of the video frame, the video frame or a part thereof being contained in the packet,

wherein the type of video frame comprises I frame data or P frame data; and

wherein the determiner is further configured to set the priority value of a packet including I frame data lower than the priority value of at least one other packet including P frame data; and

a controller configured to control scheduling of the packet based on the determined priority value for a communication device in a wireless cellular network.

2. The circuit arrangement of claim 1, wherein the determiner operates on a first layer of the wireless network or a part thereof, and the controller operates on a second layer of the wireless network or a part thereof, the first layer being different from the second layer.

3. The circuit arrangement of claim 2, wherein the first layer of the wireless network comprises a Layer 3 (L3).

4. The circuit arrangement of claim 2, wherein the second layer of the wireless network comprises a medium access control (MAC) layer.

~~5. The circuit arrangement of claim 1, wherein the circuit arrangement is configured to operate for video streaming based on the 3GPP Long Term Evolution (LTE) interface protocol.~~

~~6. The circuit arrangement of claim 1, wherein the controller is configured to perform downlink packet scheduling.~~

~~7~~5. The circuit arrangement of claim 1, wherein the determiner is configured to determine the priority value further based on a condition of a channel for packet transmission, and a delay value indicating an amount of delay for transmitting the packet.

~~8~~6. The circuit arrangement of claim ~~7~~5, wherein the condition of the channel relates to a channel rate of the communication device.

~~9~~7. The circuit arrangement of claim ~~8~~6, wherein the channel rate comprises a channel quality indicator.

~~10~~8. The circuit arrangement of claim ~~8~~6, wherein upon determining the priority value of the packet, the controller is further configured to select a resource block and assign to the resource block the communication device which has the largest channel rate as compared to those of other communication devices in the wireless network.

~~11~~9. The circuit arrangement of claim ~~7~~5, wherein the delay value comprises a Head of Line (HOL) delay.

~~12~~10. The circuit arrangement of claim ~~11~~9, wherein the priority value has a relationship with the HOL delay based on a decreasing function or a concave function or a convex function.

~~13. The circuit arrangement of claim 11, wherein the priority value has a relationship with the HOL delay based on a concave function.~~

~~14. The circuit arrangement of claim 11, wherein the priority value has a relationship with the HOL delay based on a convex function.~~

~~15~~11. The circuit arrangement of claim ~~11~~9, wherein the priority value has a relationship with an overall distortion caused by a loss of packet (D_k) based an increasing function.

~~16~~12. The circuit arrangement of claim 1, wherein the priority value is derived using a mathematical function which is selected based on a type of traffic scheduled for the packet.

~~17~~13. The circuit arrangement of claim ~~16~~12, wherein the mathematical function is a sigmoidal-like function.

~~18. The circuit arrangement of claim 1, wherein the communication device comprises a user equipment (UE).~~

~~19. The circuit arrangement of claim 1, wherein the packet is from a real-time video stream, or a voice-over-IP (VoIP) stream, or a non-real-time data with a rate constraint.~~

~~20~~14. The circuit arrangement of claim 1, wherein the packet is from a non-real-time data with a rate constraint, and wherein the priority value is derived using a mathematical function which converts the rate constraint to a delay constraint.

~~21. The circuit arrangement of claim 1, wherein the controller is further configured to control scheduling of a best effort (BE) traffic.~~

~~22. The circuit arrangement of claim 1, wherein the determiner further comprises a decoder configured to extract and decode header information of the packet.~~

~~23. The circuit arrangement of claim 22, wherein the header information comprises a sequence parameter set header, a picture parameter set header, or both.~~

~~24~~15. The circuit arrangement of claim 1, wherein the determiner is configured to set the priority value of the packet including the I frame data, the priority value indicating to be about 50% of the highest priority value of the packet including the P frame data.

~~25~~16. A method of determining a priority of packet scheduling in a wireless cellular network comprising a plurality of communication devices, the method comprising:

determining a priority value of each packet of a plurality of packets based on at least a position of a video frame in a group of pictures (GOP) and a type of the video frame, the video frame or a part thereof being contained in the packet,

wherein the type of video frame comprises I frame data or P frame data; and

wherein determining the priority value further comprising setting the priority value of a packet including I frame data lower than the priority value of at least one other packet including P frame data; and

controlling scheduling of the packet based on the determined priority value for a communication device in a wireless cellular network.

~~26~~17. The method of claim ~~25~~16, wherein determining the priority value comprises determining the priority value on a first layer of the wireless network, and controlling scheduling of the packet comprises controlling scheduling of the packet on a second layer, the first layer being different from the second layer.

~~27. The method of claim 26, wherein the first layer of the wireless network comprises a Layer 3 (L3).~~

~~28. The method of claim 26, wherein the second layer of the wireless network comprises a medium access control (MAC) layer.~~

~~29. The method of claim 25, wherein the method of packet scheduling is for video streaming based on the 3GPP Long Term Evolution (LTE) interface protocol.~~

~~30. The method of claim 25, wherein controlling scheduling of the packet comprises controlling downlink scheduling of the packet.~~

~~31. The method of claim 25, wherein determining the priority value comprises determining the priority value further based on a condition of a channel for packet transmission, and a delay value indicating an amount of delay for transmitting the packet.~~

~~32. The method of claim 31, wherein the condition of the channel relates to a channel rate of the communication device.~~

~~33. The method of claim 32, wherein the channel rate comprises a channel quality indicator.~~

~~34. The method of claim 32, wherein upon determining the priority value of the packet, controlling scheduling of the packet further comprises selecting a resource block and assigning to the resource block the communication device which has the largest channel rate as compared to those of other communication devices in the wireless network.~~

~~35. The method of claim 31, wherein the delay value comprises a Head of Line (HOL) delay.~~

~~36. The method of claim 35, wherein the priority value has a relationship with the HOL delay based on a decreasing function.~~

~~37. The method of claim 35, wherein the priority value has a relationship with the HOL delay based on a concave function.~~

~~38. The method of claim 35, wherein the priority value has a relationship with an overall distortion caused by a loss of packet (D_k) based an increasing function.~~

~~39. The method of claim 25, wherein determining the priority value comprises deriving the priority value using a mathematical function which is selected based on a type of traffic scheduled for the packet.~~

~~40. The method of claim 29, wherein the mathematical function is a sigmoidal-like function.~~

~~41~~18. The method of claim ~~25~~16, wherein determining the priority value comprises assigning a priority value of higher priority to the packet when the packet is from a real-time video stream or a voice-over-IP (VoIP) stream as compared to when the packet is from a non-real-time data with a rate constraint.

~~42~~19. The method of claim ~~25~~16, wherein when the packet is from a non-real-time data with a rate constraint, ~~and~~ determining the priority value comprises deriving the priority value using a mathematical function and converting the rate constraint to a delay constraint.

~~43. The method of claim 25, wherein the communication device comprises a user equipment (UE).~~

~~44. The method of claim 25, further comprising controlling scheduling of a best effort (BE) traffic.~~

~~45. The method of claim 25, further comprising extracting and decoding header information of the packet.~~

~~46. The method of claim 45, wherein the header information comprises a sequence parameter set header, a picture parameter set header, or both.~~

~~47. The method of claim 25, wherein the video frame comprises a plurality of P frames or a plurality of I frames.~~

4820. The method of claim 4716, wherein determining the priority value comprises establishing for ~~the~~a plurality of P frames of the video frame a linearly decreasing priority value of each P frame of a plurality of P frames of the video frame.

~~49. The method of claim 48, wherein determining the priority value comprises setting the priority value of the packet including the I frame data, the priority value indicating to be about 50% of the highest priority value of the packet including the P frame data.~~

CLAIMS

1. A circuit arrangement for a wireless cellular network, the circuit arrangement comprising:

a determiner configured to determine a priority value of each packet of a plurality of packets based on at least a position of a video frame in a group of pictures (GOP) and a type of the video frame, the video frame or a part thereof being contained in the packet,

wherein the type of video frame comprises I frame data or P frame data; and

wherein the determiner is further configured to set the priority value of a packet including I frame data lower than the priority value of at least one other packet including P frame data; and

a controller configured to control scheduling of the packet based on the determined priority value for a communication device in a wireless cellular network.

2. The circuit arrangement of claim 1, wherein the determiner operates on a first layer of the wireless network or a part thereof, and the controller operates on a second layer of the wireless network or a part thereof, the first layer being different from the second layer.

3. The circuit arrangement of claim 2, wherein the first layer of the wireless network comprises a Layer 3 (L3).

4. The circuit arrangement of claim 2, wherein the second layer of the wireless network comprises a medium access control (MAC) layer.

5. The circuit arrangement of claim 1, wherein the determiner is configured to determine the priority value further based on a condition of a channel for packet transmission, and a delay value indicating an amount of delay for transmitting the packet.

6. The circuit arrangement of claim 5, wherein the condition of the channel relates to a channel rate of the communication device.

7. The circuit arrangement of claim 6, wherein the channel rate comprises a channel quality indicator.

8. The circuit arrangement of claim 6, wherein upon determining the priority value of the packet, the controller is further configured to select a resource block and assign to the resource block the communication device which has the largest channel rate as compared to those of other communication devices in the wireless network.

9. The circuit arrangement of claim 5, wherein the delay value comprises a Head of Line (HOL) delay.

10. The circuit arrangement of claim 9, wherein the priority value has a relationship with the HOL delay based on a decreasing function or a concave function or a convex function.

11. The circuit arrangement of claim 9, wherein the priority value has a relationship with an overall distortion caused by a loss of packet (D_k) based an increasing function.

12. The circuit arrangement of claim 1, wherein the priority value is derived using a mathematical function which is selected based on a type of traffic scheduled for the packet.

13. The circuit arrangement of claim 12, wherein the mathematical function is a sigmoidal-like function.

14. The circuit arrangement of claim 1, wherein the packet is from a non-real-time data with a rate constraint, and wherein the priority value is derived using a mathematical function which converts the rate constraint to a delay constraint.

15. The circuit arrangement of claim 1, wherein the determiner is configured to set the priority value of the packet including the I frame data, the priority value indicating to be about 50% of the highest priority value of the packet including the P frame data.

16. A method of determining a priority of packet scheduling in a wireless cellular network comprising a plurality of communication devices, the method comprising:

determining a priority value of each packet of a plurality of packets based on at least a position of a video frame in a group of pictures (GOP) and a type of the video frame, the video frame or a part thereof being contained in the packet,

wherein the type of video frame comprises I frame data or P frame data; and

wherein determining the priority value further comprising setting the priority value of a packet including I frame data lower than the priority value of at least one other packet including P frame data; and

controlling scheduling of the packet based on the determined priority value for a communication device in a wireless cellular network.

17. The method of claim 16, wherein determining the priority value comprises determining the priority value on a first layer of the wireless network, and controlling scheduling of the packet comprises controlling scheduling of the packet on a second layer, the first layer being different from the second layer.

18. The method of claim 16, wherein determining the priority value comprises assigning a priority value of higher priority to the packet when the packet is from a real-time video stream or a voice-over-IP (VoIP) stream as compared to when the packet is from a non-real-time data with a rate constraint.

19. The method of claim 16, wherein when the packet is from a non-real-time data with a rate constraint, determining the priority value comprises deriving the priority value using a mathematical function and converting the rate constraint to a delay constraint.

20. The method of claim 16, wherein determining the priority value comprises establishing for a plurality of P frames of the video frame a linearly decreasing priority value of each P frame of a plurality of P frames of the video frame.