Claims

1. SUDAC comprising:

a first wireless communication interface, configured for using ultra-high frequency in order to establish at least one backend communication link with a base station; and

a second wireless communication interface, configured for using extremely-high frequency in order to establish at least one frontend communication link with a user equipment; and

a processor,

wherein the processor is configured for at least partially forwarding a first user information signal received via the frontend communication link as a first communication signal to be transmitted via the backend communication link while frequency converting the extremely-high frequency to the ultra-high frequency; or

wherein the processor is configured for at least partially forwarding a second communication signal received via the backend communication link as a second user information signal to be transmitted via the frontend communication link while frequency converting the ultra-high frequency to the extremely-high frequency;

wherein the processor is configured for extracting control information from the first user information signal and for controlling forward parameters of the first or the second wireless communication interface based on the control information, wherein the control information is a transmit power, a modulation scheme or is related to a frequency, a code, a space and/or a time slot to be utilized by the SUDAC;

wherein the forward parameters relates at least to one of a time, a frequency, a space or a code resource of the backend communication link or the frontend communication link; and

wherein the processor is configured for frequency converting the first user information signal received at extremely-high frequency to the first communication signal at the ultra-high frequency and for frequency converting the second

communication signal at the ultra-high frequency to the second user information signal at the extremely-high frequency; or

wherein the SUDAC comprises an analog to digital converter configured for digitizing the user information signal received at extremely-high frequency, and a digital to analog converter configured for analogizing a digitalized communication signal to obtain the communication signal at the ultra-high frequency wherein the processor is configured for generating the digitalized communication signal based on the digitalized user information signal.

2. SUDAC comprising:

a first wireless communication interface, configured for using ultra-high frequency in order to establish at least one backend communication link with a base station; and

a second wireless communication interface, configured for using extremely-high frequency in order to establish at least one frontend communication link with a user equipment; and

a processor,

wherein the processor is configured for at least partially forwarding a first user information signal received via the frontend communication link as a first communication signal to be transmitted via the backend communication link while frequency converting the extremely-high frequency to the ultra-high frequency; or

wherein the processor is configured for at least partially forwarding a second communication signal received via the backend communication link as a second user information signal to be transmitted via the frontend communication link while frequency converting the ultra-high frequency to the extremely-high frequency;

wherein the processor is configured for extracting control information from the first user information signal and for controlling forward parameters of the first or the second wireless communication interface based on the control information;

wherein the forward parameters relates at least to one of a time, a frequency, a space or a code resource of the backend communication link or the frontend communication link; and

wherein the processor is configured for frequency converting the first user information signal received at extremely-high frequency to the first communication signal at the ultra-high frequency and for frequency converting the second communication signal at the ultra-high frequency to the second user information signal at the extremely-high frequency; or

wherein the SUDAC comprises an analog to digital converter configured for digitizing the user information signal received at extremely-high frequency, and a digital to analog converter configured for analogizing a digitalized communication signal to obtain the communication signal at the ultra-high frequency wherein the processor is configured for generating the digitalized communication signal based on the digitalized user information signal;

wherein the frontend communication link comprises a plurality of control channels and at least one payload channel, wherein the payload channel is associated to a control channel and wherein the processor is configured for adapting parameters of the control channel to which the payload channel is associated based on the control information and wherein the processor is configured to forward information of the payload channel, wherein a bandwidth of the control channel, of a rendezvous-channel comprising a plurality of control channels and/or of the payload channel is adapted based on the adapting of the parameters.

3. SUDAC according to claim 1 or 2, wherein the frontend communication link comprises a plurality of control channels and at least one payload channel, wherein the processor is configured to reduce a bandwidth of the payload channel, wherein the processor is configured to, during a second time duration during which the bandwidth of the payload channel is reduced, increase a number of control channels when compared to a first time duration having a same length as the second time duration wherein the processor is configured to, during the first time duration, not reduce the bandwidth of the payload channel and wherein the processor is configured to forward the payload channel.

4. SUDAC according to one of previous claims, wherein the backend communication link comprises a plurality of backend control channels and at least one backend

payload channel and wherein the SUDAC is configured for transmitting or receiving control data to or from the base station, wherein the processor is configured to adapt a transmission characteristic of an antenna function of the base station based on the control data of a transmitted backend control channel or to adapt a function of the SUDAC based on the control data of a received backend control channel), wherein the function of the SUDAC relates to parameters of the frontend communication link or to switch the SUDAC to a sleep-mode.

5. SUDAC according to one of previous claims, wherein the SUDAC is configured for utilizing the frontend communication link to transmit or receive data to or from a second user equipment or a second SUDAC.

6. SUDAC according to one of previous claims, wherein the frontend communication link comprises a plurality of control channels and at least one payload channel, wherein the SUDAC is configured for transmitting at least parts of the first user information signal received via the frontend communication link in a decoded version of the parts of the first user information signal via the backend communication link and to transmit at least parts of the communication signal received via the backend communication link in a compressed version of the parts of the communication signal via the frontend communication link, wherein the processor is further configured for adapting a rate of compression or encoding/decoding based on the control information or based on a control signal received via the backend communication link.

7. SUDAC according to claim 6, wherein the processor is configured for adapting the rate of compression and encoding/decoding based on a ratio of a bandwidth of the plurality of control channels and of the bandwidth of the at least one payload channel.

8. SUDAC according to one of previous claims, wherein the frontend communication link comprises a first plurality of rendezvous channels, each rendezvous channel comprising a plurality of control channels, wherein the processor is configured for adapting an operation mode of the SUDAC based on the control information contained in the plurality of control channels.

9. SUDAC comprising:

a first wireless communication interface, configured for using ultra-high frequency in order to establish at least one backend communication link with a base station; and

a second wireless communication interface, configured for using extremely-high frequency in order to establish at least one frontend communication link with a user equipment; and

a processor,

wherein the processor is configured for at least partially forwarding a first user information signal received via the frontend communication link as a first communication signal to be transmitted via the backend communication link while frequency converting the extremely-high frequency to the ultra-high frequency; or

wherein the processor is configured for at least partially forwarding a second communication signal received via the backend communication link as a second user information signal to be transmitted via the frontend communication link while frequency converting the ultra-high frequency to the extremely-high frequency;

wherein the processor is configured for extracting control information from the first user information signal and for controlling forward parameters of the first or the second wireless communication interface based on the control information;

wherein the forward parameters relates at least to one of a time, a frequency, a space or a code resource of the backend communication link or the frontend communication link; and

wherein the processor is configured for frequency converting the first user information signal received at extremely-high frequency to the first communication signal at the ultra-high frequency and for frequency converting the second communication signal at the extremely-high frequency to the second user information signal at the ultra-high frequency; or

wherein the SUDAC comprises an analog to digital converter configured for digitizing the user information signal received at extremely-high frequency, and a digital to analog converter configured for analogizing a digitalized communication

signal to obtain the communication signal at the ultra-high frequency wherein the processor is configured for generating the digitalized communication signal based on the digitalized user information signal;

wherein the first wireless communication interface is configured for establishing a further backend communication link to a further base station, using the ultra-high frequency, wherein the SUDAC is configured for receiving the first user information signal from the user equipment via the frontend communication link, wherein the first user information signal comprises a first information related to the user equipment and to the base station and a second information related to a further user equipment and to the further base station, wherein the SUDAC is configured for converting the extremely-high frequency and the first information to the ultra-high frequency and for converting the extremely-high frequency and the second information to the further ultra-high frequency.

10. SUDAC according to one of previous claims, wherein

the backend communication link comprises a backend payload channel and wherein the frontend communication link comprises a frontend payload channel;

wherein the backend communication link comprises a backend random access channel or wherein the frontend communication link comprises a frontend random access channel;

wherein the SUDAC is configured for receiving a random frontend information from a further user equipment using the frontend random access channel or to receive a random backend information from a further base station using the backend random access channel; and

wherein the SUDAC is configured for transmitting the random frontend information using the frontend communication link or the backend communication link or for sending the random backend information using the frontend communication link or the backend communication link.

11. SUDAC according to one of previous claims, wherein the SUDAC comprises a first operation mode (active) in which the SUDAC transmits or receives information via the backend communication link, wherein the processor is configured to extract control information from the communication signal received from the base station,

the control information indicating a sleep-mode request and wherein the processor is configured for changing the first operation mode to a second operation mode (sleep) in which the SUDAC is configured for not transmitting information via the backend communication link or the frontend communication link.

12. SUDAC according to one of previous claims, wherein the SUDAC is configured for establishing a first and a second backend communication link, to receive a first and a second payload information using resources separated from each other and to transmit the frontend communication signal comprising the first and the second payload information to perform backend carrier aggregation; and/or

wherein the SUDAC is configured for establishing a first and a second frontend communication link, to receive a first and a second payload information using resources separated from each other and to transmit the backend communication signal comprising the first and the second payload information to perform frontend carrier aggregation.

13. User equipment comprising:

a first wireless communication interface configured for using ultra-high frequency in order to establish at least one direct communication link with a base station; and

a second wireless communication interface configured for using extremely-high frequency in order to establish at least one frontend communication link with a SUDAC;

wherein the user equipment is configured for receiving a user signal partially via the direct communication link and partially via the frontend communication link;

wherein the user equipment is associated to the base station;

wherein the user equipment is configured for generating the first user information signal based on an information received from a further user equipment associated to a further base station such that the first user information signal comprises information related to the user equipment and information related to the further user equipment.

14. User equipment according to claim 13, wherein the user equipment is configured for receiving the information from the further user equipment via a direct connection to the user equipment or via an indirect connection utilizing the SUDAC forwarding the information from the further user equipment.

15. User equipment according to claim 13 or 14, wherein the frontend communication link comprises a plurality of control channels and at least one payload channel, wherein the user equipment is configured for adapting a bandwidth of the payload channel in the frontend communication link.

16. User equipment according to one of claims 13-15, comprising a regular mode and a piggyback mode and wherein the frontend communication link comprises at least one payload channel and a plurality of control channels, wherein the user equipment is configured for transmitting the first user information signal using at least one control channel and the payload channel when operating in the regular mode and for transmitting the first user information signal using the payload channel and not the control channel when operating in the piggyback mode.

17. User equipment according to one of claims 13-16, wherein the frontend communication link or the direct link comprises a plurality of control channels and wherein the user equipment is configured for transmitting a control information via the control channels, the control information comprising an information related to a control of the SUDAC via the base station, and comprising information related to the SUDAC.

18. User equipment according to one of claims 13-17, wherein the user equipment is configured for transmitting a payload information in a payload channel of the frontend communication link and for transmitting a random access information in a frontend random access channel of the frontend communication link and to receive a random access information from the SUDAC, wherein the user equipment comprises a processor configured for processing the random access information.

19. User equipment according to claim 18, wherein the processor is configured for comparing the transmitted random frontend information and the received random information and to obtain an information related to the frontend communication link based on the comparison when the transmitted random frontend information was sent, or to evaluate the random information to obtain information from a further user

equipment or a further base station when the random frontend information was not sent.

20. Base station comprising:

a plurality of wireless communication interfaces;

a controller configured for controlling the plurality of wireless communication interfaces such that a multiple antenna function of the plurality of wireless communication interfaces is obtained;

wherein the base station is configured for receiving control information via at least one of the plurality of wireless communication interfaces, related to a SUDAC or a user equipment communicating with the base station;

wherein the controller is configured for adapting transmission characteristics of the multiple antenna function based on the control information;

wherein the further user equipment is associated to a further base station and not to the base station.

21. Base station according to claim 20, wherein the controller is configured for time variant adapting the transmission characteristics of the multiple antenna function based on a received information such that the multiple antenna function is based on a spatial multiplexing when the base station transmits a payload information to the user equipment or such that the multiple antenna function is based on a beamforming when the base station transmits a status/control information to the SUDAC.

22. Base station according to claim 20, wherein the controller selects the transmission characteristics of the multiple antenna function such that the multiple antenna function is based on a spatial multiplexing when the base station transmits a payload information to a system, comprising at least two SUDACs coupled to each other, and/or when the base station transmits a status/control information to the system.

23. Base station according to one of claims 20-22, wherein the control information comprises geographic information and wherein the transmission characteristics

relates at least to a directional radio pattern of a signal transmitted by the base station, such that the controller is configured for adapting a preferred direction of a backend communication link established between the base station and the SUDAC or wherein the control information relates to a preferred direction of a direct link established between the base station and the user equipment such that the controller is configured for adapting a preferred direction of the direct link or wherein the control information relates to a bandwidth information and wherein the controller is configured to adapt a bandwidth of the backend communication link.

24. Base station according to one of claims 20-23, wherein the control information comprises an information indicating that the base station is requested to organize a configuration of a network comprising the user equipment, the SUDAC and the base station, wherein the configuration comprises at least a control of transmission frequencies or transmission times of the base station, the user equipment or the SUDAC.

25. Base station according to one of claims 20-24, wherein the base stationis configured for transmitting a response information based on the control information and related to the user equipment, the response information comprising an information related to a frequency or a time slot of a transmission or reception signal of the user equipment or of the SUDAC.

26. Base station according to claim 25, wherein the response information is related to an information indicating that the user equipment is requested to change a currently used SUDAC.

27. Base station according to one of claims 20-26, wherein the base station is configured for transmitting a control information via a backend communication link associated to a SUDAC, the control information indicating that the SUDAC is requested to stop transmitting a payload data using the backend communication link.

28. Base station according to one of claims 20-27, wherein the base station is configured for receiving an equipment allocation information related to the user equipment and to send a base station allocation information based on the reception or wherein the base station is configured for transmitting the base station allocation information and for receiving the equipment allocation information related to the user equipment based on the transmission;

wherein the equipment allocation information and the base station allocation information relate to an allocation of time, frequency, space or code resource of a transmission media by which information is transmitted between the base station, the SUDAC and/or the user equipment;

wherein the controller is configured to determine a resource allocation such that a rate of a resource utilization of the base station, of the user equipment or of the SUDAC is above a predefined threshold.

29. Base station according to one of claims 20-28, wherein the base station is configured for receiving payload information related to the user equipment via the backend communication link, the user equipment being associated to the base station, wherein the payload information is received from a SUDAC, the SUDAC transmitting the payload information as information piggybacked to a payload information of a further user equipment, wherein the controller is configured to extract the information related to the user equipment.

30. SUDAC System comprising:

a SUDAC according to one of claims 1-12;

a user equipment according to one of claims 13-19; and

a base station according to one of claims 20-29.

31. SUDAC System according to claim 30, further comprising a BS-side-SUDAC configured to establish an inter-backend link to the base station using extremely-high frequency and for establishing intra-network links to the SUDAC and to the user equipment.

32. SUDAC System according to claim 30 or 31, wherein the SUDAC, is configured to determine an allocation of a utilized transmission resource for the SUDAC System.

33. Method for signal forwarding

using ultra-high frequency in order to establish at least one backend communication link with a base station; and

using extremely-high frequency in order to establish at least one frontend communication link with a user equipment;

frequency converting the extremely-high frequency to the ultra-high frequency and at least partially forwarding a user information signal received via the frontend communication link as a communication signal to be transmitted via the backend communication link; or

frequency converting the ultra-high frequency to the extremely-high frequency and at least partially forwarding the communication signal received via the backend communication link as the user information signal to be transmitted via the frontend communication link;

extracting control information from the user signal and controlling forward parameters of a first or a second wireless communication interface based on the control information, wherein the control information is a transmit power, a modulation scheme or is related to a frequency, a code, a space and/or a time slot to be utilized by the SUDAC; and

frequency converting the user information signal received at extremely-high frequency to the communication signal at the ultra-high frequency and frequency converting the communication signal at the extremely-high frequency to the communication signal at the ultra-high frequency; or

digitizing the user information signal received at extremely-high frequency, and analogizing a digitalized communication signal to obtain the communication signal at the ultra-high frequency and generating the digitalized communication signal based on the digitized user information signal.

34. Method for transmitting or receiving a signal with a user equipment

using ultra-high frequency in order to establish at least one direct communication link with a base station;

using extremely-high frequency in order to establish at least one frontend communication link with a SUDAC;

receiving a user signal at least partially via the frontend communication link with a user equipment associated to the base station; and

generating the user information signal based on an information received from a further user equipment associated to a further base station such that the user information signal comprises information related to the user equipment and information related to the further user equipment.

35. Method for transmitting or receiving a signal with a base station

controlling a plurality of wireless communication interfaces of the base station such that a multiple antenna function of the plurality of wireless communication interfaces is obtained;

receiving control information via at least one of the plurality of wireless communication interfaces, related to a SUDAC or a user equipment communicating with the base station; and

adapting transmission characteristics of the multiple antenna function based on the control information.

36. Non transitory storage medium having stored thereon a computer program having a program code for performing, when running on a computer, a method according to one of claims 33-35.