

CLAIMS

1. A communication method performed by a User Equipment, UE, in a mixed cellular and Device-to-Device, D2D, network, the method comprising:
 - 5 communicating in the mixed network according to a radio frame structure,
 - wherein the radio frame structure comprises a first D2D subframe followed by a second D2D subframe with a Guard Period, GP, at the end of the first D2D subframe when the second D2D subframe is to be transmitted after the first D2D subframe is received.
- 10 2. The method according to claim 1, further comprising:
 - determining the radio frame structure as comprising at least one D2D subframe having a GP at the end or at the beginning of the at least one D2D subframe.
3. The method according to claim 1, wherein the radio frame structure comprises a D2D
 15 subframe having a GP at its beginning, when the D2D subframe is to be transmitted after a cellular subframe and where a timing advance for transmitting the cellular subframe, TA_{cell} , is shorter than a timing advance for transmitting the D2D subframe, TA_{D2D} .
4. The method according to claim 1, wherein the radio frame structure comprises a first D2D
 20 subframe followed by a second D2D subframe with a GP at the end of the second D2D subframe, when a cellular subframe is to be transmitted after the second D2D subframe, and where a timing advance for transmitting the cellular subframe, TA_{cell} , is longer than or equal to a timing advance for transmitting the second D2D subframe, TA_{D2D} .
- 25 5. The method according to claim 1, wherein the radio frame structure comprises a D2D subframe having a GP at its beginning, when the D2D subframe is to be received after a cellular subframe is transmitted and where a timing advance for transmitting the cellular subframe, TA_{cell} , is shorter than a timing advance for transmitting the D2D subframe, TA_{D2D} , minus a transmission delay of the D2D subframe from D2D TX to D2D RX,
 30 $T_{TransDelay}$.
6. The method according to claim 1, wherein the radio frame structure comprises a first D2D subframe followed by a second D2D subframe with a GP at the end of the second D2D subframe, when a cellular subframe is to be transmitted after the second D2D subframe is
 35 received and when a timing advance for transmitting the cellular subframe, TA_{cell} , is longer than or equal to a timing advance for transmitting the second D2D subframe,

TA_D2D, minus a transmission delay of the second D2D subframe from D2D TX to D2D RX, $T_{TransDelay}$.

7. The method according to claim 1, wherein the GP corresponds to a duration of one
5 Orthogonal Frequency Division Multiplexing, OFDM, symbol.

8. A User Equipment, UE, in a mixed cellular and Device-to-Device, D2D, network, comprising:

a transceiver configured to perform transmission and reception in the mixed network
10 according to a radio frame structure,

wherein the radio frame structure comprises a first D2D subframe followed by a second D2D subframe with a Guard Period, GP, at the end of the first D2D subframe when the second D2D subframe is to be transmitted after the first D2D subframe is received.

15 9. The UE according to claim 8, further comprising:

a radio frame structure determination unit configured to determine the radio frame structure as comprising at least one D2D subframe having a GP at the end or at the beginning of the at least one D2D subframe.

20 10. The UE according to claim 8, wherein the radio frame structure comprises a D2D subframe having a GP at its beginning, when the D2D subframe is to be transmitted after a cellular subframe and a timing advance for transmitting the cellular subframe, TA_{cell} , is shorter than a timing advance for transmitting the D2D subframe, TA_{D2D} .

25 11. The UE according to claim 8, wherein the radio frame structure comprises a first D2D subframe followed by a second D2D subframe with a GP at the end of the second D2D subframe, when a cellular subframe is to be transmitted after the D2D subframe and a timing advance for transmitting the cellular subframe, TA_{cell} , is longer than or equal to a timing advance for transmitting the D2D subframe, TA_{D2D} .

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12. The UE according to claim 8, wherein the radio frame structure comprises a D2D subframe having a GP at its beginning, when the D2D subframe is to be received after a cellular subframe is transmitted and a timing advance for transmitting the cellular subframe, TA_{cell} , is shorter than a timing advance for transmitting the D2D subframe, TA_{D2D} ,
35 minus a transmission delay of the D2D subframe from D2D TX to D2D RX, $T_{TransDelay}$.

13. The UE according to claim 8, wherein the radio frame structure comprises a first D2D subframe followed by a second D2D subframe with a GP at the end of the second D2D subframe, when a cellular subframe is to be transmitted after the D2D subframe is received and a timing advance for transmitting the cellular subframe, TA_{cell} , is longer than or equal
5 to a timing advance for transmitting the D2D subframe, TA_{D2D} , minus a transmission delay of the D2D subframe from D2D TX to D2D RX, $T_{TransDelay}$.

14. The UE according to claim 8, wherein the GP corresponds to a duration of one Orthogonal Frequency Division Multiplexing, OFDM, symbol.