CLAIMS

What is claimed is:

1. A method for transmitting information, applied to a base station, the method comprising:

determining ~~whether~~a target frequency range involved in an in-device interference ~~is likely to occur~~ in user equipment~~;~~

~~determining a target frequency range involved in the in-device interference~~ when the in-device interference is ~~likely~~ to occur, wherein the target frequency range comprises a target downlink frequency range and at least one target uplink frequency range;

adjusting a transmission resource configuration within the target frequency range; and

transmitting information ~~over~~using a transmission resource after adjustment of the transmission resource configuration within the target frequency range, to avoid occurrence of the in-device interference.

2. The method according to claim 1, prior to determining the target frequency range, further comprising:

determining whether the in-device interference is to occur in the user equipment.

3. The method according to claim 2, wherein the determining whether the in-device interference is ~~likely~~ to occur in the user equipment comprises:

acquiring radio frequency support capability information of the user equipment, wherein the radio frequency support capability information at least comprises an uplink operating frequency range and a downlink operating frequency range; and

determining, based on the uplink operating frequency range and the downlink operating frequency range, whether the in-device interference is ~~likely~~ to occur in the user equipment.

~~3~~4. The method according to claim ~~1~~2, wherein the determining whether the in-device interference is ~~likely~~ to occur in the user equipment comprises:

acquiring an uplink scheduling request sent by the user equipment;

determining a current uplink operating frequency range of the user equipment based on the uplink scheduling request;

determining downlink schedule information for the user equipment, wherein the downlink schedule information at least comprises a downlink operating frequency range; and

determining, based on the current uplink operating frequency range and the downlink operating frequency range, whether the in-device interference is ~~likely~~ to occur.

~~4~~5. The method according to claim 2~~ or 3~~, wherein ~~prior to the acquiring radio frequency support capability information of the user equipment or the acquiring an uplink scheduling request sent by the user equipment,~~ the determining whether the in-device interference is ~~likely~~ to occur in the user equipment comprises:

determining that no predefined interference avoidance setting is configured in the user equipment, the interference avoidance setting being: when the in-device interference occurs, triggering a predefined operation ~~such that~~to stop information transmission~~ is stopped~~ within at least one target operating frequency range involved in the in-device interference.

~~5~~6. The method according to claim 1, wherein the adjusting a transmission resource configuration within the target frequency range comprises at least one of:

adjusting a downlink transmission resource configuration for the target downlink frequency range; and

adjusting an uplink transmission resource configuration for the target uplink frequency range.

~~6~~7. The method according to claim ~~5~~6, wherein the adjusting a downlink transmission resource configuration within the target downlink frequency range comprises at least one of:

canceling the downlink transmission resource configuration currently within the target downlink frequency range;

configuring a downlink transmission resource, ~~planned to be~~originally configured for the target downlink frequency range, within an interference-free downlink frequency range; and

narrowing the target downlink frequency range, and configuring the downlink transmission resource within a narrowed downlink frequency range.

~~7~~8. The method according to claim 6~~, wherein the downlink transmission resource comprises:~~

~~a downlink transmission resource for bearing a downlink transmission and/or a downlink retransmission.~~

~~8. The method according to claim 5~~, wherein the adjusting an uplink transmission resource configuration for the target uplink frequency range comprises:

upon acquiring an uplink scheduling request, rejecting configuring an uplink transmission resource within the target uplink frequency range.

9. The method according to claim ~~5~~6, wherein the adjusting an uplink transmission resource configuration for the target uplink frequency range comprises:

narrowing the target uplink frequency range, and determining a new uplink frequency range;

generating uplink transmission configuration information based on the new uplink frequency range, wherein the uplink transmission configuration information comprises start frequency information and end frequency information of the new uplink frequency range;

sending the uplink transmission configuration information to the user equipment; and

configuring the uplink transmission resource within the new uplink frequency range.

10. The method according to claim ~~5~~6, wherein the adjusting an uplink transmission resource configuration for the target uplink frequency range comprises:

narrowing, based on the target uplink frequency range, an uplink schedule frequency range for transmitting uplink data;

configuring, within the narrowed uplink schedule frequency range, an uplink transmission resource for transmitting the uplink data; and

configuring, within the target uplink frequency range, an uplink transmission resource for transmitting uplink control information on a designated frequency.

11. The method according to ~~any one of claims 8 to 10,~~ claim 6, wherein the adjusting an uplink or downlink transmission resource configuration comprises~~:~~

~~an uplink transmission resource for bearing an uplink transmission and/or an uplink retransmission.~~

~~12. The method according to any one of claims 6, 9 and 10, wherein the frequency range is narrowed by any~~ at least one of:

when the target frequency range comprises component carriers in a predetermined quantity, reducing the quantity of component carriers;

when the target frequency range comprises one component carrier, reducing a bandwidth configuration of the component carrier;

when the target frequency range comprises bandwidth parts in a predetermined quantity, reducing the quantity of bandwidth parts; or

when the target frequency range comprises bandwidth parts in a predetermined quantity, reducing a frequency range of at least one of the bandwidth parts.

~~13~~12. A method for transmitting information, applied to user equipment, the method comprising:

receiving uplink transmission configuration information sent by a base station for avoiding in-device interference, wherein the uplink transmission configuration information comprises an adjustment parameter of an uplink frequency range;

transmitting, based on the uplink transmission configuration information, uplink information ~~over~~using an uplink transmission resource scheduled by the base station; and

acquiring downlink information from a downlink transmission resource scheduled by the base station.

~~14~~13. The method according to claim ~~13~~12, further comprising:

reporting radio frequency support capability information of the user equipment to the base station, ~~such that~~to cause the base station ~~determines~~to determine, based on the radio frequency support capability information, whether in-device interference is ~~likely~~ to occur.

~~15~~14. An apparatus for transmitting information, applied to a base station, the apparatus comprising:

~~an interference determining module, operable to determine whether in-device interference is likely to occur in user equipment;~~

~~a frequency determining module, operable to~~ a processor; and

a memory storing instructions executable by the processor;

wherein the processor is configured to:

determine a target frequency range involved in ~~the~~an in-device interference in user equipment when the in-device interference is ~~likely~~ to occur in the user equipment, wherein the target frequency range comprises a target downlink frequency range and at least one target uplink frequency range;

~~an adjusting module, operable to~~ adjust a transmission resource configuration within the target frequency range; and

~~a transmitting module, operable to~~ transmit information ~~over~~using a transmission resource after adjustment of the transmission resource configuration within the target frequency range, to avoid occurrence of the in-device interference.

15. The apparatus according to claim 14, wherein prior to determining the target frequency range, the processor is further configured to:

determine whether the in-device interference is to occur in the user equipment.

16. The apparatus according to claim 15, wherein the ~~interference determining module comprises~~processor is further configured to:

~~a radio frequency information acquiring sub-module, operable to~~ acquire radio frequency support capability information of the user equipment, wherein the radio frequency support capability information at least comprises an uplink operating frequency range and a downlink operating frequency range; and

~~a first interference determining sub-module, operable to~~ determine, based on the uplink operating frequency range and the downlink operating frequency range, whether the in-device interference is ~~likely~~ to occur in the user equipment.

17. The apparatus according to claim 15, wherein the ~~interference determining module comprises:~~

~~a scheduling request acquiring sub-module, operable~~processor is further configured to~~-~~:

acquire an uplink scheduling request sent by the user equipment;

~~an uplink frequency determining sub-module, operable to~~ determine a current uplink operating frequency range of the user equipment based on the uplink scheduling request;

~~a downlink frequency determining sub-module, operable to~~ determine downlink schedule information for the user equipment, wherein the downlink schedule information at least comprises a downlink operating frequency range; and

~~a second interference determining sub-module, operable to~~ determine, based on the current uplink operating frequency range and the downlink operating frequency range, whether the in-device interference is ~~likely~~ to occur.

18. The apparatus according to claim ~~16 or 17~~15, wherein the ~~interference determining module~~processor is further ~~comprises:~~

~~an avoidance setting determining sub-module, operable~~configured to~~-~~:

determine that no predefined interference avoidance setting is configured in the user equipment, the interference avoidance setting being: when the in-device interference occurs, triggering a predefined operation ~~such that~~to stop information transmission ~~is stopped~~ within at least one target operating frequency range involved in the in-device interference.

19. The apparatus according to claim ~~15~~14, wherein the processor is further configured to perform at least one of:

adjusting ~~module comprises:~~

~~a downlink adjusting sub-module, operable to adjust~~ a downlink transmission resource configuration for the target downlink frequency range; and

~~an uplink~~ adjusting ~~sub-module, operable to adjust~~ an uplink transmission resource configuration for the target uplink frequency range.

20. The apparatus according to claim 19, wherein the ~~downlink adjusting sub-module comprises~~processor is further configured to perform at least one of:

~~a downlink schedule canceling unit, operable to cancel~~cancelling the downlink transmission resource configuration currently within the target downlink frequency range;

~~a schedule transferring unit, operable to configure~~configuring a downlink transmission resource ~~planned to be~~originally configured for the target downlink frequency range, within an interference-free downlink frequency range; and

~~a downlink frequency~~ narrowing ~~unit, operable to narrow~~ the target downlink frequency range, and configure the downlink transmission resource within a narrowed downlink frequency range.

~~21. The apparatus according to claim 20, wherein the downlink transmission resource comprises a downlink transmission resource for bearing a downlink transmission and/or a downlink retransmission.~~

~~22.~~21. The apparatus according to claim 19, wherein the ~~uplink adjusting sub-module~~processor is ~~operable~~further configured to, upon acquiring an uplink scheduling request, reject configuring an uplink transmission resource within the target uplink frequency range.

~~23~~22. The apparatus according to claim 19, wherein the ~~uplink adjusting sub-module comprises:~~

~~a first uplink frequency narrowing unit, operable~~processor is further configured to ~~:~~

narrow the target uplink frequency range, and determine a new uplink frequency range;

~~a configuration information determining unit, operable to~~ generate uplink transmission configuration information based on the new uplink frequency range, wherein the uplink transmission configuration information comprises start frequency information and end frequency information of the new uplink frequency range;

~~a configuration information sending unit, operable to~~ send the uplink transmission configuration information to the user equipment; and

~~an uplink scheduling unit, operable to~~ configure the uplink transmission resource within the new uplink frequency range.

~~24~~23. The apparatus according to claim 19, wherein the ~~uplink adjusting sub-module comprises~~processor is further configured to:

~~a second uplink frequency narrowing unit, operable to~~ narrow, based on the target uplink frequency range, an uplink schedule frequency range for transmitting uplink data; ~~a second~~

~~uplink scheduling unit, operable to~~ configure, within the narrowed uplink schedule frequency range, an uplink transmission resource for transmitting the uplink data; and

~~a third uplink scheduling unit, operable to~~ configure, within the target uplink frequency range, an uplink transmission resource for transmitting uplink control information on a designated frequency.

~~25~~24. The apparatus according to ~~any one of claims 22 to 24~~claim 19, wherein the ~~uplink transmission resource comprises~~processor is further configured to perform at least one of:

~~an uplink transmission resource for bearing an uplink transmission and/or an uplink retransmission.~~

~~26. The apparatus according to any one of claims 20, 23 and 24, wherein any of the frequency narrowing units comprises any one of:~~

~~a first narrowing sub-unit, operable to,~~ when the target frequency range comprises component carriers in a predetermined quantity, reduce the quantity of component carriers;

~~a second narrowing sub-unit, operable to,~~ when the target frequency range comprises one component carrier, reduce a bandwidth configuration of the component carrier;

~~a third narrowing sub-unit, operable to,~~ when the target frequency range comprises bandwidth parts in a predetermined quantity, reduce the quantity of bandwidth parts; or

~~a fourth narrowing sub-unit, operable to,~~ when the target frequency range comprises bandwidth parts in a predetermined quantity, reduce a frequency range of at least one of the bandwidth parts.

~~27~~25. An apparatus for transmitting information, applied to user equipment, the apparatus comprising:

a processor; and

a memory storing instructions executable by the processor;

wherein the processor is configured to perform the method of claim 12.

~~a receiving module, operable to receive uplink transmission configuration information sent by a base station for avoiding in-device interference, wherein the uplink transmission configuration information comprises an adjustment parameter of an uplink frequency range;~~

an uplink transmitting module, operable to transmit, based on the uplink transmission configuration information, uplink information over an uplink transmission resource scheduled by the base station; and

a downlink transmitting module, operable to acquire downlink information from a downlink transmission resource scheduled by the base station.

28. The apparatus according to claim 27, further comprising:

a radio frequency capability reporting module, operable to report radio frequency support capability information of the user equipment to the base station, such that the base station determines, based on the radio frequency support capability information, whether in-device interference is likely to occur.

29. A non-transitory computer-readable storage medium, which stores a computer program; wherein the computer program, when being executed by a processor, causes the processor to perform the steps in the method as defined in any one of claims 1 to 12.

30. A non-transitory computer-readable storage medium, which stores a computer program; wherein the computer program, when being executed by a processor, causes the processor to perform the steps in the method as defined in claim 13 or 14.

31. An apparatus for use in information transmission, comprising:

a processor; and

a memory for storing instructions executable by the processor;

wherein the processor is operable to:

determine whether in-device interference is likely to occur in user equipment;

when the in-device interference is likely to occur, determine a target frequency range involved in the in-device interference, the target frequency range comprising a target downlink frequency range and at least one target uplink frequency range;

adjust a transmission resource configuration within the target frequency range; and

transmit information over a transmission resource after adjustment of the transmission resource configuration within the target frequency range, to avoid occurrence of the in-device interference.

32. An apparatus for use in information transmission, comprising:

a processor; and

a memory for storing instructions executable by the processor;

wherein the processor is operable to:

receive uplink transmission configuration information sent by a base station for avoiding in-device interference, the uplink transmission configuration information including an adjustment parameter of an uplink frequency range;

transmit, based on the uplink transmission configuration information, uplink information over an uplink transmission resource scheduled by the base station; and

acquire downlink information from a downlink transmission resource scheduled by the base station.