

CLAIMS

What is claimed is:

1. _____ A method for wireless communication, comprising:

_identifying a set of selected beams for reporting to a base station;

_determining a first value associated with a first beam index of a set of beam indices, the first value corresponding to a first index value of a first table, wherein the set of beam indices comprises a number of beam indices equal to a number of selected beams of the set of selected beams;

_determining ~~an~~ one or more additional ~~value~~ values associated with one or more additional beam indices of the set of beam indices based at least in part on one or more additional tables;

_summing the first value and the ~~one or more of the~~ additional values to determine a combination index value; wherein the combination index value is a single integer uniquely indicating the first beam index and

the one or more additional beam indices; and transmitting, to the base station, the combination index value indicating the set of selected beams.

2. _____ The method of claim 1, further comprising:

_receiving a configuration of a codebook type for a codebook for reporting channel state information;

_receiving, from the base station, a set of reference signals associated with one or more antenna ports of the base station; and

_identifying the set of beam indices based at least in part on the codebook type and at least one of the set of reference signals or the one or more antenna ports.

3. _____ The method of claim 2, wherein the identified set of beam indices correspond to codeword indices of the codebook if the configured codebook type comprises a beam selection codebook or to antenna port indices if the configured codebook type comprises a port selection codebook.

4. _____ The method of claim 3, wherein:

each codeword of the beam selection codebook comprises a base sequence;

and

the beam selection codebook comprises one or more sets of orthogonal base sequences.

5.—The method of claim 1, wherein a set of values stored in each of the one or more additional tables is based at least in part on a preceding set of values stored in a preceding table of the first table or the one or more additional tables.

6.—The method of claim 5, wherein a value of the set of values is the sum of a preceding value of the set of values and a preceding table value of the preceding set of values, wherein the preceding value and the preceding table value ~~may be~~ is associated with a same beam index.

7.—The method of claim 1, wherein each table of the first table and the one or more additional tables has a same length and wherein a number of active entries for each table is based at least in part on a configured number of antenna ports, a configured number of beams, or a combination thereof.

8.—The method of claim 1, further comprising:

receiving a first configuration from the base station indicating a first configured number of antenna ports, configured number of beams, or combination thereof; and

selecting a first set of active entries for each table of the first table and the one or more additional tables based at least in part on the first configured number of antenna ports, configured number of beams, or combination thereof.

9.—The method of claim 8, further comprising:

receiving a second configuration from the base station indicating a second configured number of antenna ports, configured number of beams, or combination thereof wherein the second configured number of antenna ports, configured number of beams, or combination thereof is greater than the first configured number of antenna ports, configured number of beams, or combination thereof; and

selecting a second set of active entries for each table of the first table and the one or more additional tables based at least in part on the second configured number of antenna ports, configured number of beams, or combination thereof, wherein the first set of active entries is a subset of the second set of active entries.

10.—The method of claim 1, wherein a number of active entries is based at least in part on a configured number of antenna ports transmitting channel state information reference signals, a configured number of beams, or a combination thereof.

11. ———— _The method of claim 1, further comprising:

_receiving a configuration from the base station indicating a configured number of beams for selection, wherein the number of selected beams equals the configured number of beams for selection; and

_selecting the set of beam indices based at least in part on the configured number of beams for selection.

12. ———— _The method of claim 11, further comprising:

_receiving a first configuration from the base station indicating the configured number of beams for selection; and

_selecting a first set of tables comprising a number of tables equal to the configured number of beams for selection, wherein determining the first value and the one or more additional values is based at least in part on the first set of tables.

13. ———— _The method of claim 12, further comprising:

_receiving a second configuration from the base station indicating a second configured number of beams for selection that is greater than the configured number of beams for selection; and

_selecting a second set of tables comprising a second number of tables equal to the second configured number of beams for selection, wherein the first set of tables is a subset of the second set of tables.

14. ——— _The method of claim 1, wherein the first value is equal to the first beam index.

15. ——— _The method of claim 1, wherein each additional beam index of the set of beam indices increases in an ascending order with respect to a previous additional beam index.

16. ——— _The method of claim 1, wherein ~~the a first~~ additional value ~~for of the~~ one or more additional ~~beam indices~~ values is based at least in part on a current table of the one or more additional tables.

17. ———— _The method of claim 16, further comprising:

_identifying, from the current table, an input value associated with an additional beam index of the set of beam indices, wherein the first additional value is equal to the input value.

18. ——— _The method of claim 1, wherein ~~the a first~~ additional value ~~for of the~~ one or more additional ~~beam indices~~ values is based at least in part on a preceding table and a current table of the one or more additional tables.

19. ———— The method of claim 18, further comprising:

 identifying a preceding beam index that is one less than an additional beam index of the set of beam indices;

 identifying, from the preceding table, a first input value associated with the preceding beam index;

 identifying, from the current table, a second input value associated with the preceding beam index; and summing the first input value and the second input value to obtain the first additional value for the additional beam index.

~~summing the first input value and the second input value to obtain the additional value for the additional beam index.~~

20. ———— The method of claim 1, further comprising:

 identifying a beam index of the set of beam indices, wherein identifying the beam index comprises:

 identifying a first sub-beam index corresponding to a first dimension;

 identifying a second sub-beam index corresponding to a second dimension; and

 calculating the beam index based at least in part on the first sub-beam index and the second sub-beam index.

21. ———— The method of claim 20, wherein calculating the beam index further comprises:

 multiplying the first sub-beam index with a size of the second dimension to obtain an intermediate value; and adding, to the intermediate value, the second sub-beam index to obtain the beam index.

~~adding, to the intermediate value, the second sub-beam index to obtain the beam index.~~

22. ———— The method of claim 12, further comprising:

 selecting one or more beams from ~~at~~ the codebook based at least in part on the set of reference signals, wherein identifying the set of beam indices is based at least in part on the selected one or more beams.

23.—The method of claim 22, wherein the codebook used for the selecting is based at least in part on a configuration of a number of antenna ports.

24.—~~A method for wireless communication, comprising:~~

~~receiving, from a user equipment (UE), a combination index value indicating a set of selected beams;~~

~~determining a greatest beam index for a first selected beam of the set of selected beams based at least in part on a current table and the combination index value; and~~

~~determining an additional beam index for each additional selected beam of the set of selected beams based at least in part on one or more additional tables and an updated combination index value.~~

25.—The method of claim 24, further comprising:

~~transmitting, to the UE, a configuration of a codebook type for a codebook for channel state information reporting; and~~

~~transmitting, to the UE, a set of reference signals associated with one or more antenna ports.~~

26.—The method of claim 25, wherein the greatest beam index and the additional beam index for each additional selected beam of the set of selected beams correspond to codeword indices of the codebook if the configured codebook type comprises a beam selection codebook or to antenna port indices if the configured codebook type comprises a port selection codebook.

27.—The method of claim 26, wherein:

~~each codeword of the beam selection codebook comprises a base sequence;~~
and

~~the beam selection codebook comprises one or more sets of orthogonal base sequences.~~

28.—The method of claim 24, wherein the current table and the one or more additional tables are selected from a set of tables stored in a memory.

29.—The method of claim 28, wherein the set of tables comprises a first table and one or more subsequent tables, wherein a set of values stored in each of the one or more subsequent tables is based at least in part on a preceding set of values stored in a preceding table of the set of tables.

30.—The method of claim 29, wherein a value of the set of values is the sum of a preceding value of the set of values and a preceding table value of the preceding set of values, wherein the preceding value and the preceding table value may be associated with a same beam index.

31.—The method of claim 28, further comprising:

selecting a first set of tables comprising a number of tables equal to a number of the set of selected beams, wherein determining the greatest beam index and the additional beam index for each additional selected beam is based at least in part on the first set of tables.

32.—The method of claim 31, further comprising:

receiving, from the UE, a second combination index value indicating a second set of selected beams, wherein a number of the second set of selected beams is greater than the number of the set of selected beams; and

selecting a second set of tables comprising a second number of tables equal to the number of the second set of selected beams, wherein the first set of tables is a subset of the second set of tables.

33.—The method of claim 24, wherein each additional beam index decreases in a descending order with respect to a previous additional beam index.

34.—The method of claim 24, wherein determining the greatest beam index for the first selected beam further comprises:

identifying a greatest value of the current table that is less than or equal to the combination index value, wherein the greatest beam index is set to an index corresponding to the identified greatest value; and

updating the combination index value by subtracting the identified greatest value from the combination index value.

35.—The method of claim 34, wherein determining the additional beam index for each additional selected beam further comprises:

identifying an additional greatest value of a next table of the one or more additional tables that is less than or equal to the updated combination index value, wherein the additional beam index is set to an additional index corresponding to the identified additional greatest value; and

updating the updated combination index value by subtracting the identified additional greatest value from the updated combination index value.

36.—The method of claim 34, wherein a smallest beam index for a last selected beam of the set of selected beams is equal to a last updated combination index value.

37.—The method of claim 24, wherein each table of a set of tables stored in memory comprises a same length and wherein a number of active entries for each table is based at least in part on a configured number of antenna ports, configured number of beams, or combination thereof.

38.—The method of claim 24, further comprising:

identifying a first configured number of antenna ports, configured number of beams, or combination thereof; and

selecting a first set of active entries for each table of a set of tables stored in memory based at least in part on the first configured number of antenna ports, configured number of beams, or combination thereof.

39.—The method of claim 38, further comprising:

identifying a second configured number of antenna ports, configured number of beams, or combination thereof, wherein the second configured number of antenna ports, configured number of beams, or combination thereof is greater than the first configured number of antenna ports, configured number of beams, or combination thereof; and

selecting a second set of active entries for each table of the set of tables based at least in part on the second configured number of antenna ports, configured number of beams, or combination thereof, wherein the first set of active entries is a subset of the second set of active entries.

40.——The method of claim 24, wherein each table of a set of tables stored in memory comprises a number of active entries based at least in part on a configured number of antenna ports transmitting channel state information reference signals (CSI-RS), a configured number of beams, or a combination thereof.

41.——The method of claim 24, further comprising:

calculating, for a beam index, a first sub-beam index corresponding to a first dimension and a second sub-beam index corresponding to a second dimension.

42.——The method of claim 41, wherein calculating the first sub-beam index comprises:

dividing the beam index by a size of the second dimension to obtain an intermediate value; and

rounding the intermediate value down to the nearest integer to obtain the first sub-beam index.

43.——The method of claim 41, wherein calculating the second sub-beam index comprises:

dividing the beam index by a size of the second dimension to obtain the second sub-beam index, wherein the second sub-beam index is a remainder of the division.

44.——The method of claim 24, further comprising:

identifying the set of selected beams based at least in part on a codebook and the greatest beam index and each additional beam index.

45.——The method of claim 44, wherein the codebook used for the identifying is based at least in part on a configuration of a number of antenna ports.

46.———An apparatus for wireless communication, comprising:

—means for identifying a set of selected beams for reporting to a base station;

—means for determining a first value associated with a first beam index of a set of beam indices, the first value corresponding to a first index of a first table, wherein the set

of beam indices comprises a number of beam indices equal to a number of selected beams of the set of selected beams;

 means for determining ~~one or more~~ additional ~~value~~values associated with one or more additional beam indices of the set of beam indices based at least in part on one or more additional tables;

 means for summing the first value and the one or more of the additional values to determine a combination index value; wherein the combination index value is a single integer uniquely indicating the first beam index and

the one or more additional beam indices; and means for transmitting, to the base station, the combination index value indicating the set of selected beams.

47. — ~~25.~~ The apparatus of claim ~~46~~24, further comprising:

 means for receiving a configuration of a codebook type for a codebook for reporting channel state information;

 means for receiving, from the base station, a set of reference signals associated with one or more antenna ports of the base station; and

 means for identifying the set of beam indices based at least in part on the codebook type and at least one of the set of reference signals or the one or more antenna ports.

48. — ~~26.~~ The apparatus of claim ~~47~~25, wherein the identified set of beam indices correspond to codeword indices of the codebook if the configured codebook type comprises a beam selection codebook or to antenna port indices if the configured codebook type comprises a port selection codebook.

49. — ~~27.~~ The apparatus of claim ~~46~~24, wherein a set of values stored in each of the one or more additional tables is based at least in part on a preceding set of values stored in a preceding table of the first table or the one or more additional tables.

50. — ~~28.~~ The apparatus of claim ~~49~~27, wherein a value of the set of values is the sum of a preceding value of the set of values and a preceding table value of the preceding set of values, wherein the preceding value and the preceding table value ~~may be~~is associated with a same beam index.

51. — ~~29.~~ The apparatus of claim ~~46~~24, wherein each table of the first table and the one or more additional tables has a same length and wherein a number of active entries for each table is based at least in part on a configured number of antenna ports, a configured number of beams, or a combination thereof.

52. — ~~30.~~ The apparatus of claim ~~46~~24, further comprising:

_means for receiving a first configuration from the base station indicating a first configured number of antenna ports, configured number of beams, or combination thereof; and

_means for selecting a first set of active entries for each table of the first table and the one or more additional tables based at least in part on the first configured number of antenna ports, configured number of beams, or combination thereof.

53. ———— 31. The apparatus of claim ~~52~~30, further comprising:

_means for receiving a second configuration from the base station indicating a second configured number of antenna ports, configured number of beams, or combination thereof, wherein the second configured number of antenna ports, configured number of beams, or combination thereof is greater than the first configured number of antenna ports, configured number of beams, or combination thereof; and

_means for selecting a second set of active entries for each table of the first table and the one or more additional tables based at least in part on the second configured number of antenna ports, configured number of beams, or combination thereof, wherein the first set of active entries is a subset of the second set of active entries.

54. ———— 32. The apparatus of claim ~~46~~24, further comprising:

_means for receiving a configuration from the base station indicating a configured number of beams for selection, wherein the number of selected beams equals the configured number of beams for selection; and

_means for selecting the set of beam indices based at least in part on the configured number of beams for selection.

55. ———— 33. The apparatus of claim ~~54~~32, further comprising:

_means for receiving a first configuration from the base station indicating the configured number of beams for selection; and

_means for selecting a first set of tables comprising a number of tables equal to the configured number of beams for selection, wherein determining the first value and the one or more additional values is based at least in part on the first set of tables.

56. ———— 34. The apparatus of claim ~~55~~33, further comprising:

_means for receiving a second configuration from the base station indicating a second configured number of beams for selection that is greater than the configured number of beams for selection; and

_means for selecting a second set of tables comprising a second number of tables equal to the second configured number of beams for selection, wherein the first set of tables is a subset of the second set of tables.

57. ~~_____~~ 35. The apparatus of claim ~~46~~24, further comprising:

means for identifying a beam index of the set of beam indices, wherein the means for identifying the beam index further comprise:

~~_____~~ _means for identifying a first sub-beam index corresponding to a first dimension;

~~_____~~ _means for identifying a second sub-beam index corresponding to a second dimension; and

_means for calculating the beam index based at least in part on the first sub-beam index and the second sub-beam index.

58. ~~_____~~ 36. The apparatus of claim ~~57~~35, further comprising:

means for multiplying the first sub-beam index with a size of the second dimension to obtain an intermediate value; and means for adding, to the intermediate value, the second sub-beam index to obtain the beam index.

~~_____~~ ~~means for adding, to the intermediate value, the second sub-beam index to obtain the beam index.~~

59. ~~_____~~ 37. An apparatus for wireless communication, comprising:

~~_____~~ ~~means for receiving, from a user equipment (UE), a combination index value indicating a set of selected beams;~~

~~_____~~ ~~means for determining a greatest beam index for a first selected beam of the set of selected beams based at least in part on a current table and the combination index value; and~~

~~_____~~ ~~means for determining an additional beam index for each additional selected beam of the set of selected beams based at least in part on one or more additional tables and an updated combination index value.~~

60.—The apparatus of claim 59, further comprising:

means for transmitting, to the UE, a configuration of a codebook type for a codebook for channel state information reporting; and

means for transmitting, to the UE, a set of reference signals associated with one or more antenna ports.

61.—The apparatus of claim 60, wherein the greatest beam index and the additional beam index for each additional selected beam of the set of selected beams correspond to codeword indices of the codebook if the configured codebook type comprises a beam selection codebook or to antenna port indices if the configured codebook type comprises a port selection codebook.

62.—The apparatus of claim 59, wherein the current table and the one or more additional tables are selected from a set of tables stored in a memory.

63.—The apparatus of claim 62, wherein the set of tables comprises a first table and one or more subsequent tables, wherein a set of values stored in each of the one or more subsequent tables is based at least in part on a preceding set of values stored in a preceding table of the set of tables.

64.—The apparatus of claim 63, wherein a value of the set of values is the sum of a preceding value of the set of values and a preceding table value of the preceding set of values, wherein the preceding value and the preceding table value may be associated with a same beam index.

65.—The apparatus of claim 59, further comprising:

means for identifying a greatest value of the current table that is less than or equal to the combination index value, wherein the greatest beam index is set to an index corresponding to the identified greatest value; and

means for updating the combination index value by subtracting the identified greatest value from the combination index value.

66.—The apparatus of claim 65, further comprising:

~~means for identifying an additional greatest value of a next table of the one or more additional tables that is less than or equal to the updated combination index value, wherein the additional beam index is set to an additional index corresponding to the identified additional greatest value; and~~

~~means for updating the updated combination index value by subtracting the identified additional greatest value from the updated combination index value.~~

67.—The apparatus of claim 65, wherein a smallest beam index for a last selected beam of the set of selected beams is equal to a last updated combination index value.

68.—An apparatus for wireless communication, comprising:

_____a processor;

_____memory in electronic communication with the processor; and

_____instructions stored in the memory and operable, when executed by the processor, to cause the apparatus to:

identify a set of selected beams for reporting to a base station;

determine a first value associated with a first beam index of a set of beam indices, the first value corresponding to a first index value of a first table, wherein the set of beam indices comprises a number of beam indices equal to a number of selected beams of the set of selected beams; determine one or more additional values associated with one or more additional beam indices of the set of beam indices based at least in part on one or more additional tables; sum the first value and the one or more additional values to determine a combination index value, wherein the combination index value is a single integer uniquely indicating the first beam index and the one or more additional beam indices; and transmit, to the base station, the combination index value indicating the set of selected beams.

~~determine an additional value associated with one or more additional beam indices of the set of beam indices based at least in part on one or more additional tables;~~

~~sum the first value and one or more of the additional values to determine a combination index value; and~~

~~transmit, to the base station, the combination index value indicating the set of selected beams.~~

69.—An apparatus for wireless communication, comprising:

_____a processor;

~~memory in electronic communication with the processor; and~~
~~instructions stored in the memory and operable, when executed by the~~
~~processor, to cause the apparatus to:~~

~~receive, from a user equipment (UE), a combination index value~~
~~indicating a set of selected beams;~~

~~determine a greatest beam index for a first selected beam of the set of~~
~~selected beams based at least in part on a current table and the combination index~~
~~value; and~~

~~determine an additional beam index for each additional selected beam~~
~~of the set of selected beams based at least in part on one or more additional tables and~~
~~an updated combination index value.~~

70. ~~38.~~ A non-transitory computer readable medium storing code for wireless
communication, the code comprising instructions executable by a processor to:

~~_~~identify a set of selected beams for reporting to a base station;

~~_~~determine a first value associated with a first beam index of a set of beam
indices, the first value corresponding to a first index value of a first table, wherein the set of
beam indices comprises a number of beam indices equal to a number of selected beams of the
set of selected beams;

~~determine an additional value associated with~~ determine one or more additional values
associated with one or more additional beam indices of the set of beam indices based at least
in part on one or more additional tables; sum the first value and the one or more additional
values to determine a combination index value, wherein the combination index value is a
single integer uniquely indicating the first beam index and the one or more additional beam
indices of the set of beam indices based at least in part on one or more additional tables;; and
transmit, to the base station, the combination index value indicating the set of selected beams.

~~sum the first value and one or more of the additional values to determine a~~
~~combination index value; and~~

~~transmit, to the base station, the combination index value indicating the set of~~
~~selected beams.~~

71. ~~A non-transitory computer readable medium storing code for wireless~~
~~communication, the code comprising instructions executable by a processor to:~~

~~receive, from a user equipment (UE), a combination index value indicating a set of selected beams;~~

~~determine a greatest beam index for a first selected beam of the set of selected beams based at least in part on a current table and the combination index value; and~~

~~determine an additional beam index for each additional selected beam of the set of selected beams based at least in part on one or more additional tables and an updated combination index value.~~