

CLAIMS

1. A system for receiving signals from an array antenna that includes a first number of antenna elements, comprising:

a different frequencies generator module configured to generate a first number of different frequency signals each shifted by a given extent relative to a neighboring frequency signal, covering collectively a given frequency bandwidth;

a first number of multipliers each configured to receive a respective array antenna element analog signal and a respective frequency signal of said first number of frequency signals and generate a corresponding multiplied analog signal, giving rise to a first number of multiplied analog signals extending over said given frequency bandwidth;

a first number of filter modules each coupled to a respective multiplier such that said multiplied analog signals are each filtered to reduce interference to neighboring multiplied signals;

a second number of summation modules configured to receive the first number of multiplied analog signals from said multipliers and generate a second number of summed analog signals extending over said given frequency bandwidth;

a second number of analog to digital converters configured to receive said summed analog signals that extend over said given frequency bandwidth and generate a second number of summed digital signals;

said summed digital signals are capable of being fed to a digital processor for generating a processed signal of said array antenna,

wherein said second number of analog to digital converters falls in the range of 1 to less than said first number of antenna elements.

2. The system according to Claim 1, further comprising a first number of down converter modules configured to generate said array antenna element analog signals.

3. The system according to Claim 1, wherein said second number of analog to digital converters is 1.

4. The system for receiving signals from an array antenna according to Claim 1, further comprising:

a divider module configured to receive said second number of summed digital signals and divide them into a first number of digitally divided signals each corresponding to a respective array antenna element analog signal of an antenna element of said array of antenna elements;

a different frequencies generator digital module configured to generate said first number of different frequency digital signals each shifted by a given extent relative to a neighboring frequency digital signal, covering collectively a given frequency bandwidth;

a first number of digital multipliers each configured to receive a respective digitally divided signal of said digitally divided signals and a respective frequency digital signal of said first number of frequency digital signals, and generate a corresponding multiplied digital signal, giving rise to a first number of multiplied digital signals extending over said given frequency bandwidth; and

the digital processor configured to receive said first number of multiplied digital signals for generating a processed signal of said array antenna.

5. A system for receiving signals from an array antenna that includes a first number of antenna elements, comprising:

a codes generator module configured to generate a first number of different code

signals each characterized by a unique code;

a first number of down converter modules configured to generate array antenna element analog signals;

a first number of multipliers each configured to receive a respective array antenna element analog signal of said array antenna element analog signals and a respective code signal of said first number of code signals and generate a corresponding multiplied analog signal characterized by unique code, giving rise to a first number of multiplied analog signals;

a first number of filter modules each following a respective down converter module of said down converter modules and preceding a respective multiplier such that said array antenna element analog signals are filtered, wherein filtering of said array antenna element analog signals reduces adjacent channel interference between different ones of the first number of multiplied analog signals;

a second number of summation modules configured to receive the first number of multiplied analog signals from said multipliers and generate a second number of summed analog signals;

a second number of analog to digital converters configured to receive said summed analog signals and generate a second number of summed digital signals;

a divider module configured to receive said second number of summed digital signals and divide them into a first number of digitally divided signals each corresponding to a respective array antenna element analog signal of an antenna element of said array of antenna elements; and

a codes generator digital module configured to generate said first number of different code digital signals each characterized by a second unique code;

wherein said second number of summed digital signals are capable of being fed to a digital processor being configured to utilize said codes for generating a processed signal of said array antenna,

wherein said second number of analog to digital converters falls in the range of 1 to less than said first number of antenna elements.

6. The system according to Claim 5, wherein said second number of analog to digital converters is 1.

7. The system according to Claim 5, wherein said array antenna is a phased array antenna.

8. The system for receiving signals from an array antenna according to Claim 5, further comprising:

a first number of digital multipliers, each configured to receive a respective digitally divided signal of said digitally divided signals and a respective code digital signal of said first number of code digital signals, and generate a corresponding multiplied digital signal characterized by said second unique code, giving rise to a first number of multiplied digital signals; and

the digital processor configured to receive said first number of multiplied digital signals for generating a processed signal of said array antenna.

9. A method for receiving signals from an array antenna that includes a first number of antenna elements, comprising:

generating said a first number of different frequency signals each shifted by a given extent relative to a neighboring frequency signal, covering collectively a given frequency

bandwidth;

receiving a respective array antenna element analog signal and a respective frequency signal of said first number of frequency signals and generating a corresponding multiplied analog signal, giving rise to a first number of multiplied analog signals extending over said given frequency bandwidth;

filtering each of said multiplied analog signals, to reduce interference to neighboring multiplied signals;

receiving, by a second number of summation modules, the first number of multiplied analog signals and generating a second number of summed analog signals extending over said given frequency bandwidth;

receiving said summed analog signals that extend over said given frequency bandwidth and generating a second number of summed digital signals;

wherein said summed digital signals are capable of being digitally processed for generating a processed signal of said array antenna, and

wherein said second number of summation modules falls in the range of 1 to less than said first number of antenna elements.

10. A method for receiving signals from an array antenna that includes a first number of antenna elements, comprising:

generating, by a codes generator module, a first number of different code signals each characterized by a unique code;

generating array antenna element analog signals using a first number of down converter modules;

filtering said array antenna element analog signals;

receiving a respective array antenna element analog signal of said array antenna element analog signals after the filtering and a respective code signal of said first number of code signals, and generating a corresponding multiplied analog signal characterized by unique code, giving rise to a first number of multiplied analog signals, wherein filtering of said array antenna element analog signals reduces adjacent channel interference between different ones of the first number of multiplied analog signals;

receiving, by a second number of summation modules, the first number of multiplied analog signals and generating a second number summed analog signals;

receiving said summed analog signals and generating a second number of summed digital signals;

receiving said second number of summed digital signals and dividing them into a first number of digitally divided signals each corresponding to a respective array antenna element analog signal of an antenna element of said array of antenna elements; and

generating, by a codes generator digital module configured to generate said first number of different code digital signals each characterized by a unique code;

wherein said second number of summed digital signals are capable of being digitally processed to utilize said codes for generating a processed signal of said array antenna, and

wherein said second number of summation modules falls in the range of 1 to less than said first number of antenna elements.

11. The method according to Claim 10, wherein said second number of analog to digital converters is 1.

12. The method according to Claim 10, wherein said array antenna is a phased array antenna.

13. A computer program product, comprising a non-transitory computer usable medium having a computer readable program code embodied therein, said computer readable program code adapted to be executed to implement a method for receiving signals from an array antenna that includes a first number of antenna elements, comprising:

generating, by a codes generator module, a first number of different code signals each characterized by a unique code;

generating array antenna element analog signals using a first number of down converter modules;

filtering said array antenna element analog signals;

receiving a respective array antenna element analog signal of said array antenna element analog signals after the filtering and a respective code signal of said first number of code signals, and generating a corresponding multiplied analog signal characterized by unique code, giving rise to a first number of multiplied analog signals, wherein filtering of said array antenna element analog signals reduces adjacent channel interference between different ones of the first number of multiplied analog signals;

receiving, by a second number of summation modules, the first number of multiplied analog signals and generating a second number of summed analog signals;

receiving said summed analog signals and generating said second number of summed digital signals;

receiving said second number of summed digital signals and dividing them into a first number of digitally divided signals each corresponding to a respective array antenna element analog signal of an antenna element of said array of antenna elements; and

generating, by a codes generator digital module, said first number of different code digital signals each characterized by a unique code;

wherein said second number of summed digital signals are capable of being digitally processed to utilize said codes for generating a processed signal of said array antenna, and

wherein said second number of summation modules falls in the range of 1 to less than said first number of antenna elements.

14. The computer program product according to Claim 13, wherein said second number of analog to digital converters is 1.

15. The computer program product according to Claim 13, wherein said array antenna is a phased array antenna.