CLAIMS

1. A system for directionally classifying of a radio signal originating from an emitter, said system comprising:

a receiving station including:

a switch, including at least two input ports and at least one output port, said switch alternately coupling each of said at least two input ports with said output port;

an antenna, coupled with a respective one of said at least two input ports, receiving at least a radio signal originating from said emitter and producing a first electric received signal;

at least a second antenna, coupled with a respective another one of said at least two input ports, receiving at least said radio signal originating from said emitter and producing a second electric received signal; and

a single channel receiver, coupled with said output port of said switch, performing reception operations on said first electric received signal and on said second electric received signal and producing a first and a second received signals respectively;

at least one other receiving station including:

at least a first other antenna, receiving respective said radio signal originating from said emitter and producing another electric received signal;

another receiver, coupled with said at least first other antenna, performing reception operations on said another electric signal produced by said first other antenna and producing another received signal, said another receiver being asynchronous with said single channel receiver; and

a directional classifier, including a phase difference detector, coupled with said single channel receiver and with said another receiver, said phase difference detector measuring a plurality of first phase differences between said first received signal and said another received signal when said switch couples said antenna with said single channel receiver, producing a first phase difference measurement curve, said phase

difference detector further measuring a plurality of second phase differences between said second received signal and said another received signal when said switch couples said second antenna with said single channel receiver, producing a second phase difference measurement curve, said directional classifier subtracting said second phase difference measurement curve from said first phase difference measurement curve producing a phase difference estimate between said first electric received signal and said second electric received signal, thereby alleviating errors in the phase difference measurements, said errors being caused by error factors, said error factors including at least one of clock drift, phase ambiguity and Doppler shift..

2. The system according to claim 1, wherein said directional classifier further classifies said radio signal according said phase difference estimate.

3. The system according to claim 2, wherein said directional classifier determines the direction of arrival of said radio signal according to said phase difference estimate and classifies said radio signal according to said direction of arrival.

4. The system according to claim 1, wherein said at least one other receiving station further includes:

another switch, including at least two other input ports and at least one other output port, said switch alternately coupling each of said at least two other input ports with said other output port, said at least first other antenna is coupled with a respective one of said at least two other input ports; and

at least a second other antenna, coupled with the other one of said at least two other input ports, receiving at least said radio signal originating from said emitter and producing a second other electric received signal,

wherein said another receiver is a single channel receiver coupled with the output port of said other switch and performs

reception operations on said another electric received signal and on said second other electric received signal.

5. The system according to claim 4, wherein said phase difference detector measures another plurality of first phase differences between one of said first received signal and said second received signal, and said another received signal, when said another switch couples said at least another antenna with said another receiver, producing another first phase difference measurement curve,

said phase difference detector further measuring another plurality of second phase differences between one of said first received signal and said second received signal, and said second other received signal when said other switch couples said at least second other antenna with said another receiver, producing another second phase difference measurement curve, said directional classifier subtracts said another second phase difference measurement curve from said another first phase difference measurement curve producing another phase difference estimate.

6. The system according to claim 5, wherein said directional classifier further classifies each received signal according to said another phase difference estimate.

7. The system according to claim 5, wherein said directional classifier determines another direction of arrival of said radio signal according to said another phase difference estimate and classifies said radio signal according to said another direction of arrival.

8. The system according to claim 4, wherein said switch couples each of said at least two input ports with said output port according to a switching scheme, and

wherein said another switch couples each of said at least two other input ports with said other output port according to another switching scheme.

9. The system according to claim 8, wherein said switching scheme and said another switching scheme are different one with respect to the other with respect to at least one of the frequency of said switching scheme, the phase of said switching scheme and the switch state intervals ratios.

10. The system according to claim 1, wherein each of said single channel receiver and said another receiver are one of a superhetrodyne receiver and a software radio receiver.

11. The system according to claim 10, wherein said reception operations is at least one of:

down conversion;
filtering;
sampling;
demodulation; and
equalization

12. A method for directionally classifying of a radio signal originating from an emitter, said method comprising the procedures of:

coupling a first antenna with a single channel receiver;

measuring a plurality of first phase differences between received signal from said first antenna and a received signal from a reference antenna and producing a first phase difference measurement curve;

coupling a second antenna with said single channel receiver;

measuring a plurality of second phase differences between a received signal from said second antenna and a received signal from said reference antenna and producing a second phase difference measurement curve;

subtracting said second phase difference measurement curve from said first phase difference measurement curve to produce a phase difference estimate between said received signal from said first antenna and said received signal from said second antenna thereby alleviating errors in the phase difference measurements, said errors being caused by

error factors, said error factors including at least one of clock drift, phase ambiguity and Doppler shifts; and

directionally classifying said emitter according to said phase difference estimate.