using electrochemical, or optical detection techniques known to the skilled addressee. Such measurements can be made as standalone measurements or in combination with other analytes to be detected in the sample.

[0026] The binding agent may itself by attached directly to a wall or surface of said channel within the cartridge, by suitable bonding to the wall or surface for example, by way of physical adsorption, covalent chemical coupling, non covalent chemical bonding (e.g. biotin-avidin) or a combination of any of the above. In a preferred embodiment the binding agent is in the form of a magnetic or paramagnetic particle, comprising a binding moiety and the binding moiety is bound by non covalent chemical bonding (e.g. biotin-avidin) to the surface of the particle. Additional embodiments could also include physical adsorption, covalent chemical coupling, non covalent chemical bonding (e.g. biotin-avidin) or any combination of these to the surface of a magnetic agent, such as a magnetic particle. The magnetic agents/particles which are functionalised to comprise the binding agent bound thereto, may simply be deposited within a channel of the cartridge, such that upon the sample being applied to the cartridge and being drawn into the channel(s), the functionalised magnetic agents/particles are resuspended by the fluid sample and hence come into contact with any analyte in the sample. The area of deposition may be specifically defined using hydrophobic stop features, through the techniques described previously in order to separate this area from the detection area in order to ensure that high background readings are not obtained due to reagent components (e.g. fluorescent latex) being dried down in the measurement/detection area.

[0027] As mentioned above as well as the binding agents, the cartridge may comprise one or more further reagents deposited within said microfluidic channels(s), which reagents may facilitate detection of the captured analyte. For example said one or more reagents may include a label which has been adapted to specifically bind to the captured analyte, thus facilitating its detection.

[0028] Bound analyte may be detected directly providing the bound analyte is capable of generating a detectable signal, or upon binding of the analyte a reaction may place, so as to generate a reaction product and the reaction product may be detected. However, in a preferred embodiment, bound analyte is contacted with a label which is able to bind the bound analyte and a label/binding agent/analyte complex is subsequently detected. The label may itself be bound to a further binding moiety which is also capable of specifically binding to the binding agent/analyte complex. Typically the label is able to bind to a different portion of the analyte to which the first binding agent binds, or is capable of binding to a region of the binding agent/analyte complex which is formed only on generation of such a complex.

[0029] Bound analyte may be transported to the label within a region of the cartridge by way of the transport means in the reader causing the bound analyte to be moved. Alternatively a detection agent or label is brought into contact with the bound analyte by virtue of an amount of fluid being introduced into the cartridge from a fluid reservoir/reservoirs in the reader.

[0030] Desirably the binding agent and any detection agent/label are in a dry state when deposited in the channel(s) of the cartridge.

[0031] In one embodiment, the detection agent/label which is designed to facilitate detection of the analyte, is initially located upstream (in terms of the direction the sample flows into the cartridge following introduction) from such a stop feature. In this manner said detection agent does not initially come into contact with the sample upon initial sample application to the cartridge. Only when a fluid such as a buffer is provided to the cartridge through the fluid input port, is the detection agent constructed with the bound analyte. When a fluid is introduced into the cartridge from the reader, the detection agent may be carried by the fluid into contact with the bound analyte resuspended and carried by the fluid, passing by the stop feature and into contact with the captured analyte.

[0032] In another embodiment, after the initial binding phase between the sample and the binding agent and optional wash, the magnetic particle-analyte complex within a buffer media could be transferred to an upstream region of the channel, where the label is located, in dry form within the channel. The magnetic particle-analyte complex within the buffer media would resuspend/rehydrate the label and allow binding of the label to the analyte. This transfer event is possible due to the ability of the reader to effectively and accurately remove air from the channel (which is a sealed system). This method may allow greater control of rehydration of deposited reagents and homogeneity of reagent dispersion.

[0033] In another embodiment, the binding agent and the label are deposited in the sample channel. The sample rehydrates these reagents allowing the binding reaction to occur. In this embodiment all the reagents can contact the sample, the reader then accumulates the magnetic particle-analyte-label complexes to a region within the sample channel via the application of a magnet/electromagnet. The reader then expels the unbound label/sample into the sink using an air/fluid wash. The reader can use a disposable fluid/air reservoir/reservoirs or likewise a reusable fluid reservoir/reservoirs. The magnetic particle-analyte-label complex is then quantified in a fluid or air environment.

[0034] Each cartridge may be designed to carry out single analyte detection or multiple analyte detection. Moreover, each cartridge comprises more than one microfluidic channel system, so that more than one assay may be carried out using a single cartridge.

[0035] Desirably the cartridges may easily be mass produced. The cartridge may provide in a strip, where a number of cartridges are initially connected for example, be initially together, such as by way of a perforated seal. In this manner, the user can easily remove a cartridge from the strip, prior to use.

[0036] Once the cartridge has been loaded with a sample, any captured analyte may be detected by way of a suitable reader. The present invention provides such a reader and an important aspect of the present invention is the separate provision of a fluid/buffer reservoir/reservoirs within the reader. One advantage of this is that the cartridges themselves may be initially "dry", that is contain little or no fluid within the cartridge prior to sample application. This not only simplifies manufacturing of the cartridges themselves, but also improves shelf-life and allows many of the cartridges of the present invention to be stored at room temperature, with little degradation of the chemical or biological components within the cartridge prior to use.

[0037] In a further aspect there is provided a method of conducting an assay on a sample, the method comprising:

- **[0038]** Introducing a sample into a microfluidic cartridge of the present invention such that any analyte present in the sample is capable of being bound by a binding agent;