PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)* 24 September 2010 (24.09.2010)
Applicant's or agent's file reference NC69655WO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/FI2010/050241	26 March 2010 (26.03.2010)	29 June 2009 (29.06.2009)

International Patent Classification (IPC) or both national classification and IPC
See supplemental box

Applicant
NOKIA CORPORATION et al.

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [x] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/FI	Date of completion of this opinion	Authorized officer
National Board of Patents and Registration of Finland P.O. Box 1160, FI-00101 HELSINKI, Finland	22 September 2010 (22.09.2010)	Janne Nummela
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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/FI2010/050241

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

   ☐ on paper

   ☐ in electronic form

   b. (time)

   ☐ in the international application as filed

   ☐ together with the international application in electronic form

   ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-28	YES
	Claims		NO
Inventive step (IS)	Claims	1-28	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-28	YES
	Claims		NO

2. Citations and explanations:

2.1 Reference is made to the following documents:
D1: US2009045042 A1
D2: US2008013773 A1
D3: US2007165878 A1
D4: JP62283273 A

2.2 Claimed invention
The invention relates to an apparatus, an electronic device, a method, and a computer readable storage according to claims 1-28. The claimed invention comprises an acoustic transducer and a sound channel coupled to the acoustic transducer, the sound channel comprisin an element having a shape that is electrically controllable, wherein the shape of the element is electrically controllable to change the acoustic properties of the sound channel.

2.3 Novelty under PCT Article 33(2)
Documents D1 - D4 represent the general state of the art.

D1 discloses the vacuum chuck (Fig. 8, reference sign 200) that comprises a contact surface (202), which has apertures (204) disposed thereon. A power source, in this case a vacuum pump (206), is in operative communication with the vacuum chuck (200) via a conduit (208). The conduit (208) fluidly connects the vacuum pump (206) to the vacuum chuck (200). The contact surface (202) of the vacuum chuck (200) comprises an active material. The active material of the contact surface is configured to transition between a first position and a second position through a change in a property of the active material upon receipt of an activation signal. When the active material is in the first position, as shown in FIG. 8(a), the contact surface (202) has the apertures (204). When the active material is in the second position, as shown in FIG. 8(b), the active material covers the apertures (204), such that the contact surface (202) is a solid uniform plane. The active material of the vacuum chuck (200) permits variably selecting the amount of fluid communication between the contact surface (202) and a second contact body. In other words, the active material is configured to control the amount of vacuum supplied to the vacuum chuck (200) by the vacuum pump (206). The amount of vacuum at the contact surface (202) controls the frictional force level at the interface between the chuck surface (202) and a second contact body. When the active material is in the first position, the chuck and the second body have a first normal force between them (paragraphs [0046] and [0047]).

D2 discloses an earphone speaker unit housing where a slidable rigid cover plate (130) e.g. a fan-shaped plate is arranged on the housing for selectively shielding adjustable sound holes.

D3 discloses a loudspeaker array constituted by a plurality of loudspeaker units for controlling the directional characteristics of sound.

D4 discloses a method for controlling a gas flow by using a material, in which a piezo-electric porcelain

Continued to next page

Supplemental Box

Continuation of: Box V (1 / 1)

plate is formed into bimorph construction for the driving part of a valve.

These documents are presented here only to express that even the technical problem presented in the application is unknown in the state of the art.

2.3.1 Independent claims
None of the cited documents discloses all the features of claims 1, 15, 16, and 28. The subject matter of claims 1, 15, 16, and 28 is therefore novel.

2.3.2 Dependent claims
Because the subject matter of independent claims 1, 15, 16, and 28 is novel, dependent claims 2-14, and 17-27 are also novel.

2.4 Inventive step under PCT Article 33(3)
Considering the prior art, the subject matter of claims 1, 15, 16, and 28 is not obvious to a person skilled in the art. Thus, claims 1, 15, 16, and 28 involve an inventive step. Consequently, dependent claims 2-14, and 17-27 also meet the requirement of inventiveness.

2.5 Industrial applicability under PCT Article 33(4)
Claims 1-28 meet the requirement of industrial applicability because the claimed subject matter can be made or used in industry.

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Claims 1-28 are not drafted in the two-part form in accordance with PCT Rule 6.3(b), which in the present case would be appropriate, with those features known from the prior art placed in the preamble (PCT Rule 6.3(b)(i)) and the remaining features included in the characterising part (PCT Rule 6.3(b)(ii)).

The features of the claims are not provided with reference signs placed in parentheses (PCT Rule 6.2(b)).

Each of the parts of the description shall preferably be preceded by an appropriate heading as suggested in the Administrative Instructions. (PCT Rule 5.1(c)).

International application No.
PCT/FI2010/050241

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of: International Patent Classification (IPC)

Int.Cl.
G10K 11/00 (2006.01)
H04R 1/00 (2006.01)