PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)* **06 September 2019 (06.09.2019)**

Applicant's or agent's file reference
P115220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SG2018/050598	**07 December 2018 (07.12.2018)**	

International Patent Classification (IPC) or both national classification and IPC
G06F 3/01(2006.01)i, G06F 3/02(2006.01)i, G06F 3/039(2006.01)i, A47B 21/03(2006.01)i

Applicant
RAZER (ASIA-PACIFIC) PTE. LTD.

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

- ☒ 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
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ 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 66.1bis(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.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	06 September 2019 (06.09.2019)	BYUN, Sung Cheal Telephone No. +82-42-481-8262

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/SG2018/050598

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:

   a. ☐ forming part of the international application as filed:
      ☐ in the form of an Annex C/ST.25 text file.
      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
      ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

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 forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/SG2018/050598

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

1. Statement

Novelty (N)	Claims	1-30	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-30	NO
Industrial applicability (IA)	Claims	1-30	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:
D1: US 2014-0191973 A1 (STRATEGIC POLYMER SCIENCES, INC.) 10 July 2014
D2: US 2013-0002584 A1 (LARKHOON LEEM et al.) 03 January 2013

I. Novelty and Inventive Step (PCT Article 33(2) and (3))

1. Claims 1-13

1.1. Claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a user interface device, comprising: a base layer (301); cushions (303) provided between each of EMP actuators (310) and a corresponding FSR sensor (302); the EMP actuators (310) creating a vibration structure and each separated from the corresponding FSR sensor (302) by the cushion (303); and a cover layer made of a durable, flexible material, and attached to the EMP actuators (310) (see paragraphs [0039]-[0041]; claim 1; and figure 3 in D1).

The subject matter of claim 1 differs from D1 in that at least two flexible supports are configured to isolate a base structure from a vibrating motion of a vibration assembly, and the vibration motion of the vibration assembly causes a surface of the vibration assembly directed towards a cushion assembly to move relative to a corresponding surface of the cushion assembly directed towards the vibration assembly in a manner so as to allow the vibration motion of the vibration assembly to be sensed through the cushion of the cushion assembly. However, the different feature is merely a matter of design option in view of the feature of D1 considering that the cushion reduces attenuation of haptic feedback when a user pushes hard on a key, and as the EMP actuators (310) are attached to the back side of the cover

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layer, the cover layer together with the EMP actuators (310) creates a vibration structure (see paragraphs [0040]-[0041]; and figure 3 in D1).

Therefore, claim 1 lacks an inventive step as being obvious to a person skilled in the art over D1.

1.2. Claims 2-13

The additional features of claims 2-3 are merely matters of design option in view of the feature of D1 considering the cover layer together with the EMP actuators (310) creating a vibration structure (see paragraph [0040]; and figure 3 in D1).

The additional feature of claim 4 is merely a matter of design option in view of the feature of D1 considering the cushions (303) provided between each of EMP actuators (310) and the corresponding FSR sensor (302) (see paragraph [0041]; and figure 3 in D1).

The additional features of claims 5-6 are merely matters of design option in view of the feature of D1 considering the cushions (303) having circular or rectangular cylinders structures (see paragraph [0041]; and figure 6 in D1).

The additional features of claims 7-8 are merely matters of design option in view of the feature of D1 considering that the EMP actuator is attached to a raised or embossed area of the cover layer (see paragraph [0042]; and figure 7 in D1).

The additional features of claims 9-11 are merely matters of design option in view of the feature of D2 considering that an apparatus for providing tactile feedback features in response to lateral force relies on having a top layer and bottom layer of an overlay structure mate at an interface having a saw tooth configuration, the apparatus comprising an interface layer (706) to provide lubrication (see paragraphs [0034]-[0035]; and figures 7a-7b in D2).

The additional feature of claim 12 is merely a matter of design option in view of the feature of D1 considering the cover layer attached to the EMP actuators (310) (see paragraph [0039]; and figure 3 in D1).

The additional feature of claim 13 is merely a matter of design option in view of the

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feature of D1 considering a force-sensing layer including one or more force-sensing sensors (see claim 1 in D1).

Therefore, claims 2-8, 12-13 lack an inventive step as being obvious over D1, and claims 9-11 lack an inventive step as being obvious over D1 in view of D2.

2. Claims 14-23

2.1. Claim 14

D1, which is considered to be the closest prior art to the subject matter of claim 14, discloses a user interface device, comprising: a base layer (301); cushions (303) provided between each of EMP actuators (310) and a corresponding FSR sensor (302); the EMP actuators (310) creating a vibration structure and each separated from the corresponding FSR sensor (302) by the cushion (303); and a cover layer made of a durable, flexible material, and attached to the EMP actuators (310) (see paragraphs [0039]-[0041]; claim 1; and figure 3 in D1).

The subject matter of claim 14 differs from D1 in the feature of a lubricating layer between a vibration member of a vibration assembly and a cushion of a cushion assembly, wherein at least two flexible supports are configured to isolate a base structure from a vibrating motion of the vibration assembly, wherein the vibrating motion of the vibration member of the vibration assembly causes a surface of the vibration member of the vibration assembly directed towards the cushion assembly to move relative to a corresponding surface of the cushion of the cushion assembly directed towards the vibration assembly, wherein the lubricating layer is configured to minimize vibration losses of the vibration member of the vibration assembly and facilitate the relative movement between the vibration member of the vibration assembly and the cushion of the cushion assembly. However, the different feature is merely a matter of design option in view of the combined features of D1 considering that the cushion reduces attenuation of haptic feedback when a user pushes hard on a key, and as the EMP actuators (310) are attached to the back side of the cover layer, the cover layer together with the EMP actuators (310) creates a vibration structure (see paragraphs [0040]-[0041]; and figure 3 in D1), and D2 considering that an apparatus for providing tactile feedback features in response to lateral force relies on having a top layer and bottom layer of an overlay structure mate at an interface having a saw tooth configuration, the apparatus comprising an interface layer (706) to provide lubrication (see

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paragraphs [0034]-[0035]; and figures 7a-7b in D2).

Therefore, claim 14 lacks an inventive step as being obvious to a person skilled in the art over D1 in view of D2.

2.2 Claims 15-23

The additional feature of claim 15 is merely a matter of design option in view of the feature of D1 considering the cover layer together with the EMP actuators (310) creating a vibration structure (see paragraph [0040]; and figure 3 in D1).

The additional feature of claim 16 is merely a matter of design option in view of the feature of D1 considering the cushions (303) provided between each of EMP actuators (310) and the corresponding FSR sensor (302) (see paragraph [0041]; and figure 3 in D1).

The additional features of claims 17-18 are merely matters of design option in view of the feature of D1 considering the cushions (303) having circular or rectangular cylinders structures (see paragraph [0041]; and figure 6 in D1).

The additional features of claims 19-21 are merely matters of design option in view of the feature of D2 considering the interface layer (706) provided between the bottom layer (702) and the top layer (704) to provide lubrication (see paragraphs [0034]-[0035]; and figures 7a-7b in D2).

The additional feature of claim 22 is merely a matter of design option in view of the feature of D1 considering the cover layer attached to the EMP actuators (310) (see paragraph [0039]; and figure 3 in D1).

The additional feature of claim 23 is merely a matter of design option in view of the feature of D1 considering a force-sensing layer including one or more force-sensing sensors (see claim 1 in D1).

Therefore, claims 15-23 lack an inventive step as being obvious over D1 in view of D2.

3. Claims 24-30

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3.1. Claim 24

D1, which is considered to be the closest prior art to the subject matter of claim 24, discloses a user interface device, comprising: a base layer (301); cushions (303) provided between each of EMP actuators (310) and a corresponding FSR sensor (302); the EMP actuators (310) creating a vibration structure and each separated from the corresponding FSR sensor (302) by the cushion (303); and a cover layer made of a durable, flexible material, and attached to the EMP actuators (310) (see paragraphs [0039]-[0041]; claim 1; and figure 3 in D1).

The subject matter of claim 24 differs from D1 in the feature of a lubricating plate fixedly attached to a side of a cushion of a cushion assembly directed towards a vibration assembly, wherein a vibrating motion of a vibration member of the vibration assembly causes a surface of the vibration member of the vibration assembly directed towards the cushion assembly to move relative to a corresponding surface of the lubricating plate directed towards the vibration assembly, wherein at least two flexible supports are configured to isolate a base structure from a vibrating motion of the vibration assembly, wherein the lubricating plate is in contact with the vibration member of the vibration assembly to minimize vibration losses of the vibration member of the vibration assembly and facilitate the relative movement between the vibration member of the vibration assembly and the cushion of the cushion assembly. However, the different feature is merely a matter of design option in view of the combined features of D1 considering that the cushion reduces attenuation of haptic feedback when a user pushes hard on a key, and as the EMP actuators (310) are attached to the back side of the cover layer, the cover layer together with the EMP actuators (310) creates a vibration structure (see paragraphs [0040]-[0041]; and figure 3 in D1), and D2 considering that an apparatus for providing tactile feedback features in response to lateral force relies on having a top layer and bottom layer of an overlay structure mate at an interface having a saw tooth configuration, the apparatus comprising an interface layer (706) to provide lubrication (see paragraphs [0034]-[0035]; and figures 7a-7b in D2).

Therefore, claim 24 lacks an inventive step as being obvious to a person skilled in the art over D1 in view of D2.

3.2. Claims 25-30

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The additional feature of claim 25 is merely a matter of design option in view of the feature of D1 considering the cushions (303) provided between each of EMP actuators (310) and the corresponding FSR sensor (302) (see paragraph [0041]; and figure 3 in D1).

The additional features of claims 26-27 are merely matters of design option in view of the feature of D1 considering the cushions (303) having circular or rectangular cylinders structures (see paragraph [0041]; and figure 6 in D1).

The additional feature of claim 28 is merely a matter of design option in view of the feature of D2 considering the interface layer (706) provided between the bottom layer (702) and the top layer (704) to provide lubrication (see paragraphs [0034]-[0035]; and figures 7a-7b in D2).

The additional feature of claim 29 is merely a matter of design option in view of the feature of D1 considering the cover layer attached to the EMP actuators (310) (see paragraph [0039]; and figure 3 in D1).

The additional feature of claim 30 is merely a matter of design option in view of the feature of D1 considering a force-sensing layer including one or more force-sensing sensors (see claim 1 in D1).

Therefore, claims 25-30 lack an inventive step as being obvious over D1 in view of D2.

II. Industrial Applicability (PCT Article 33(4))

Claims 1-30 are industrially applicable.