UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

CYWEE GROUP LTD.
Patent Owner

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Case IPR2019-00534
Patent No. 8,552,978

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**EXPERT DECLARATION OF DR. JOSEPH LAVIOLA, PH.D., IN
SUPPORT OF PATENT OWNER PRELIMINARY RESPONSE**

**Table of Contents**

## I.    INTRODUCTION

**1.**    I have been retained by Patent Owner CyWee Group Ltd. ("CyWee" or "Patent Owner") as an expert in the area of motion sensors and sensor fusion technology. I make this Declaration at the request of CyWee regarding my opinions as an independent expert regarding issues of validity of U.S. Patent No. 8,552,978 (the "'978 Patent") raised in the matter of *Inter Partes* Review, Petition IPR2018-01257 ("Petition").

**2.**    I am being compensated for this work at the rate of $400/hr, and my compensation is not dependent on the outcome of this matter.

**3.**    In preparation for this Declaration, I studied Exhibits 1001-1006 provided by Petitioner as well as the Petition.  I have also studied several documents from various district court actions concerning the '978 Patent. These include the claim construction orders in *CyWee Group Ltd. v. Samsung Electronics Co., Ltd.*, *et al*, No. 2:17-cv-00140-WCB-RSP (E.D. Tex.) (the "Samsung Suit") and *CyWee Group Ltd. V. Motorola Mobility LLC*, No. 1:17-cv-00780-GMS (D. Del.) (the "Motorola Suit").[1] The claim construction orders from these cases are provided as Exhibits 2003 and 2006-2007.

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[1] I have also reviewed the claim construction order in *CyWee Group, Ltd. v. Huawei Device Co. Ltd.*, No. 2:17-cv-00495-WCB-RSP (E.D. Tex) (the "Huawei

4.    In addition to the above Papers and other documents, my opinions herein are also based upon my personal knowledge, professional judgment, education and experience gained through my years as a computer scientist, professor, and consultant.

## II.    QUALIFICATIONS, PUBLICATIONS, AND PRIOR TESTIMONY

5.    My Curriculum Vitae is provided as Exhibit 2005. The following is a summary of my education and relevant experience.

6.    I have almost 20 years of experience working in the virtual reality ("VR") and augmented reality ("AR") fields, as well as advancing three-dimensional ("3D") interaction techniques for use in both VR and AR environments. More specifically, I have worked extensively on and with user and object motion tracking sensors, algorithms and systems.

7.    I am the Charles N. Millican Professor of Computer Science in the Department of Computer Science at the University of Central Florida, located in Orlando, Florida. I also serve as the Director of the Interactive Computing Experiences Research Cluster at the University of Central Florida. Through these functions, I supervise over fifteen graduate and undergraduate students working on various research projects in the area of human-computer interaction. In addition,

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Suit") in which the court adopted the same constructions it adopted in the Samsung Suit.

since 2013, I have served as an Adjunct Associate Professor of Computer Science at Brown University, located in Providence, Rhode Island.

8.      I received my Bachelor of Science degree in Computer Science from Florida Atlantic University in 1996. I also hold two Masters degrees – an Sc.M. in Computer Science and an Sc.M. in Applied Mathematics from Brown University – which were awarded in 2000 and 2001 respectively. I received my Ph.D. in Computer Science from Brown University in 2005.

9.      I serve as Associate Editor for various publications in the area of human-computer interaction, including the International Journal of Human-Computer Studies and the Association for Computing Machinery's Transactions on Interactive Intelligent Systems.  I have also served as Program Chair for the IEEE Virtual Reality conference.

10.    I have contributed to more than 40 peer-reviewed journal publications and nearly 100 refereed conferences and workshops, the majority of which deal with virtual and augmented reality and user and object motion tracking. For instance, I am the lead author of the second edition of the most comprehensive textbook on 3D user interaction, entitled "3D User Interfaces: Theory and Practice." As part of that work, I analyzed many different types of input and output hardware, 3D user

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