UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,

Petitioner,

v.

ANDREA ELECTRONICS INC.,

Patent Owner.

Patent No. 6,363,345

IPR2017-00626

REPLY DECLARATION OF BERTRAND HOCHWALD REGARDING U.S. PATENT NO. 6,363,345

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I. INTRODUCTION

1. I have been retained by counsel for Apple Inc. as an expert witness in the above-captioned proceeding. I have been asked to provide an opinion regarding the patentability of certain claims in U.S. Patent No. 6,363,345 ("the '345 Patent") (Exhibit 1001). I previously submitted declarations in this matter as Exhibits 1003 and 1004.

2. My background and qualifications are set forth in my opening declarations Exhibits 1003 and 1004. A copy of my CV was attached as Exhibit B to those declarations. I disclosed the compensation I am receiving, and prior testimony in my opening declarations. I also set forth my understanding of the relevant legal standards in my opening declarations.

3. I understand that Andrea submitted responses to the petitions and the Institution decisions, and that Andrea submitted two declarations from Dr. Scott Douglas (both labeled Ex. 2002). I have considered Andrea's Responses and Dr. Douglas's declarations, and this declaration sets forth my reply to certain of Andrea's and Dr. Douglas's arguments.

II. RESPONSE TO DR. DOUGLAS'S OPINIONS

A. Martin's Sub-Windows Are an Optional Feature

4. Andrea and Dr. Douglas contend that multiple sub-windows ($W > 1$) are a "crucial" part of Martin's algorithm. [Ex. 2002 (-626 Douglas) at ¶60.] They are wrong because sub-window(s) are not crucial for rapid adjustment of noise

level. Using $W = 1$ in Martin's algorithm is a perfectly reasonable choice for that parameter.

5. Martin says the overall window length L must be large enough to bridge any peak of speech activity, but short enough to follow non-stationary noise variations. He does not make similar comments about the number of sub-windows W. [Ex. 1006 at 1094.] Martin does not specify any upper or lower bounds on W. Where $W = 1$, the length of each sub-window M is equal to the length of the window L. Martin does not suggest that these values would not work. On the contrary, he specifies these values as configurable parameters which one in the art would understand how to set. One in the art would understand that Martin's algorithm functions equally well for any positive integer W. [Ex. 1006, Figure 2.]

6. Martin says a window time length of 0.625 (seconds) is "a good value", and this value corresponds in his example to window sample length of $L = 5000$. He does not provide any qualitative assessment of how many sub-window(s) W would be "good."

7. Martin explains that W is chosen at least in part on the basis of "computational complexity and delay" [Ex. 1006 at 1094.] The basis for "computational complexity" used by Martin at time of publication was in 1993. Six years later in 1999, at the time of the filing of the '345 patent, computers were considerably faster and more capable. Hence a value of W that would be chosen in

1993 could differ in 1999 or today. Martin had the foresight to anticipate this issue, and allow the choice of *W* to be a design variable, whether smaller or larger.

8. Martin says sub-windows can "improve[e] the noise tracking capability" for "a rapid noise power increase." [Ex. 1006 at 1094.] Martin does not state that this feature is required to track noise. Just that it improves noise tracking in some circumstances.

9. According to Martin's algorithm, the noise floor $P_n(i)$ adjusts to rapid noise power decreases, because the noise floor is immediately updated if the current smoothed power is less than the floor. This is true for any *W*.

10. Other aspects of Martin's algorithm are not affected by the choice of *W*. For example, the noise floor $P_n(i)$ is never allowed to be above $\bar{P}_x(i)$. [Ex. 1006 at Figure 2.], and $\bar{P}_x(i)$ has no dependency on *W*.

11. Dr. Douglas asserts that Martin does not update the noise floor $P_n(i)$ periodically. [Ex. 2002 (-626 Douglas) at ¶72.] That statement is not correct. Where $W = 1$, Martin's noise floor $P_n(i)$ is always set to P_{Mmin} at the end of the window. In Martin's Figure 2, both branches of the monotonically increasing test simplify to the same result when $W = 1$. In the "no" branch, Martin selects the minimum of the last *W* values stored in *min_vec* (italicized for ease of reading). Martin shows this through the mathematical statement min(*min_vec*(*r***M*), *min_vec*((*r*-1)**M*),… *min_vec*(*r*-*W*+1)**M*). The last value in this list is *min_vec*(*r*-

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