IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Marcus Da Silva et al.	
U.S. Patent No.:	10,715,235	Attorney Docket No.: 50095-0047IP1
Issue Date:	July 14, 2020	
Appl. Serial No.:	15/495,539	
Filing Date:	April 24, 2017	
Title:	DIRECTED WIRELESS COMMUNICATION	

DECLARATION OF DR. ROBERT AKL

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

By: 

Dr. Robert Akl, D.Sc.

Date: January 5, 2023

I, Robert Akl, D.Sc., hereby state and declare:

1. I am over the age of 18 and am competent to make this Declaration. I have personal knowledge, or have developed knowledge, of these technologies based upon my education, training, and/or experience, of the matters set forth herein. If called upon to do so, I would testify competently thereto.

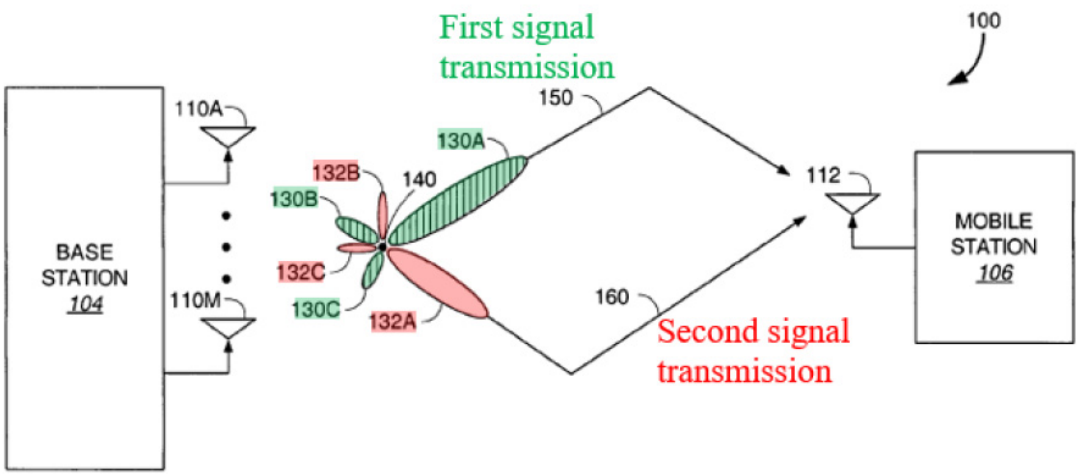
2. I have been retained by counsel for Petitioners Apple Inc. and HP Inc. (collectively "Petitioners"), in the above matter. I am submitting this Declaration to support Petitioners' Reply to Patent Owner's Response. I had previously submitted a Declaration (EX1003 – dated January 7, 2022) in the IPRs for 10,715,235 ("the '235 Patent").

3. In preparing this Declaration, in addition to the materials I reviewed for my prior Declaration (EX1003), I also reviewed the Patent Owner Response (Paper 14 or "POR") and Dr. Vojcic's declaration (EX2010) and his deposition transcript (EX1043), as well as the exhibits and other materials referenced herein.

4. Patent Owner ("XR") argues that: (1) it would have not been obvious to a POSITA to modify Burke's receiver antenna to be an antenna array with multiple antenna elements; (2) Burke does not teach or suggest receiving first and second signal transmissions at the first and second antenna elements, respectively; and (3) Burke does not teach or suggest that the two signal transmissions are received simultaneously. POR, 1, 2. I disagree.

5. Burke explicitly discloses the use of an antenna array at Burke's receiver and also explicitly discloses that signal transmissions are configured so that they are received simultaneously. EX1006, 5:18-20, 25:58-61, 7:66-8:2, 6:30-42, 5:54-55, 8:42-51.

6. In particular, Burke's FIG. 2 (reproduced below) explicitly depicts two signal transmissions being transmitted by and received from a remote station (base station 104). EX1006, 4:6-18. Burke discloses that **both the base station 104 and the mobile station 106, which includes antenna 112,** can use an array of antennas to communicate information with each other and other devices. EX1006, 25:58-61 ("antenna 112 (which may be a single antenna, or an array of diversity antennas for deploying diversity techniques known in the art)), 5:18-20 ("Alternative embodiments may deploy an array of antennas for antenna 360, or one or more antennas 110 may be shared for receive and transmit"); EX1003, ¶[84]. Like mobile station 106, base station 104 includes a receive antenna 360 that may be implemented as an array of antennas. EX1006, 25:58-61, 5:18-20. Moreover, Burke teaches that base station 104 "produces weights and delays that cause the **signals received** along the various M multipaths **to arrive simultaneously** and in-phase." EX1006, 7:66-8:2, FIG. 3. It would have been obvious to a POSITA that when Burke's disclosure is considered as a whole, Burke, by itself, renders claim feature [8a] **("*receiving a first signal transmission from a remote station via the first antenna element and a second signal transmission from the remote station via the second antenna element simultaneously*")** obvious.



EX1006, FIG. 2

7. To the extent that the use of two different antenna elements at the receiver is not explicitly described in Burke, in ¶¶[83]-[87] of my previous declaration (EX1003), I had explained that it would have been obvious, in Burke's antenna array, two signals would have been received at different antenna elements, namely a first antenna element and a second antenna element. This was not a hindsight or "common sense" determination, as XR alleges. POR, 2, 3. Rather, in disclosing that receiver antenna 112 can be implemented as "an array of diversity antennas for deploying diversity techniques" and similarly "one or more antennas 110 may be shared for receive,"[1] Burke suggests to

[1] Although antenna 110 refers to the antenna of the base station 104, a POSITA would have readily understood that Burke's disclosure that an array of antennas can be shared for receiving data similarly applies on the mobile station 106 when the mobile station 106

a POSITA that when an array of antenna elements is used to receive signals, two antenna elements in the array can be used for receiving two signal transmissions. EX1003, ¶¶[84]-[86].

8. In my previous declaration, I had also explained that such an understanding would have been similar to other known systems in the art, such as Hottinen, Walton, and Goldsmith. *Id.*; EX1011, 22-29; EX1012, 2:8-40, 20:50-22:21, FIG. 5; EX1017, 191-192. For instance, Hottinen describes M transmitting antennas transmitting beams to N receive antennas using, in some cases, different parallel beams optimized for different receive antennas (here, N and M can both equal 2). EX1011, 24-26. Walton's FIG. 5 (reproduced below) depicts two sets of receive antennas 552A and 552R in terminals 106A (highlighted in yellow) and 106B (highlighted in green), respectively, that are communicating with a base station 104 (highlighted in red). EX1012, 3:23-43, 21:42-22:20. For each terminal 106, a first receive antenna (*e.g.*, 552A) receives at least a first

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uses an array of antennas to receive data. Indeed, space-time diversity (*i.e.*, an example of a diversity technique) is one benefit of using diversity antennas, which are explicitly noted in Burke as being used by the mobile station 106. EX1006, 2:27-45, 25:56-67, Abstract. Space-time diversity allows for more robust communication between a base station and a mobile station by exploiting redundancy in multiple transmitted versions of a signal.

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