Court File No. A- 207 - 22
(T-952-20)

FEDERAL COURT OF APPEAL

B E T W E E N:

GOOGLE LLC

Appellant
(Plaintiff/Defendant by Counterclaim)

- and –

SONOS INC.

Respondent
(Defendant/Plaintiff by Counterclaim)

NOTICE OF APPEAL

TO THE RESPONDENT:

A LEGAL PROCEEDING HAS BEEN COMMENCED AGAINST YOU by the appellant. The relief claimed by the appellant appears on the following page.

THIS APPEAL will be heard by the Court at a time and place to be fixed by the Judicial Administrator. Unless the Court directs otherwise, the place of hearing will be as requested by the appellant. The appellant requests that this appeal be heard at Toronto, Ontario.

IF YOU WISH TO OPPOSE THIS APPEAL, to receive notice of any step in the appeal or to be served with any documents in the appeal, you or a solicitor acting for you must prepare a notice of appearance in Form 341 prescribed by the Federal Courts Rules and serve it on the appellant's solicitor, or where the appellant is self-represented, on the appellant, **WITHIN 10 DAYS** of being served with this notice of appeal.

IF YOU INTEND TO SEEK A DIFFERENT DISPOSITION of the order appealed from, you must serve and file a notice of cross-appeal in Form 341 prescribed by the Federal Courts Rules instead of serving and filing a notice of appearance.

Copies of the Federal Courts Rules information concerning the local offices of the Court and other necessary information may be obtained on request to the Administrator of this Court at Ottawa (telephone 613-992-4238) or at any local office.

IF YOU FAIL TO OPPOSE THIS APPEAL, JUDGMENT MAY BE GIVEN IN YOUR ABSENCE AND WITHOUT FURTHER NOTICE TO YOU.

~~September 30, 2022~~

Issued:
October 3, 2022

Issued by: Vanessa George

(Registry Officer)

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APPEAL

THE APPELLANT APPEALS to the Federal Court of Appeal from the Judgment of Justice Zinn dated July 26, 2022 in Federal Court File No. T-952-20 (the "**Judgment**").

THE APPELLANT ASKS THAT this Court:

1. Allow this appeal and reverse and/or set aside paragraph 1 of the Judgment;

2. Grant the Appellant's action in T-952-20 and declare that Claim 7 (defined below) is valid and infringed;

3. Grant the Appellant its costs both in this Court and in the Court below;

4. Grant such further and other relief as this Honourable Court may find just.

THE GROUNDS FOR THIS APPEAL are as follows:

A. Background Regarding the Sonos Devices

1. In the below action, the Plaintiff, Google LLC ("**Google**"), commenced a claim for patent infringement against the Defendant, Sonos Inc. ("**Sonos**"), for infringement of Canadian Letters Patent No. 2,545,150 entitled "Method and Apparatus for Adaptive Echo and Noise Control" (the "**150 Patent**"). The action was subsequently limited only to infringement of claim 7 of the 150 Patent ("**Claim 7**") (para. 1).[1]

2. Sonos commenced a counterclaim for invalidity of the 150 Patent, which was also subsequently limited only to invalidity of Claim 7 (para. 1).

3. Google claimed that five of Sonos' smart speakers (the "**Sonos Devices**"), which are configured to use third party voice assistants that can recognize and

[1] All bracketed paragraph references are to the Judgment and Reasons issued July 26, 2022 unless indicated otherwise.

respond to a user's voice command, infringe Claim 7. The Sonos Devices employ the "Sonos Voice Pipeline" to receive and transmit a clean audio signal to the voice assistants (paras. 17, 22).

4. The focus of the Sonos Voice Pipeline is to address echo — the part of the signal caused by the sound coming from the Sonos Devices' speakers being picked up by the microphones — and noise — any undesired part of the signal, which in the case of the Sonos Devices is anything other than the user's voice (paras. 22-26).

5. The Sonos Voice Pipeline processes audio signals using microphones, speakers, and other processing steps that are effected through computer source code. When a microphone on the Sonos Devices receives an audio input signal, it passes through several processing steps or "blocks" that are active or inactive depending on whether there is self-sound coming from the speakers (such as music or the "beep" sound that plays when a user says a "wake word" designed to prompt the voice assistant to respond) (paras. 23-24).

B. Procedural History

6. The parties agreed to bifurcate issues of liability and damages. The issues before the Court were therefore (1) the proper construction of Claim 7; (2) whether Sonos directly or indirectly infringed Claim 7; and (3) whether Claim 7 is invalid because its subject matter was obvious to the person of skill in the art (para. 6).

7. The trial in this action occurred in June 2022. Through Confidential Judgment and Reasons dated July 26, 2022, the trial judge dismissed Google's action and Sonos' counterclaim, finding that Claim 7 was valid but not infringed by use of the Sonos Devices.

8. Google appeals the trial judge's determinations on construction and infringement.

C. Summary of the Trial Judge's Relevant Conclusions[2]

9. The only claim before the trial judge was Claim 7 of the 150 Patent. The claim reads as follows:

> 7. An electronic device, comprising:
>
> an audio input configured to receive a received signal;
>
> an audio output configured to output an output signal;
>
> a transceiver configured to transmit a transmitted signal; and
>
> an adaptive echo and noise control system coupled to the audio input, the audio output, and the transceiver, the adaptive echo and noise control system including
>
> an echo canceller; and
>
> a noise suppressor,
>
> wherein the adaptive echo and noise control system is configured to adaptively determine an order of echo cancellation and noise suppression based on an amount of noise in the received signal to generate a desired signal, and

10. The trial judge made the following findings that are relevant to this Appeal.

i. Construction

11. **"Echo Cancellation"**: The trial judge determined that the disagreement between the experts as to what is meant by "echo cancellation" was largely motivated by the question of whether "echo cancellation" and "noise suppression" are mutually exclusive terms (para. 47).

12. Based on this understanding of the disagreement and his review of the experts' opinions on the meanings of echo and noise, the trial judge held that "echo cancellation" and "noise suppression" are meant to be two distinct and mutually exclusive processes (para. 50).

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[2] Given that this was a bifurcated action, the trial judge made no findings as to remedy.

13. **"Noise"**: The trial judge agreed with Sonos' view that "while echo is, strictly speaking, a type of noise, the way these terms are used in the 150 Patent indicates that they are to be treated as distinct processes." He stated that "[o]n a purposive reading of the claims of the 150 Patent, it is clear that "noise suppression" and "echo cancellation" are meant to be two distinct and mutually exclusive processes." (paras. 49-50)

14. The trial judge then found that this interpretation of those terms is further supported by the disclosure of the 150 Patent, and "[t]hroughout the disclosure, echo is always treated as a separate and distinct phenomenon from noise." He therefore concluded that "noise" must be construed as "noise other than echo" (paras. 51-52).

15. **"Adaptive" and "Adaptively determine"**: The trial judge reviewed the constructions set out by the experts and held that the term "adaptive" "suggests some degree of automatic response" and excludes changes triggered by user command (paras. 57-58).

16. The trial judge offered the example of a lightbulb: "A lightbulb that changes brightness as the sky gets darker is adaptive; a lightbulb with a dimmer switch is not." (para. 57)

17. **"An order"**: The trial judge determined that to have "an order of echo cancellation and noise suppression", both functions must be performed in a sequence. "This means that the device of Claim 7 must have at least two operating states that include both noise suppression and echo cancellation, with the sequence of echo cancellation and noise suppression in those states being different." (para. 64)

ii. Validity

18. The trial judge determined that Claim 7 of the 150 Patent was not obvious and was valid (para. 106).

iii. Infringement

19. The trial judge determined that the Sonos Devices do not directly infringe the 150 Patent because "out of the box, the Sonos Voice Pipeline is not used at all. There is therefore no echo cancellation or noise suppression, nor any received signal." (para. 65)

20. The trial judge held that if there is an act of infringement by an end user of the Sonos Devices, Sonos would be found to have induced the infringement because Sonos influences users to enable voice assistant; would know that in response to its influence a user is likely to enable the assistant; provides the Sonos Voice Pipeline to its users and provides links in its user manuals to learn more about setting it up; and advertises that the Sonos Devices are compatible with voice assistant (para. 69).

21. The trial judge therefore considered whether a user, when using the Sonos Devices configured to use the Sonos Voice Pipeline, would infringe Claim 7 of the 150 Patent.

22. The trial judge concluded that a user would not infringe Claim 7. He did so based on an application of his construction of Claim 7 to the four "states" of operation of the Sonos Devices presented by Google's expert, Dr. Kyriakakis (paras. 71-72). The trial judge concluded that none of the states contain the requisite elements of Claim 7 as construed, for three reasons:

a) States 1 and 4 (in both of these, the Sonos Devices are powered on and not playing any self-sound from the speakers) do not involve the presence of both echo cancellation and noise suppression and do not involve any adaptive determination of an order, because the term "order" as construed requires both echo cancellation and noise suppression to be present and performed in a sequence (para. 76).

b) States 2 (in which the Sonos Devices are playing a "beep" sound from the speakers because the voice assistant wake word

has been detected) and 3 (in which the Sonos Devices are playing music or other content from the speakers) are identical because the order is always noise suppression → echo cancellation → noise suppression and therefore there is no change in order between them (paras. 77-78).

c) The triggering event that causes a transition from one state to another is "user-controlled or done in a pre-determined manner" and therefore does not comprise the claim element of "adaptive" determination (para. 80).

D. The Appeal

i. Reviewable Errors Regarding Construction

23. The trial judge committed reviewable errors of law in arriving at his construction of Claim 7 of the 150 Patent. The trial judge made errors of law by failing to properly construe the terms "echo cancellation", "noise", "order", and "adaptive".

24. Without limiting the generality of the foregoing, the trial judge made the following specific errors of construction.

25. **Failing to Consider the Pertinent Construction Issue**: It was Google's position that the term "echo cancellation" referred to a method of reducing echo in the received signal and was not limited to echo cancellation achieved by a particular method (i.e., by use of a reference signal to model and 'cancel' the acoustic echo path, as urged by Sonos). This issue was engaged by the closing briefs of both Google and Sonos.

26. Instead of considering this construction issue, the trial judge focused upon whether echo cancellation and noise suppression are mutually exclusive functions (paras. 47-52).

27. The trial judge's focus on this issue caused him to overlook and ultimately not decide whether the broad term "echo cancellation" encompassed any method of reducing echo in the received signal, or whether it should be narrowed to only embrace echo cancellation achieved by a single method. The failure to decide this issue was an error.

28. **Reading in Limitations to the Claim**: While the trial judge did not explicitly adopt a construction that narrowed the claim term "echo cancellation" to only a specific method of reducing echo, it is possible that he did so either implicitly or inadvertently as he later determined that a function within the Sonos Voice Pipeline did not perform echo cancellation (see paras. 77-78).

29. If he did so, this was an error in that such a construction narrows the language of Claim 7 of the 150 Patent in a manner that is not supported by the claim language, or indeed, the 150 Patent in its entirety.

30. Additionally, the trial judge's construction reads into Claim 7 an additional requirement that "adaptive" must be wholly independent of user involvement (paras. 57-58), and that an "order" of two items requires the occurrence of both of them, one after another, rather than various orders (paras. 59-64). Claim 7 does not include these additional limitations on triggering events that may precede an "adaptive" determination or the types of "orders" that would fall within the claim.

31. **Offending the Principles of Claim Differentiation and Creating Redundancy**: Claims are not to be read as being redundant of each other, and claims should be compared with each other as an aid to construing them. The trial judge's implicit construction of "echo cancellation" as only including a specific method of reducing echo offends the principles of claim differentiation and avoiding redundancy. Claim 8 of the 150 Patent is dependent on Claim 7 and contains the very limitation the trial judge may implicitly have read in to the claim element. The trial judge did not consider Claim 8 in construing Claim 7. On the trial judge's implicit

construction of “echo cancellation”, Claim 7 and Claim 8 would be identical and redundant.

32. **Improper Recourse to the Disclosure**: Before anything else in a patent suit, construction of the claims is to be done once, for all purposes, through the eyes of a skilled person, imbued only with their common general knowledge (*i.e.*, knowledge that is generally known and accepted without question by the bulk of those who are engaged in the particular art) and not with any extrinsic evidence or any evidence of the subjective intentions of the inventor(s).

33. The trial judge held that “[r]eference may be had to the disclosure in order to understand or confirm what the claims say” (para. 44), even though the experts agreed none of terms in Claim 7 were ambiguous (para. 40). While recourse to the disclosure is, of course, appropriate for some purposes, absent an ambiguity, it is not appropriate so as to allow the scope or ambit of a claim to be varied.

34. The trial judge fell into error by using the disclosure to narrow the scope of Claim 7, with respect to the terms “echo cancellation”, “order” and “noise”, in the absence of a finding that any of these terms would have been ambiguous to a skilled person.

ii. Reviewable Errors Regarding Infringement

35. In addition to the errors described above with respect to construction, the trial judge committed reviewable errors of law and/or palpable and overriding errors in finding that Sonos did not infringe Claim 7.

36. Without limiting the generality of the foregoing, the trial judge made the following specific errors in his infringement analysis.

37. **Incorrect and Incomplete Analysis of the Function of the Sonos Devices**: As a result of the trial judge’s construction error above, wherein he did not address whether “echo cancellation” refers to *any* method to reduce or mitigate echo or

instead refers only to a *specific* method that uses a reference signal to model acoustic echo, he did not address this issue in his infringement analysis.

38. This failure to consider the variety of methods by which echo cancellation can be performed led the trial judge to determine that a disputed function in the Sonos Voice Pipeline only ever performs noise suppression (and not echo cancellation) (para. 78).

39. The trial judge devoted only two paragraphs to the characterization of this function in the Sonos Voice Pipeline, which do not reference or consider this function's performance in reducing echo at all. The trial judge reasoned: "I prefer the evidence of Dr. Johnson as to the third step in State 3. Step 3 is performed by a [redacted], which Dr. Johnson says is a well-known method of noise suppression." The trial judge then quoted a passage from Dr. Johnson's expert report that also does not consider the function's performance in reducing echo and indicated Dr. Johnson's view that only methods that "model the acoustic echo path" constitute echo cancellation (para. 78).

40. The trial judge thereby performed an infringement analysis with respect to the claim element "echo cancellation" that either did not first construe the crucial aspect of the claim element, or that implicitly accepted an incorrect construction. This is an error of law as set out above with respect to construction, and leads to a palpable and overriding error in the trial judge's conclusions on infringement.

41. If echo cancellation refers to methods of reducing or mitigating echo and can be performed by methods *other* than use of a reference signal to model acoustic echo, as urged by Google and supported by the evidence of Dr. Kyriakakis, then the disputed function in the Sonos Voice Pipeline can perform echo cancellation in certain instances.

42. **Incorrect Application of Construction of "Adaptive" to Sonos Devices**: The trial judge also erred in failing to correctly apply his own construction of "adaptive" to the Sonos Devices when performing his infringement analysis.

43. In construing the term "adaptive", the trial judge offered the example of a lightbulb that changes brightness as the sky gets darker as a determination that *would be* adaptive. On the other hand, a lightbulb with a dimmer switch that a user must control would not be adaptive.

44. The Sonos Voice Pipeline operates in the exact same manner as the first lightbulb example offered by the trial judge. Google adduced evidence establishing that it is not a user controlling a "dimmer switch" that prompts the Sonos Devices to switch between states, it is the source code within the Sonos Devices that recognizes the presence or absence of self-sound. The user plays no more role than the darkening sky in the trial judge's example.

45. The trial judge therefore erred by failing to recognize that, even on his own construction of the terms "adaptive" and "adaptively determine", the Sonos Devices contain this claim element, because no user involvement is involved in the adaptive determination process implemented by the Sonos Voice Pipeline.

46. **Mistaken Criticisms of Google's Expert**: It was an error of law and/or a palpable and overriding error for the trial judge to discount the expert evidence of Dr. Kyriakakis on infringement on the basis of two factually incorrect premises.

47. First, the trial judge stated that "Dr. Kyriakakis in his report and testimony relied, to some extent, on [the expert report of Robert S. Plachno]. To the extent that he relied on any portions of the Plachno Report not agreed upon by the parties, the evidence is inadmissible." (para. 9)

48. It is not the case that Dr. Kyriakakis relied on Mr. Plachno's evidence; rather, for ease of reference in his report, Dr. Kyriakakis referred on several occasions to Mr. Plachno's evidence and adopted his statements as Dr. Kyriakakis' own.

49. Second, the trial judge held that because Dr. Johnson reviewed the entirety of the source code comprising the Sonos Voice Pipeline and Dr. Kyriakakis reviewed portions requested by Mr. Plachno, "where there is a difference between the two experts relating to the Sonos Source Code, I prefer the evidence of Dr. Johnson" (para. 11). There were, in fact, no disagreements between Dr. Kyriakakis and Dr. Johnson in respect of the Sonos source code. Rather, the experts disagreed in respect of how certain blocks should be *characterized* as echo cancellation or noise suppression, not how they operate in the source code.

50. To the extent the trial judge's mistaken criticisms of Google's expert influenced his decision that the Sonos Voice Pipeline operates the same way in States 2 and 3, this is an error of law and/or a palpable and overriding error.

51. Google relies on such further and other grounds as counsel may advise and this Honourable Court may permit.

52. Google proposes that the Appeal be heard in Toronto, Ontario.

DATED: September 30, 2022

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