

IN THE UNITED STATES DISTRICT COURT
COUNTY OF FOR THE DISTRICT OF DELAWARE

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APPLE, INC., :
Plaintiff, :
: CASE.:
-against- : 1:22-cv-01377-UNA
MASIMO CORPORATION AND :
SOUND UNITED, LLC, :
Defendants. :
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VIDEOTAPED DEPOSITION OF
DR. STEVEN WARREN
NEW YORK, NEW YORK
January 23, 2024

REPORTED BY: KIARA MILLER

DIGITAL EVIDENCE GROUP
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1 Deposition of DR. STEVEN WARREN, taken on
2 behalf of PLAINTIFF, at 230 Park Avenue, New
3 York, New York, commencing at 9:06 a.m.,
4 January 23, 2024, before Kiara Miller.

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1 A P P E A R A N C E S:

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21 ALSO PRESENT:

22 VIDEOGRAPHER, DREW CERRIA

1 same context that the word "generic" is used
2 here seems like a misnomer. I can't match
3 the two semantically.

4 Q What is a raw signal?

5 MS. KRINGSTEIN: Objection. Vague.

6 A Are you asking me in the context of a
7 signal in an instrumentation system?

8 Q Sure. What's a raw signal in the
9 context of an instrumentation system?

10 A So in the context of an instrumentation
11 system or a biomedical sensing system, a raw
12 signal is a signal that has not been
13 processed or changed in a manner that has
14 changed its frequency components.

15 Q Is a digital signal a raw signal?

16 A It can be.

17 Q Is a signal converted from analog to
18 digital a raw signal?

19 A I would say a signal converted from
20 analog to digital via an A/D converter, for
21 example, is a processed signal.

22 Q Why?

1 A Because when you take an
2 analog-to-digital converter and you convert
3 an analog signal to a digital representation,
4 that involves a sampling operation. And the
5 sampling operation itself processes the
6 signal. It determines what frequencies now
7 are representable in the signals downstream
8 and which frequencies are not representable
9 in the versions of that signal downstream.

10 Q So in your opinion a signal converted
11 from analog to digital is not raw?

12 A My statement was that a signal is
13 converted from an analog signal to a digital
14 signal, via an A/D converter, is no longer a
15 raw signal because that signal has been
16 processed and sampled.

17 Q Is there any other way of converting an
18 analog-to-digital signal other than an A/D
19 converter?

20 A There are other ways of converting
21 analog signals to digital signals through
22 circuits like simple comparators. But in

1 that case, the nature of the signal changes,
2 and you essentially are then processing the
3 signal.

4 Q So is there any way to change an analog
5 signal to a digital signal where it's still
6 raw at the end of it?

7 A I cannot think of a mechanism offhand as
8 we sit here where you convert an analog
9 signal to a digital signal without then
10 changing the signal's frequency content, so I
11 don't have a clear answer on that one. But I
12 think generally when you change an analog
13 signal into a digital signal, you change the
14 nature of the signal; and you, therefore,
15 process it.

16 Q So sitting here today, you can't think
17 of a way that you can convert an analog
18 signal to a digital signal and have the
19 signal still be raw, correct?

20 A That's a tricky, hypothetical question.
21 Because some sensors, by their nature, appear
22 to be analog when they really are digital. A

1 good example of that is a photodiode. It
2 accepts packets of light with discreet energy
3 levels and converts those into discrete
4 numbers of electrical entities, which are
5 electrons. So by nature it's a digital
6 device, but it appears analog.

7 Q The signal of the photodiode produces an
8 analog, correct?

9 A No, that's what I just said. By nature
10 a photodiode is -- you can see it as a
11 discrete device if you see light as photons
12 or packets. Each packet of energy is
13 absorbed by the device, and that's converted
14 to a digital packet of electrons that are
15 then made available to the circuit.

16 Q Is the electrical signal produced by a
17 photodiode analog?

18 A We describe it as being analog, but at a
19 fundamental level it -- it can be represented
20 as a digital signal.

21 Q Do you convert photodiodes' electrical
22 signals to digital with an A/D converter when

1 building a pulse oximeter?

2 A If a photodiode produces a signal and
3 that signal is in the form of either current
4 or voltage versus time and you send that
5 signal to an analog-to-digital converter,
6 which samples it and then produces discrete
7 levels based on the original signal, you
8 process the signal.

9 Q Can you go to your Rebuttal Report at
10 page 270.

11 A I'm with you.

12 Q Can you go to page 275.

13 Can you see where it says the heading B,
14 "There are multiple alternatives that do not
15 infringe the asserted Masimo patents"?

16 A Yes.

17 Q And the asserted Masimo patents you're
18 referring to in that heading are the '223,
19 '507 and '911 patents, correct?

20 A Yes.

21 A You don't offer any opinions on
22 noninfringing alternatives for the '743 or