Page 1

1 IN THE UNITED STATES PATENT AND

2 TRADEMARK OFFICE

3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4 --X

5 SAMSUNG ELECTRONICS CO., LTD;

6 and SAMSUNG ELECTRONICS AMERICA, INC.,;

7   Petitioners,

8   - against -

9 AFFINITY LABS OF TEXAS, LLC

10   Patent Owner.

11 Case IPR2014-01181

12 Patent 8,532,641 B2

13 --X

14   1211 Avenue of the Americas
New York, New York

15   April 17, 2015
        9:30 a.m.

16

17

18   Deposition of Expert Witness SCHUYLER

19 QUACKENBUSH, PhD, taken pursuant to Notice, before

20 Rita Persichetty, a Notary Public of the State of

21 New York.

22

23

24

25

Page 2

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

2

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9   - and

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24

25 ALSO PRESENT: MARILYN WOLF

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1 ----------------- I N D E X ------------------

2 WITNESS   EXAMINATION BY   PAGE

3 SCHUYLER QUACKENBUSH   MR. SCHULTZ   4

4

5

6 --------------- E X H I B I T S ---------------

7 EXHIBIT   DESCRIPTION   FOR I.D.

8   (No exhibits marked)

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1 S C H U Y L E R   Q U A C K E N B U S H,

2   called as a witness, having been sworn

3   by the Notary Public, was examined and

4   testified as follows:

5 EXAMINATION BY

6 MR. SCHULTZ:

7   Q   Good morning Dr. Quackenbush, how are

8 you today?

9   A   I'm fine, thank you.

10   Q   We've had a couple of depositions

11 before, so I'm not going to go over the general

12 ground rules and I'm assuming you're generally

13 familiar with them, correct?

14   A   I am, thank you.

15   Q   Is there any reason you can't testify

16 truthfully today?

17   A   There is none.

18   Q   And you understand you're here at

19 this deposition based on your declarations in

20 several IPR proceedings on the, what I'll call

21 the '641 patent?

22   A   I do understand that.

23   Q   And in front of you, I've already set

24 forth Exhibit 1001 which is the '641 patent.

25 And then if you want to just look through the

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1 stack real quick here, I'll kind of look over
2 here.
3   Then I believe are your three
4 declarations, one is Exhibit 1023, 1123 and
5 1223. They're marked at the bottom --
6   A   That is correct, I see them.
7   Q   Okay. And those were the exhibits
8 1023, 1123 and 1223 are your declarations that
9 you submitted as against the '641 patent,
10 correct?
11   A   That is correct.
12   Q   And do those declarations set forth
13 all of the opinions that you have as to the
14 '641 patent?
15   A   All as of this time, yes, they do.
16   Q   What do you mean as of this time?
17   A   Well, it may be that I'll express
18 some additional information at this deposition
19 but they express all my opinions that I formed
20 with respect to the report.
21   Q   And do those declarations have all of
22 the supports and reasons for your opinions that
23 you express in those declarations?
24   A   So they have support for my opinions
25 I may say a -- and they have cited references

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1 so I may bring to you additional cites in those
2 references at this deposition.
3   Q   Is there any reason you couldn't have
4 provided those cites when you signed those
5 declarations?
6   MS. HONG: Objection.
7   A   No reasons, but in order to give you
8 the best possible answer I may choose to bring
9 forward additional citations to support my
10 opinion.
11   Q   And those citations would not be what
12 is in your declarations?
13   MS. HONG: Objection.
14   A   So my opinions are expressed and
15 they're supported in my report, but I may feel
16 that to bring greater clarity I may -- I
17 reserve the privilege to direct you to
18 additional citations in the references.
19   Q   Now, you can pick any one of them.
20 In the back of them you have your CV, right?
21   A   I see that.
22   Q   Is that CV as current as of whenever
23 you executed those declarations?
24   A   Yes.
25   Q   You can refer to your CV if you need

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1 to but I'll ask you a few questions as to just
2 your general background and experiences, okay?
3   A   Sure.
4   Q   Do you have any experience in
5 designing cellphones?
6   A   Well, I worked for the phone company
7 for a number of years. And the phone company
8 had at that time, that is to say AT&T, I worked
9 at Bell Laboratories, had as a component of its
10 business a cellphone division. And so as a
11 researcher I was charged with inventing
12 technology that may be applicable to that
13 business.
14   Q   All right. But I'm asking solely on
15 your experience, not Bell Lab's.
16   A   Uh-huh.
17   Q   Do you have any experience at Bell
18 Labs or other where you were tasked with
19 designing the hardware of a cellphone?
20   A   So a cellphone is composed of
21 hardware and software and it's not as if one
22 person builds a complete cellphone.
23   So although you ask about hardware, I
24 think that the bigger picture is that a
25 cellphone is composed of hardware platform that

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1 runs software modules. Some functions are
2 executed totally in hardware some functions are
3 software.
4   And in this respect yes, I was
5 working on software that is directly applicable
6 to cellphones, so for example, at Bell Labs I
7 worked on audio coding. I worked to
8 standardize audio codecs. The result was
9 ISO/IEC MPEG advanced audio coding.
10   I worked and contributed to that
11 standardization effort, decoder software. I
12 wrote the software module for that audio
13 decoder. And I worked hard to make it very
14 efficient.
15   So in something like a cellphone,
16 which is a portable device, software efficiency
17 is very important because you want to minimize
18 processor resources, which directly correlates
19 to battery. Or another way the more -- the
20 less efficient the software, the lower lifetime
21 of battery.
22   So my point is, I directly took a
23 part in standardizing that algorithm and
24 writing the software. And that algorithm is
25 now standardized in almost every cellphone

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1 **worldwide. More than 8 billion cellphones**
2 **worldwide have my work in it, so in this**
3 **respect I say the answer is, yes.**
4   Q   Okay. My question was simply the
5 selection of hardware, okay, so I want to focus
6 on that.
7   Were you involved in or have any
8 experience in the selection of hardware for
9 cellphones?
10   MS. HONG: Objection.
11   A   So a cellphone is a hardware
12 platform, portable but I have deep experience
13 in embedded systems. So, often cellphone has
14 an embedded processor, it might have a digital
15 signal processor. I have years of experience
16 programming digital signal processors.
17   And I've built hardware platforms
18 with digital signal processors all about the
19 theme of seeing whether the technology that I'm
20 working on is appropriate for -- for example
21 telephone use, be it wired or wireless.
22   Q   My question is just simply, were you
23 involved or have any experience in the
24 selection of hardware for cellphones?
25   MS. HONG: Objection asked and

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1   answered.
2   A   So in terms of, so what are the
3 components of a cellphone? One might be a
4 digital signal processor. So my answer to your
5 question is yes, I worked on selecting digital
6 signal processors that are often made into the
7 algorithms they run, that would be appropriate
8 for cellphone use.
9   So AT&T built digital signal
10 processors which were used very widely in AT&T
11 product line for cellular communication.
12   Q   So you don't have any experience in
13 selecting hardware for cellular phones?
14   MS. HONG: Objection.
15   A   I do, I just answered that question.
16   Q   No, you answered about other
17 components that could be embedded in a
18 cellphone which wasn't what my question was.
19   My question was simply, were you ever
20 tasked with the responsibility or part of a
21 team that was involved in selecting the
22 hardware to be in a cellphone?
23   MS. HONG: Objection.
24   A   In my opinion, yes.
25   Q   Which product would that be?

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1   A   The selection would be the AT&T
2 DSP-16 signal processors as a component
3 appropriate for use in cellphone.
4   Q   What cellphone is that incorporated
5 in?
6   A   **I don't recollect but it could be in**
7 **any one of the products or maybe no product,**
8 **because in research it's not clear that things**
9 **make it to the market.**
10   Q   So it could be in none?
11   MS. HONG: Objection.
12   A   It could be in many, it is not my
13 purview. I recommend, but it may not be that
14 recommendation is accepted.
15   Q   You don't have any experience in
16 selecting the screen size in a cellular phone,
17 correct?
18   MS. HONG: Objection.
19   A   So I have personally built products
20 with screens.
21   Q   But my question was, have you ever
22 been involved or experience in selecting the
23 screen size in a cellphone?
24   MS. HONG: Objection.
25   A   I have not specified screens, I've

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1 specified screens for other portable products
2 but not cellphones.
3   Q   You don't have any experience in
4 selecting wireless transceivers to be put in
5 cellular telephones, correct?
6   MS. HONG: Objection.
7   A   So my understanding is of course you
8 can build any prototype cellphone but the
9 transceivers are largely adherent to what is
10 international standards, not even de facto
11 standards. So the selection, that may be
12 selection of a chip set, but the selection of
13 the protocol is not a design issue frankly.
14   Q   My question was not to design, not
15 the protocol. My question was, were you ever
16 involved in the selection of the wireless
17 transceivers that would be put in a cellular
18 telephone?
19   MS. HONG: Objection.
20   A   So can you clarify, what does it mean
21 the wireless transceiver?
22   Q   Are you familiar with the term
23 wireless transceiver?
24   A   **But what does your question mean,**
25 **does it mean I specify a TI part number?**

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1   Q   Have you -- we can even go higher.
2 Have you ever been involved in the selection
3 process of choosing the cellular telephone have
4 a Wi-Fi transceiver in the cellular telephone.
5   MS. HONG: Objection.
6   A   I've certainly used Wi-Fi.
7   Q   Not my question. My question was,
8 have you ever been involved or experienced in
9 selecting a Wi-Fi transceiver to be placed in a
10 cellular telephone?
11   MS. HONG: Objection.
12   A   So I would answer I have deep
13 experience in embedded systems and so my
14 relevant experience I think is very applicable
15 to this matter.
16   Q   Again, not my question. My question
17 was, do you have any experience in selecting a
18 Wi-Fi transceiver to be placed in a cellular
19 telephone?
20   MS. HONG: Objection.
21   A   I have deep experience in embedded
22 systems with various kinds of wired and
23 wireless interfaces, but none of those involved
24 cellular modems or cellular telephone.
25   Q   And likewise, you have no experience

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1 in selecting a local area network transceiver,
2 such as a Bluetooth transceiver, to be placed
3 in a cellular telephone, correct?
4   MS. HONG: Objection.
5   A   So I have deep experience in embedded
6 systems and deep experience using various kinds
7 of communication protocols and hardware.
8   Q   Again, you're not answering my
9 question. My question was, do you have any
10 experience in selecting local area network
11 transceivers, such as Bluetooth, to be put in a
12 cellular telephone?
13   MS. HONG: Objection.
14   A   So your question has two components.
15 Do I have experience selecting local area
16 transceivers the answer is, yes.
17   Q   No, that would be two separate
18 questions.
19   **A   Now concerning the conjunction in a**
20 **cellular telephone; is that what you asked?**
21   Q   That's correct.
22   **A   So the platforms in which I designed**
23 **were embedded platforms, not specifically**
24 **cellular telephones, but the technology and the**
25 **understanding I think applies.**

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1   Q   My question is just simply --
2   **A   No, I answered the question.**
3   Q   My question is simply, you do not
4 have any experience in selecting a local area
5 transceiver to be used in a cellular telephone.
6   MS. HONG: Objection.
7   A   I believe I've answered the question,
8 would you like the court reporter to read it
9 back?
10   Q   No, I would like you to answer my
11 question.
12   MS. HONG: Objection.
13   A   So I have deep experience in embedded
14 systems using transceiver technology. And I
15 think that is applicable to this matter, and to
16 my understanding of how it would be used in a
17 cellular telephone.
18   Q   But none of those embedded systems
19 that your talking about were a cellphone
20 telephone, correct?
21   MS. HONG: Objection.
22   A   They could have been. I'm not -- so
23 they could have been, my work has been in
24 research not product development.
25   Q   That would include not doing a

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1 product development of cellular telephones,
2 correct?
3   MS. HONG: Objection.
4   A   As a product. But of course as I
5 said before, I have deep experience in doing
6 technology that is an inextricable part of
7 cellphones, as cited in my audio coding
8 experience and also my embedded hardware system
9 experience.
10   Q   But you don't know one way or the
11 other if it was or was not in a cellular
12 telephone?
13   MS. HONG: Objection.
14   A   The point I'm making is that my
15 background and experience I think fully permits
16 me to understand design tradeoffs as
17 appropriate to a cellular telephone or portable
18 platform device, irrespective of whether I
19 actually was on a team to build that device.
20   Q   Now I understand that that's your
21 belief. I'm simply asking for the experiences
22 where you perhaps may have or may not have done
23 certain things.
24   **A   Okay.**
25   Q   That's all I'm asking you, so I'm not

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1 asking about your general background or
2 history. What -- I'm just trying to find out
3 if you have some experiences in these various
4 discreet questions that I'm asking.
5   MS. HONG: Objection.
6   Q   Okay. So do you have any experience
7 in the selection of a power source for a
8 cellular telephone?
9   MS. HONG: Objection.
10   A   If in respect to batteries some
11 peripheral experience, yes.
12   Q   What was that?
13   **A   Just building portable devices and**
14 **having batteries in them.**
15   Q   I'm focusing on cellular phones, were
16 those portable devices that you're talking
17 about cellular phones?
18   MS. HONG: Objection.
19   A   So let me reiterate to answer your
20 question but I'm going to qualify it. So I
21 have deep experience in embedded systems and I
22 feel that I have a good appreciation of the
23 issues that pertain to rendering opinions on
24 the '641 patent.
25   However, to your question, I was not

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1 on a team that designed a cellular telephone.
2 But nevertheless, as I stated, I feel I
3 understand the issues.
4   Q   Do you have any experience where you
5 were involved in the selection of certain
6 processes to be performed in software versus
7 performing those processes in a hardware in a
8 cellular telephone?
9   MS. HONG: Objection.
10   A   Yes, I do.
11   Q   What are those experiences?
12   **A   As I said earlier in my statements, I**
13 **have deep experience in for example, audio**
14 **coding algorithms, and I've had recommendations**
15 **and discussions with product groups to**
16 **understand and to advise how those functions**
17 **would be realized in a telephone platform.**
18   Q   What functions were those?
19   **A   For example, audio coding functions.**
20   Q   Anything else?
21   **A   Concern -- well, also speech coding**
22 **functions, so concerning phones in general**
23 **speech coding functions are typically**
24 **paramount. And concerning the '641 patent**
25 **audio coding functions are paramount, so I**

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1 **think I really have deep expertise in this**
2 **area.**
3   Q   But were you involved in whether or
4 not you were going to execute those commands by
5 hardware or software in the cellular telephone?
6   MS. HONG: Objection.
7   A   Yes, I made specific recommendations.
8   Q   Such as?
9   **A   That it would be best to execute the**
10 **functions in software.**
11   Q   And why was that?
12   **A   Well --**
13   MS. HONG: Objection.
14   A   -- the data rates in audio coding are
15 such that they are amenable to software --
16 realization of software. And if you instead
17 realized them in hardware, you may find that
18 that hardware has significant idle time because
19 the data put through rate is not that high.
20   Q   What product was this experience in?
21   MS. HONG: Objection.
22   A   So I had a liaison with the group
23 doing telephony and cellular telephony and I
24 made my report to them.
25   Q   Were they doing both telephony and

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1 cellular telephony or is it just telephony?
2   MS. HONG: Objection.
3   A   I don't recollect. In the case of
4 voice communications it would be applicable to
5 both.
6   Q   But you don't know one way or the
7 other that decision to run the audio codec and
8 software was for a cellular phone versus a
9 handheld -- a landline phone?
10   MS. HONG: Objection.
11   A   I believe it was cellular but I don't
12 recollect.
13   Q   Okay. Do you have any experience in
14 designing cellular telephones to use Bluetooth?
15   MS. HONG: Objection.
16   A   So my understanding is, Bluetooth is
17 a kind of wireless communication device and
18 looking at the references I cited, and you can
19 go there if you wish, Bluetooth was emerging at
20 the time of, let's say 2000 and had very wide
21 industry support.
22   And Bluetooth in its first inception,
23 is offered as integrated circuit products
24 because many of these companies, TI for
25 example, are chip making companies. So

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