

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

3

4 APPLE INC.,

5 Petitioner,

6 v.

Case No.: IPR2024-01048

7

U.S. Patent 10,547,648

8 S.M.R INNOVATIONS LTD

9 AND Y.M.R TECH LTD,

10 Patent Owners.

11

12 VIDEOTAPED DEPOSITION

13

14

15 WITNESS: SAFYE KIAEI, PH.D.

16 DATE: Monday, September 10, 2025

17 START TIME: 11:27 a.m. ET

18 END TIME: 12:40 p.m. ET

19 REMOTE LOCATION: Remote Legal platform

20 PROCEEDINGS OFFICER: Michelle Clark, CER-4440

21 JOB NO.: 40211

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1 INDEX OF TESTIMONY

2

3 EXAMINATION OF SAFYE KIAEI: PAGE

4 By Mr. Alexander 7

5 By Mr. Hart 37

6

7

8

9

10

11

12

13

14

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16

17

18

19

20

21

22

23

24

25

1 INDEX OF EXHIBITS

2 (available for download)

3

4 EXHIBIT DESCRIPTION PAGE

5 1 Excerpts from Webster's New World 10

6 Computer Dictionary

7 2 HomeRF/SWAP: A Wireless Voice and 37

8 Data System for the Home Article

9

10

11

12

13

14

15

16

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18

19

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1 P R O C E E D I N G S

2 THE PROCEEDING OFFICER: Good morning.

3 We are now on the record. Today's date is September the
4 10th, 2025, and the time is approximately 11:27 a.m.
5 Eastern Time.

6 My name is Michelle Clark, and I'm the
7 officer designated by Remote Legal, 11 Broadway, Suite
8 468, New York, New York, to take the record of this
9 proceeding.

10 This is the deposition of Mr. Sayfe Kiaei
11 taken in the matter of Apple Inc., Petitioner, v. S.M.R
12 Innovations LTD, and Y.M.R Tech LTD, Patent Owners,
13 IPR2024-01048, U.S. Patent 10,547,648, filed in the
14 United States Patent and Trademark Office before the
15 Patent Trial and Appeal Board.

16 Would Counsels please identify themselves
17 for the record and state who you represent, starting
18 with the noticing attorney.

19 MR. ALEXANDER: Cortney Alexander for the
20 patent owners.

21 MR. HART: Paul Hart for Petitioner,
22 Apple. Also on the line is Kevin Rongish from my firm,
23 Erise IP, for Petitioner, Apple.

24 THE PROCEEDING OFFICER: Thank you.

25 This deposition is being taken remotely

1 on behalf of S.M.R Innovations LTD, et al, and is being
2 conducted pursuant to the procedural rules and laws
3 governing this matter.

4 As such, all parties agree to this means
5 of capturing the official record, which may include
6 recording by audio, audiovisual, and/or stenographic
7 means and agree not to oppose admissibility of the
8 testimony in this proceeding on the basis of the
9 personnel or method by which the testimony was captured.

10 Further, all parties agree that the
11 proceedings officer or person administering the oath may
12 be authorized to administer the oath under the rules
13 where they reside.

14 Do the parties so stipulate?

15 MR. HART: Yes.

16 THE PROCEEDING OFFICER: I didn't --
17 great. And, Mr. Alexander, I didn't hear you.

18 MR. ALEXANDER: Yes.

19 THE PROCEEDING OFFICER: Okay, great.
20 Thank you.

21 Witness, can you please state and spell
22 your name for the record?

23 MR. KIAEI: Good morning. This is Sayfe
24 Kiaei.

25 THE PROCEEDING OFFICER: And if you could

1 spell your name as well, please.

2 MR. KIAEI: S-A-Y-F-E K-I-A-E-I.

3 THE PROCEEDING OFFICER: Thank you. And
4 can you raise your right hand? Do you swear or affirm
5 to tell the truth, the whole truth, and nothing but the
6 truth?

7 MR. KIAEI: Yes, I do.

8 WHEREUPON,

9 S A Y F E K I A E I ,

10 having been called as a witness, being duly sworn by the
11 notary public present, testified as follows:

12 THE PROCEEDING OFFICER: Thank you.

13 Counsel, you may now begin.

14 EXAMINATION

15 BY MR. ALEXANDER:

16 Q Good morning, Dr. Kiaei. Did I catch that
17 right? Kiaei?

18 A Yes, sir. You did. Thank you, Mr. Alexander.

19 Q Sure. In your supplemental declaration, you
20 used the term PSTN, correct?

21 A Yes, sir. I did.

22 Q That stands for public switched telephone
23 network?

24 A It is. Yes. It is a public switched
25 telephone networking system, yes.

1 Q I'm going to put up an exhibit on the screen,
2 so give it a second to load, and then I'll ask the court
3 reporter to mark this. So just give it one second here.

4 A I see that. Yeah.

5 Q You see it? Yeah.

6 MR. HART: Cortney, we're -- I'm seeing
7 it fine on my end, but you're breaking up quite a bit.
8 There may be a connection issue on your end.

9 MR. ALEXANDER: Yeah. This might be a
10 problem.

11 THE PROCEEDING OFFICER: Okay. There's a
12 couple of things you might want to try. One is to
13 refresh your browser. The second thing is to close down
14 any other apps that you might have open on your
15 computer.

16 MR. ALEXANDER: Hello? Are you able to
17 hear me now?

18 THE PROCEEDING OFFICER: I can. You're
19 much clearer at my end.

20 MR. ALEXANDER: Okay, great. All right.

21 THE PROCEEDING OFFICER: And can you see
22 the exhibit?

23 MR. ALEXANDER: I can see the exhibit.

24 BY MR. ALEXANDER:

25 Q Dr. Kiaei, can you see it?

1 A Yes, I do. Yes.

2 Q Okay. So you should be able to scroll down.
3 There are three pages to this exhibit. The third -- so
4 the first page you see is the cover page for the
5 Webster's New World Computer Dictionary. The second
6 page is a copyright page. And then on the third page,
7 there is a definition for PSTN. Do you see that?

8 A Yes, I do.

9 Q Okay. And is this definition describing the
10 PSTN that you referenced in your supplemental
11 declaration?

12 A I -- yes, I mentioned the PSTN in my
13 supplemental declaration. I think that was with regards
14 to specifically a reference in there, but I do mention
15 PSTN.

16 Q Okay. And this definition is describing the
17 PSTN that you referenced in your supplemental
18 declaration?

19 MR. HART: Object to form.

20 THE WITNESS: I mean, well, this is a
21 general description of what the PSTN is. It doesn't
22 have any -- really, I don't see any technical details
23 there. All it has is the acronym for the public
24 switched telephone network and the history of that
25 originating in 1876 by Bell and so forth. That's --

1 it's a very general term used in the dictionary.

2 BY MR. ALEXANDER:

3 Q Okay. And is this an accurate description of
4 the PSTN?

5 MR. HART: Object to form.

6 THE WITNESS: In general, it's a general
7 description, yes. How -- I haven't analyzed exactly the
8 details of this description, but the general terminology
9 used, the acronym, and the history of it seems to be
10 accurate.

11 BY MR. ALEXANDER:

12 Q Okay.

13 THE PROCEEDING OFFICER: Counsel, did you
14 want this exhibit marked?

15 MR. ALEXANDER: Yeah. Thank you for
16 reminding me. Please do so.

17 (Exhibit 1 was marked for identification.)

18 THE WITNESS: Is there a way I can
19 download these exhibits or no, by the way? I'm not used
20 to this website application.

21 BY MR. ALEXANDER:

22 Q I don't know. Michelle -- I expect there is,
23 but I don't know the details. I know your counsel will
24 certainly be able to download it, but I don't know if
25 you can download it right now.

1 A Okay.

2 MR. HART: I -- I'm also unfamiliar with
3 this interface, Dr. Kiaei, but it looks like if you
4 click the three horizontal lines just above, to the top
5 left above the exhibit, there's a download option there.

6 THE WITNESS: Perfect. Right here --

7 THE PROCEEDING OFFICER: Also, there are
8 two buttons, a minus and a plus button. If you're
9 having trouble reading it, you can zoom in on the text
10 or zoom out.

11 And then Counsel Alexander, when you go
12 to a certain page, if you press "bring all to me,"
13 everybody will see the page you're on.

14 MR. ALEXANDER: Okay. Thank you.

15 BY MR. ALEXANDER:

16 Q All right. So Dr. Kiaei, so this definition,
17 it says that PSTN, it says it refers to the worldwide
18 network of switched telephone interconnections enabling
19 hundreds of millions of telephones worldwide to
20 establish direct connections. And then it goes on, like
21 you said, to describe how it originated in 1876 with
22 Alexander Graham Bell's patent, correct?

23 A That's what it states in there, yes. I agree
24 that it is stating that.

25 Q Okay. So in your supplemental declaration,

1 you refer to the HomeRF specification, correct?

2 A Yes, sir. I have.

3 Q The HomeRF specification describes different
4 device types that can be used in a HomeRF network,
5 correct?

6 A Before we move, if you don't mind, would you
7 mind sharing? Or if you're okay, I have a clean copy of
8 HomeRF and my supplemental declaration I can open, but I
9 wanted to get your okay with it before I do that, or you
10 can put it as an exhibit if you don't mind.

11 Q I may get to the point where I introduce it
12 here, but it -- I understand that you have a copy of it,
13 which is fine. I take it it's a clean copy, right? I
14 think you said so.

15 A It is a clean copy. There is no markings on
16 it, either one of them. And if you'd like me to open
17 that, I'm okay. If you're okay with it, I'll open it.

18 Q You may open it.

19 A Sure.

20 Q Would you like me to re-ask my question?

21 A Yes, please. Go ahead.

22 Q Sure. It's correct, isn't it, that the HomeRF
23 specification describes different device types that can
24 be used in a HomeRF network?

25 A That is correct, yes.

1 Q And the various types of devices have
2 different functionality, correct?

3 A That is correct. As long as there are also --
4 as I said in my declaration also, they have to be
5 compatible with that, but yes, it can connect to it.

6 Q Okay. And I-node is one HomeRF device type,
7 correct?

8 A I-node standing for isochronous devices, which
9 are a class of devices that connect to HomeRF.

10 Q Okay. So I just want to make sure we're on
11 the same page. It's correct that an I-node is one
12 HomeRF device type, correct?

13 MR. HART: Object to form.

14 THE WITNESS: I would not characterize it
15 that way. I would say that I-nodes are set up nodes
16 that are devices which have the capabilities to connect
17 to the HomeRF.

18 BY MR. ALEXANDER:

19 Q Okay.

20 A And the -- the HomeRF connects to that. And I
21 -- I believe I also discussed that in my declaration as
22 well. So --

23 Q So you would not characterize an I-node as one
24 HomeRF device type?

25 A Yeah. No, I -- I read that. Yeah, I

1 understood that. I-node, I think to be clear, in the
2 HomeRF, the specification, Page 5, in the abbreviation
3 of the I-node, what it is -- what it is, is that it's a
4 node that uses a TDMA access mechanism and provides the
5 isochronous data service, and the isochronous
6 connectionless broadcast data service.

7 And also, as I explained in my declaration --
8 I have to look into that for a second. In Paragraph 15
9 of my declaration, I also discussed that, which I say
10 that the whole model system include -- includes a
11 connection point -- a control point that was used as an
12 intermediate routing device to route toll- quality
13 voice, audio video, and data, to a wireless node, such
14 as isochronous node, including mobile phone, cordless
15 telephone and wireless handsets. So these are a set of
16 nodes which have the -- which are the -- which are the
17 devices that are connecting with the HomeRF.

18 Q Okay. So a -- and I-node is a HomeRF device
19 type, correct?

20 MR. HART: Object to form.

21 THE WITNESS: Again, I wouldn't
22 characterize it that way. I disagree with you.

23 BY MR. ALEXANDER:

24 Q Okay. Is an A-node a HomeRF device type?

25 A It is a HomeRF compatible device. And I

1 clearly state that in the Paragraph 16 of my declaration
2 also, which includes all the hardware and software for
3 networking, et cetera, that it makes it a HomeRF
4 compatible device.

5 Q An A-node has different functionality than an
6 I-node, correct?

7 A They A-node, "A" as in apple node, I assume,
8 correct?

9 Q Correct.

10 A A-node also in the -- again, to be on the same
11 page, in the HomeRF, Page 4, A-node is described as
12 well. Is a node that uses a CSMA, which is carrier sense
13 multiple access mechanism, and provides asynchronous
14 data service. It provides an asynchronous data service
15 to the -- that's it. It provides that.

16 Q Okay. And my question is that an A-node has
17 different functionality than an I-node, correct?

18 A I don't know what you mean by functionality.
19 That's not clear.

20 Q Okay. I'll try again.

21 An A-node has different capabilities than an
22 I-node, correct?

23 A In general, yes. But I -- top of my head, A-
24 node, it describes the communication data services,
25 asynchronous data services. And is there an A- node

1 which has similar type of services as an I-node? On the
2 top of my head, I can't think of any right now. But in
3 general, it's a different type of data service. It's
4 asynchronous data service.

5 Q Okay. And an I-node is not required to
6 provide the capabilities of an A- node, correct?

7 MR. HART: Object to form.

8 THE WITNESS: What do you mean by
9 capabilities? Each -- I don't understand your question,
10 please.

11 BY MR. ALEXANDER:

12 Q Well, the HomeRF specification describes
13 certain capabilities that an I-node is required to
14 provide, correct?

15 A In the HomeRF arena, or in the HomeRF
16 environment, an I-node provides certain compatibility
17 with the HomeRF environment. And the A-node also
18 provides certain compatibility with an A-node -- also
19 with the HomeRF. They provide different data services
20 and different types of mechanism for communications.

21 Q And the I-node is not required to provide the
22 A-nodes type of mechanisms for communication, correct?

23 MR. HART: Object to form.

24 THE WITNESS: Again, I disagree with that
25 question. No, I disagree. Again, these are two

1 separate independent nodes, that they each provide their
2 capabilities to the HomeRF, and they have their own
3 mechanism for communications to be a HomeRF compatible.

4 BY MR. ALEXANDER:

5 Q And it's true that an I-node does not have to
6 provide the capabilities of an A-node, right?

7 A Each node is independently sending their
8 capabilities to the HomeRF control point independently.

9 Q I'm a little confused by what you mean about
10 "sending their capabilities." That wasn't really my
11 question. An I-node provides certain capabilities,
12 correct?

13 A That is correct, yes.

14 Q And an A-node provides certain capabilities
15 that are described in the HomeRF specification, correct?

16 A That is correct.

17 Q And an A-node does not have to provide the
18 capabilities of an I-node, correct?

19 A As I said earlier, each node is independent.
20 So if a node happens to be an A-node, it provides its
21 own capabilities.

22 Q And so it would not have to provide the
23 capabilities of an I-node, right?

24 A That is correct. Yes, sir.

25 Q Now you mentioned the term "control point,"

1 correct?

2 A Yes, sir. I did.

3 Q An asynchronous HomeRF network does not
4 require a control point, correct?

5 A I don't remember on the top of my head because
6 I did not analyze A-node in my supplemental. Can you
7 point me to where you were talking about?

8 Q Where I'm talking about -- where -- I'm sorry,
9 sir. What are you asking for?

10 A You asked a question about A-node and control
11 point. My answer -- my question is that, can you point
12 me to where you're discussing that question from,
13 because I don't recall discussing A-node in my
14 supplemental declaration?

15 Q So you don't know if --

16 A And I don't -- I don't remember on the top of
17 my head. I mean, that -- as you saw the HomeRF, the
18 spec, is over 2000 pages. So if you have any specific
19 things you want me to look into, I did not opine on that
20 in my declaration.

21 Q Okay. But you did talk about a control point,
22 correct?

23 A I did.

24 Q So right now, you don't know whether an
25 asynchronous HomeRF network requires a control point?

1 MR. HART: Object to form.

2 THE WITNESS: To be accurate, I need to
3 look at the source and see what exactly is going on
4 there to be able to answer that. I did not memorize the
5 entire HomeRF specification.

6 BY MR. ALEXANDER:

7 Q But you're familiar that a HomeRF network can
8 be asynchronous instead of isochronous?

9 MR. HART: Object to form.

10 THE WITNESS: I disagree with that
11 statement also. I disagree with you.

12 BY MR. ALEXANDER:

13 Q You disagree that a HomeRF network can be
14 asynchronous instead of isochronous?

15 A I wouldn't put it that way. HomeRF -- I would
16 not put it that way. No.

17 Q So I've put Exhibit 1039 on the screen. Are
18 you able to see that, Dr. Kiaei?

19 A Yes, sir. I have it downloaded. Thank you
20 for putting that.

21 Q Sure. And this is a -- you're familiar with
22 this document, correct?

23 A Yes, sir. I am. Yes, I am.

24 Q Okay. Could you turn to page 2?

25 A I'm in page 2, sir.

1 Q Okay. And so in the left-hand column, could
2 you look at the first full paragraph on that page?

3 A Yes. I see that. The one that starts with
4 the 10/100 BASE-T Ethernet and goes down to the next
5 paragraph, the SWAP network?

6 Q Right. So I was referring to the paragraph
7 that begins with, the SWAP networking vision?

8 A Yes, sir. I see that. Yeah.

9 Q Okay. And the second sentence of that
10 paragraph says that, the HomeRF technology supports
11 both, isochronous clients that are slaves to the main
12 home PC and an asynchronous network of peer devices,
13 which is effectively a wireless ethernet, correct?

14 A That is correct. I agree with it.

15 Q Okay. And then if you jump forward a couple
16 of sentences, there's a sentence that begins, "This
17 Control Point"; is that right?

18 A Yes, sir.

19 Q It says, "This Control Point is not absolutely
20 necessary for devices in the asynchronous network of
21 Figure 1", correct?

22 A That says that. Yes, sir.

23 Q Okay. So in an asynchronous HomeRF network, a
24 Control Point is not required, correct?

25 A Well, it says not necessary. So really that

1 also depends on the -- the device. It may be required
2 in some devices, but in general, not necessary. I agree
3 that in general, it's not necessary.

4 Q If you look down into the next to last
5 sentence of this paragraph, it says, "Note that data
6 transfer on the asynchronous network between any two
7 peers is directly to each other as opposed to routed
8 through the Control Point". Do you see that?

9 A Yes. I see that, yes.

10 Q Okay. And that's consistent with the earlier
11 statement that the Control Point is not absolutely
12 necessary for devices in an asynchronous network,
13 correct?

14 A I agree with it absolutely -- not absolutely.
15 I think it says that, it's not -- yeah, actually, it
16 does say absolutely necessary. Yeah, I agree with that.
17 I don't see that -- but are there examples where -- by
18 which it may not be the case? I can't think of on top
19 of my head.

20 Q Okay.

21 A But I agree with the fact that the data
22 communications between the peers, it happens in a way
23 that -- that paper talks about it.

24 Q I just want to make sure I -- you said it does
25 say absolutely necessary. I want to make sure we're on

1 the same page. It says a Control Point is not
2 absolutely necessary, correct?

3 A It says it is not absolutely necessary. Yes,
4 it says that. Correct.

5 Q Okay. And one of the authors on this document
6 is Jim Lansford, an Intel Corporation employee; is that
7 right?

8 A That's correct. Yes, sir.

9 MR. ALEXANDER: I'm going to close this.

10 THE PROCEEDING OFFICER: Did you want
11 that labeled, Counsel?

12 MR. ALEXANDER: It's actually it -- it's
13 already introduced in the proceeding, so I don't think
14 it needs to be marked again. Thank you, though.

15 MR. HART: For the record, that's Exhibit
16 1039 in this proceeding.

17 THE WITNESS: So should I close this
18 document?

19 BY MR. ALEXANDER:

20 Q Yeah, I actually thought I probably did close
21 it for everybody because I've tried to put up a new
22 document. Do you see a new document on your screen?

23 A Yes, sir. I see a paper by Jim -- Mr. Jim
24 Lansford, from Intel.

25 Q Okay. So this is the same Jim Lansford. It

1 appears he was an author on Exhibit 1039, correct?

2 A Yes, sir.

3 THE WITNESS: Sorry, Paul, did I
4 interrupt you?

5 MR. HART: No. Go ahead. I was just
6 objecting to form.

7 THE WITNESS: Okay. Yeah, I see that
8 paper. Yes, sir.

9 BY MR. ALEXANDER:

10 Q All right. This article is titled
11 HomeRF/SWAP, a Wireless Voice and data system for the
12 home. Do you see that?

13 A Yes, sir. I see that.

14 Q All right. Could you turn to page 2, please?

15 A Sure. And I haven't seen this document
16 before. Just for the record. This is the first time
17 I'm seeing this paper.

18 Q Understood. Do you see the -- on Page 2 on
19 the -- in the left-hand column, there's a section header
20 that says, "Network Topology"?

21 A Yep. I see that. That's on top of the page
22 2.

23 Q Okay. And this is talking about how HomeRF
24 networks can operate, correct, correct?

25 MR. HART: Object to form. Lacks

1 foundation.

2 THE WITNESS: I don't agree with that. I
3 mean, it's a -- it's a paper by Mr. Jim Lansford. It is
4 not a -- I don't know whether it was published. So I
5 don't know if it has gone through a peer review or not.
6 And second of all, it is an overview from his
7 perspective on HomeRF. If it -- I personally, not
8 personally, but I think anybody in the industry when
9 discussing a -- specifically standards, they look at the
10 actual standard documentations. It is an overview by
11 Mr. Lansford. I haven't read the paper, so I -- I'm not
12 sure exactly what he said.

13 BY MR. ALEXANDER:

14 Q Well, you did cite a -- another document by
15 Mr. Lansford, that wasn't a specification, but instead a
16 publication, correct?

17 A Yeah, it's a publication. I mean, I publish
18 papers regularly, few of them a year. And we -- you
19 know, we may get a peer review. We may not. But even
20 if we do get a peer review that paper, statements and
21 how it is accurate in terms of the accuracy of it
22 relative -- especially with a standards, that's a
23 different issue.

24 Q And this paper is describing HomeRF, correct?

25 MR. HART: Object to form. Lacks

1 foundation.

2 THE WITNESS: What it says as an
3 introduction is that this document provides an overview
4 of the MAC, which is Media Access Control, protocol for
5 SWAP. So it is a overview of this gentleman's
6 understanding of what the HomeRF/SWAP match layer is --
7 is focusing primarily on the MAC layer, I believe. I
8 have not read the paper, so I don't know what he's
9 talking about there.

10 BY MR. ALEXANDER:

11 Q All right. Could you go to page 2?

12 A Yes, sir.

13 Q And you see the section titled, "Network
14 Topology"?

15 A Yes, I do.

16 Q And look at the last paragraph in that
17 section?

18 The first sentence says that, "The network can
19 operate as either an ad hoc network or as a managed
20 network under the control of a Control Point". Do you
21 see that?

22 A Yes. I see that.

23 Q And then the last sentence says, "Since there
24 is no Control Point, only data communication is
25 supported in an ad hoc network", correct?

1 A That's what it says in there.

2 Q And so he's saying that a Control Point is not
3 required in a HomeRF ad hoc network, correct?

4 MR. HART: Object to form. Lacks
5 foundation.

6 THE WITNESS: That's what he says. I
7 don't necessarily agree with that. I -- and I have not
8 --

9 BY MR. ALEXANDER:

10 Q What's your basis for disagreeing?

11 A I have not analyzed ad hoc networks and that's
12 not really something I looked into for this particular
13 deposition. And their topology and whether that
14 statement is true for all the ad hoc network and what
15 they mean by ad hoc network also and so forth. This is
16 a statement by Mr. Stanford -- Lansford, sorry. By Mr.
17 Lansford. So I can't opine on that one way or another.
18 He's talking about ad hoc network and I -- I don't know
19 what the specific networks he's discussing here.

20 Q But you don't have any basis today to disagree
21 with his statement that a HomeRF ad hoc network does not
22 require a Control Point, correct?

23 MR. HART: Object to form.

24 THE WITNESS: I don't have any agreements
25 on it either. I -- I don't think -- on top of my head,

1 I cannot say. I don't know that answer. I need to
2 investigate that and look into that with the right
3 documentations to be able to give you an honest and
4 accurate answer. At this point, I will not be able to
5 do that and give you an honest and accurate answer.

6 BY MR. ALEXANDER:

7 Q So you cannot agree or disagree, correct?

8 A As I said, I have not analyzed this. And this
9 is not really what I have prepared for this and opined
10 on in this particular deposition. And I don't have any
11 opinion one way or another, agree or disagree with it.

12 Q Is it your testimony that a HomeRF network has
13 to be isochronous?

14 A No, I never said that. No.

15 Q In a HomeRF network, a Class 1 connection
16 point is required to manage I-nodes, correct?

17 MR. HART: Object to form.

18 THE WITNESS: Can you be more specific
19 and show me also on the HomeRF specification, what do
20 you mean by Class 1?

21 BY MR. ALEXANDER:

22 Q Okay. You don't know the answer at the
23 moment; is that right?

24 MR. HART: Object to form.

25 THE WITNESS: That's not what I said.

1 What I said was that I don't recall exactly where the
2 class one comes from. That's a pretty vague and broad
3 term. So if you can identify what you mean by class
4 one, that would be helpful to answer your question.

5 BY MR. ALEXANDER:

6 Q It's the term class one that you're not
7 familiar with? Is that -- do I understand you right?

8 A Class one represents -- I mean, that's a very
9 big term. Again, that could represent many things. If
10 you have a specific place that you like to point on, I
11 would be happy to look at that and tell you -- and
12 answer your question to the best of what I can. But at
13 this point, you're saying, class one, I don't know what
14 you're talking about.

15 Q Okay. Turn to page 48 of Exhibit 1038, which
16 is the HomeRF Specification.

17 A Page 48. Page 48, I assume PDF, not the
18 actual document page? Or you're talking about the page
19 48 of the document?

20 Q I believe so. I believe Page 48 of the
21 document. It is also at the bottom right-hand corner --

22 A Okay.

23 Q -- labeled, "Apple Exhibit 1038, Page 48."

24 A Okay. I think -- yeah, that's -- I
25 understand. Okay. Because there's also a Page -- that

1 -- that is equal to the page 20 of the document. But
2 let's go from now on, on the exhibit page 48. Yes, I
3 see class one in that table that talks about HomeRF
4 device type.

5 Q Okay. And a class one connection point is
6 required to provide management of I-nodes, correct?

7 A It provides management of I-nodes, S-nodes,
8 and A-nodes. And it provides connectivity to the PSTN
9 and a host PC. And a number of other requirements, it
10 has that in there, that is important here. So it's --
11 it's not just a -- I know -- I know a variety of other
12 nodes as well and descriptions on the table.

13 Q Is it correct that an isochronous HomeRF
14 network could not function if the Control Point was
15 removed from the environment and could not communicate
16 with the I-Nodes?

17 MR. HART: Object to form.

18 THE WITNESS: Can you repeat the question
19 again, please?

20 BY MR. ALEXANDER:

21 Q Is it correct that an isochronous HomeRF
22 network could not function if the Control Point was
23 removed from the environment and could not communicate
24 with the I-nodes?

25 A I disagree with the way you have formed the

1 question.

2 Q So you're saying that a HomeRF network -- an
3 isochronous HomeRF network could function if the Control
4 Point was removed from the environment and could not
5 communicate with the I-nodes?

6 MR. HART: Object to form.

7 THE WITNESS: Again, I disagree with the
8 statement. With the -- with the way you have formed it,
9 I disagree with that.

10 BY MR. ALEXANDER:

11 Q I'm just trying to understand. I asked the
12 opposite question the second time and you disagreed both
13 ways. So could an isochronous HomeRF network function
14 if the Control Point was removed from the environment
15 and could not communicate with the I-nodes?

16 MR. HART: Object to form.

17 THE WITNESS: Again, I mean functionality
18 of I-node -- again, I disagree with that. Functionality
19 of I-node and its operation is its own operation and
20 what it does. So I -- I, again, disagree with your --
21 the way you asked the question.

22 BY MR. ALEXANDER:

23 Q Could you explain how an isochronous HomeRF
24 network could function if the Control Point was removed
25 from the environment and could not communicate with the

1 I-nodes?

2 MR. HART: Object to form.

3 THE WITNESS: Again, I disagree with your
4 question, because I-node is an independent node that
5 operates and does its thing. So it could not function.
6 I disagree with the fact that you're saying without a
7 connection point, you could not operate. That is a --
8 not -- that's not clear. I disagree with that.

9 BY MR. ALEXANDER:

10 Q Yeah. Perhaps you misunderstood the question.
11 I didn't ask if an I-node could operate. I asked if an
12 isochronous HomeRF network could operate if the Control
13 Point was removed from the environment and could not
14 communicate with the I-nodes on that network.

15 MR. HART: Object to form.

16 THE WITNESS: Again, I -- I disagree with
17 the way you asked the question. I-node is an
18 independent node. HomeRF device -- devices, and the
19 HomeRF environment, and how they communicate with I-
20 nodes, that's a separate issue. So your question is not
21 -- is too broad. The functionality of I-node -- the
22 functionality as an I-node.

23 BY MR. ALEXANDER:

24 Q Could a HomeRF isochronous network operate
25 without the Control Point?

1 MR. HART: Object to form.

2 THE WITNESS: Can you repeat the question
3 again, please? Sorry.

4 BY MR. ALEXANDER:

5 Q Could a HomeRF isochronous network operate
6 without the Control Point?

7 A Again, I disagree with the way you state the
8 question. I apologize, but I do disagree with the way
9 you have stated the question.

10 Q What do you disagree with?

11 A Well, HomeRF is an environment that provides
12 the networking capabilities for connecting the nodes.
13 So that's a separate issue than the functionality of I-
14 node in a HomeRF environment. So --

15 Q Right. I didn't mention the term I-node in my
16 question. So let me try the question again. Can an
17 isochronous HomeRF network operate without the Control
18 Point?

19 MR. HART: Object to form.

20 THE WITNESS: You mean by the connection
21 point, not a Control Point?

22 BY MR. ALEXANDER:

23 Q What's the difference between a connection
24 point and a Control Point?

25 A I don't know what you mean by Control Point.

1 Connection point, as I also describe it in my
2 declaration, is a -- I apologize. Actually, I do --
3 yes, Control Point is -- give me a second, please.

4 Yes, I -- I take that statement back, in terms
5 of the last statement I said. The Control Point is on
6 the HomeRF. So can you repeat your question then with
7 this answer I gave you?

8 Q Could an isochronous HomeRF network operate
9 without the Control Point?

10 MR. HART: Object to form.

11 THE WITNESS: Again, it's not -- your
12 question is vague. A HomeRF has a Control Point by
13 which it performs certain functionalities in there, and
14 it requires that functionalities and the Control Point
15 to communicate with an I-node. That is my answer.

16 And that's very clear in the paragraph 12
17 of my declaration, where I talk about the -- that issue
18 in terms of how the I-node utilize the protocol to
19 perform initial registration and then location
20 registration with a Control Point of the HomeRF. By
21 which, I also saw an error in my Paragraph 12. If you
22 don't mind, I want to correct that, if that's okay?

23 BY MR. ALEXANDER:

24 Q I don't have any questions about your
25 paragraph 12 for the moment.

1 A Okay.

2 Q So let me ask you this -- do you disagree that
3 a HomeRF network could be asynchronous instead of
4 isochronous?

5 THE PROCEEDING OFFICER: I'm sorry. Mr.
6 Hart, could you put yourself on mute please?

7 MR. HART: My cell phone?

8 THE PROCEEDING OFFICER: No. If you
9 could put yourself on mute, because we can hear the
10 typing. It's very loud. Thank you so much.

11 MR. HART: Yeah, of course.

12 THE WITNESS: I apologize. I forgot the
13 question. If you don't mind asking again, please?

14 BY MR. ALEXANDER:

15 Q Do you disagree that a HomeRF network could be
16 asynchronous instead of isochronous?

17 MR. HART: Object to form.

18 THE WITNESS: We just read the class one,
19 for example, and that consists of having various nodes,
20 some isochronous, some asynchronous, some S-node, and
21 some A/I-node, which is asynchronous or isochronous.

22 And -- and that's Figure 1 of the paper
23 we had by Exhibit 1039 as a good diagram of that. So it
24 could be many different connection points that comes to
25 the Control Point of the HomeRF.

1 BY MR. ALEXANDER:

2 Q I'm -- Dr. -- sorry, Dr. Kiaei, but I didn't
3 understand whether you -- I didn't understand your
4 response to my question.

5 Do you disagree that a HomeRF network can be
6 asynchronous instead of isochronous?

7 MR. HART: Object to form.

8 THE WITNESS: I disagree with the way you
9 asked the question. I disagree with that.

10 BY MR. ALEXANDER:

11 Q Explain to me why you disagree that a HomeRF
12 network can be asynchronous instead of isochronous?

13 A Well, the HomeRF is a -- connects to the
14 isochronous clients and isochronous nodes. It can also
15 connect to the asynchronous nodes. So when you say
16 HomeRF network, I'm not clear what do you mean by that.
17 HomeRF connects to the isochronous node, or it connects
18 to the asynchronous nodes, or it connects to the
19 combination of them. That's where the ambiguity is from
20 your question.

21 Q A HomeRF network could consist entirely of
22 asynchronous nodes, correct?

23 A No. I disagree with that also. It does
24 require a -- a PC or a mobile device or something else
25 that it connects to as well, or some form of a -- a

1 gateway, as I also said that in my declaration.

2 Q Can you point me in the HomeRF specification
3 to anywhere that says that a HomeRF network cannot
4 consist only of asynchronous nodes?

5 A No. That's not what I said. What I said was
6 that a HomeRF network can be connecting to an
7 isochronous node or it can connect to the asynchronous
8 nodes, or a combination on one end, and in the other
9 end, connect it to a mobile device or a PC or other
10 types of devices in there. It is an intermediary
11 network that connects a class of networks of
12 isochronous, et cetera, in one end, to a mobile device
13 or other type of devices on the other end.

14 MR. ALEXANDER: I think we've been going
15 about an hour. I think this is a good time for a break,
16 maybe ten minutes.

17 THE PROCEEDING OFFICER: Okay.

18 Time is -- time is 12:25 p.m. Eastern
19 Time, we are now going off the record.

20 (Off the record.)

21 THE PROCEEDING OFFICER: And the time is
22 12:34 p.m. Eastern Time, we are now back on the record.

23 MR. ALEXANDER: Okay. I didn't realize
24 we weren't on the record. But I -- so we're good with
25 Exhibit 2 being marked, correct?

1 THE PROCEEDING OFFICER: Yeah. Yes.

2 (Exhibit 2 was marked for identification.)

3 MR. ALEXANDER: I have no further
4 questions.

5 EXAMINATION

6 BY MR. HART:

7 Q All right. The only thing I have, Dr. Kiaei,
8 you mentioned that you had a correction to make to
9 paragraph 12 in your supplemental declaration. What was
10 that correction you wanted to do -- make on the record?

11 MR. ALEXANDER: Objection. Outside the
12 scope of the cross.

13 THE WITNESS: On paragraph 12, I mistyped
14 the -- in the parentheses which says, "E.g. Zhang's
15 mobile device." That should be, e.g. HomeRF. And I
16 made the same mistake also, I repeated that in
17 Paragraph, I believe it was 19. Same exact -- same
18 thing. Verbatim on that same paragraph, I have in the
19 parentheses, "Zhang's mobile device," that should be
20 HomeRF.

21 There was one other error I found, which
22 was a typo on the citation. And I don't exactly
23 remember what it was, but I think it was on paragraph 9.
24 The second line to the last line, I cite Zhang's column
25 4, lines 35 to 45, that should be column 6, lines 35 to

1 45. Those were the only areas I found. I agree with
2 every other thing in my -- in my declaration.

3 MR. HART: Okay. That's all I have.

4 Thank you very much, Dr. Kiaei.

5 THE WITNESS: Thank you, Mr. Alexander.

6 Thanks for your time.

7 Thank you, Michelle.

8 Thank you, Paul.

9 MR. ALEXANDER: Yeah. Hold on. I have
10 to -- give me a moment, please.

11 THE PROCEEDING OFFICER: Sure. One
12 moment, please.

13 So Counsel Alexander, the certified
14 transcript is included in your --

15 MR. ALEXANDER: Wait, wait, wait. We're
16 not necessarily done yet.

17 THE PROCEEDING OFFICER: Oh. We're not?
18 I'm so sorry.

19 MR. ALEXANDER: Give me a moment, please.

20 No further questions.

21 THE PROCEEDING OFFICER: Okay.

22 So Counsel Alexander, the certified
23 transcript is included in your order. Can I confirm
24 that you would like the transcript to be produced and
25 you have asked for an expedited transcript to be

1 produced by September the 12th, that's correct?

2 MR. ALEXANDER: That is correct.

3 THE PROCEEDING OFFICER: Okay. And end
4 of day September the 12th?

5 MR. ALEXANDER: If you can do it earlier,
6 that would be preferable.

7 THE PROCEEDING OFFICER: Okay. Thank
8 you.

9 And, Counsel Hart, will you be purchasing
10 a copy of the transcript?

11 MR. HART: Yes. We'll take a standard
12 copy. We don't need expedited. We don't need a rough.

13 THE PROCEEDING OFFICER: Okay. Okay.
14 Thank you. And will the witness read and sign?

15 MR. HART: Yes. We'll reserve the right
16 to read and sign.

17 THE PROCEEDING OFFICER: Thank you.

18 So if there's no other business, we'll
19 now be going off the record.

20 The date is September the 10th, 2025, and
21 the time is 12:40 p.m. Eastern Time, we are now going
22 off the record.

23 (Proceedings concluded at 12:40 p.m., ET)

24 * * * * *

25

1 CERTIFICATE OF PROCEEDINGS OFFICER

2

3 I, Michelle Clark, hereby certify:

4 That the foregoing proceedings were taken
5 before me at the time and place therein set forth;

6 That the proceedings were recorded by me and
7 thereafter formatted into a full, true, and correct
8 transcript of same;

9 I further certify that I am neither counsel
10 for nor related to any parties to said action, nor in
11 any way interested in the outcome thereof.

12

13 DATED, this 12th day of September 2025.

14

15

16 _____/s/_____

17 Michelle Clark, Certification #CER-4440

18 Proceedings Officer

19

20

21

22

23

24

25

1 A C K N O W L E D G M E N T

2

3 I do hereby certify that having been first
4 duly sworn to testify to the truth, I gave the above
5 testimony on the 10th day of September.

6

7 I further certify that the foregoing
8 transcript is a true and correct transcript of the
9 testimony given by me at the time and place specified.

10

11

12

13

SAFYE KIAEI, PH.D.

14

15 Sworn to before me this ____ day of _____, 20__

16

17

18

19 _____
Notary Public

20

21

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23

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25

E R R A T A S H E E T

Deponent: SAFYE KIAEI, PH.D.

Deposition Date: Wednesday, September 10, 2025

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Under penalties of perjury, I declare that I have read the foregoing deposition and hereby affix my signature that same is true and correct, except as noted above.

SAFYE KIAEI, PH.D.

Date

Sworn to before me this ____ day of _____, 20__

Notary Public

<u>WORD</u> <u>INDEX</u>				
< 1 >	12:40	4:7	abbreviati	administer
1 4:5	1:18	< 4 >	on 14:2	ing 6:11
10:17	39:21, 23	4 15:11	able	admissibil
20:21	12th	37:25	8:16	ity 6:7
27:15,	39:1, 4	40211	9:2	affirm
20 34:22	40:13	1:21	10:24	7:4
10 1:16	1400 2:5	45	19:4, 18	affix
4:5	15 14:8	37:25	27:3, 4	42:1
42:1	16 15:1	38:1	absolutely	Agent
10, 547, 648	17th 2:4	468 5:8	20:19	2:20
1:7	1876	48	21:11,	agree
5:13	9:25	28:15,	14, 16,	6:4, 7,
10/100	19 37:17	17, 19,	25 22:2,	10
20:4	< 2 >	20, 23	3	11:23
1038	2 4:7	29:2	access	20:14
28:15, 23	19:24,	< 5 >	14:4	21:2, 14,
1039	25	5 14:2	15:13	16, 21
19:17	23:14,	57 2:13	25:4	24:2
22:16	18, 22	5755	accuracy	26:7
23:1	25:11	2:12	24:21	27:7, 11
34:23	36:25	< 6 >	accurate	38:1
10th	37:2	6 37:25	10:3, 10	agreements
5:4	20 29:1	< 7 >	19:2	26:24
39:20	41:15	7 3:4	24:21	ahead
41:5	42:1	717 2:4	27:4, 5	12:21
11 5:7	2000	< 8 >	acronym	23:5
11:27	18:18	80202	9:23	al 6:1
1:17	2025	2:6	10:9	ALEXANDER
5:4	1:16	< 9 >	action	2:15
12	5:4	9 37:23	40:10	3:4
33:16,	39:20	< A >	actual	5:19
21, 25	40:13	a.m	24:10	6:17, 18
37:9, 13	42:1	1:17	28:18	7:15, 18
12:25	< 3 >	5:4	ad	8:9, 16,
36:18	30022	A/I-node	25:19,	20, 23,
12:34	2:14	34:21	25 26:3,	24 10:2,
36:22	35 37:25		11, 14,	11, 15,
	37 3:5		15, 18, 21	21
			administer	11:11,
			6:12	14, 15,
				22

13:18	10, 11,	areas	audiovisua	bottom
14:23	16, 21	38:1	l 6:6	28:21
16:11	16:17,	arena	author	break
17:4	18 17:6,	16:15	23:1	36:15
19:6, 12	14, 17,	Article		breaking
22:9, 12,	20 18:6,	4:8	authorized	8:7
19 23:9	10, 13	23:10	6:12	bring
24:13	A-nodes	asked	authors	11:12
25:10	16:22	18:10	22:5	broad
26:9	29:8	30:11,	available	28:2
27:6, 21	answer	21	4:2	31:21
28:5	18:11	31:11,		broadcast
29:20	19:4	17 35:9	< B >	14:6
30:10,	27:1, 4,	38:25	back	Broadway
22 31:9,	5, 22	asking	33:4	5:7
23 32:4,	28:4, 12	18:9	36:22	browser
22	33:7, 15	34:13	BASE-T	8:13
33:23	anybody	assume	20:4	business
34:14	24:8	15:7	basis	39:18
35:1, 10	apologize	28:17	6:8	button
36:14,	32:8	asynchrono	26:10, 20	11:8
23 37:3,	33:2	us	begins	buttons
11 38:5,	34:12	15:13,	20:7, 16	11:8
9, 13, 15,	APPEAL	14, 25	behalf	
19, 22	1:2	16:4	6:1	< C >
39:2, 5	5:15	18:3, 25	believe	called
Alpharetta	Appearing	19:8, 14	13:21	7:10
2:14	2:9, 17	20:12,	25:7	capabiliti
ambiguity	appears	20, 23	28:20	es
35:19	23:1	21:6, 12	37:17	13:16
analyze	APPLE	34:3, 16,	Bell	15:21
18:6	1:4	20, 21	9:25	16:6, 9,
analyzed	5:11, 22,	35:6, 12,	Bell's	13 17:2,
10:7	23 15:7	15, 18,	11:22	6, 8, 10,
26:11	28:23	22 36:4,	best	11, 14,
27:8	applicatio	7	28:12	18, 21,
and/or	n 10:20	attorney	big 28:9	23 32:12
6:6	approximat	5:18	bit 8:7	captured
A-node	ely 5:4	audio	BOARD	6:9
14:24	apps	6:6	1:2	capturing
15:5, 7,	8:14	14:13	5:15	6:5

career 15:12	cite 24:14	23:19	confirm 38:23	consists 34:19
Case 1:6	37:24	37:24, 25	confused 17:9	control 14:11
21:18	Clark 1:20	combinatio n 35:19	connect 13:5, 9,	17:8, 25
catch 7:16	5:6	36:8	16	18:4, 10,
cell 34:7	40:3, 17	comes 28:2	35:15	21, 25
CER-4440 1:20	class 13:9	34:24	36:7, 9	20:17,
40:17	27:15,	communicat e 29:15,	connecting 14:17	19, 24
certain 11:12	20 28:2,	23 30:5,	32:12	21:8, 11
16:13,	3, 6, 8,	15, 25	36:6	22:1
16, 18	13 29:3,	31:14,	connection 8:8	25:4, 20,
17:11,	5 34:18	19 33:15	14:11	24 26:2,
14 33:13	36:11	communicat ion	27:15	22
certainly 10:24	clean 12:7, 13,	15:24	29:5	29:14,
CERTIFICAT E 40:1	15	16:22	31:7	22 30:3,
Certificat ion	clear 14:1	25:24	32:20,	14, 24
40:17	15:19	communicat ions	23 33:1	31:12,
certified 38:13, 22	31:8	16:20	34:24	25 32:6,
certify 40:3, 9	33:16	17:3	connection less	17, 21,
41:3, 7	35:16	21:22	14:6	24, 25
cetera 15:3	clearer 8:19	compatibil ity	connection s 11:20	33:3, 5,
36:12	clearly 15:1	16:16, 18	connectivi ty 29:8	9, 12, 14,
CHANGE 42:1	click 11:4	compatible 13:5	connects 13:20	20 34:25
characteri ze	clients 20:11	14:25	35:13,	copy 12:7, 12,
13:14,	35:14	15:4	17, 18,	13, 15
23 14:22	close 8:13	Computer 4:6	25 36:11	39:10, 12
citation 37:22	22:9, 17,	8:15	consist 35:21	copyright 9:6
	20	9:5	36:4	cordless 14:14
	Colorado 2:6	concluded 39:23	consistent 21:10	corner 28:21
	column 20:1	conducted 6:2		Corporatio n 22:6
				correct 7:20
				11:22
				12:1, 5,
				22, 25
				13:2, 3,

7, 11, 12 14:19 15:6, 8, 9, 17, 22 16:6, 14, 22 17:12, 13, 15, 16, 18, 24 18:1, 4, 22 19:22 20:13, 14, 21, 24 21:13 22:2, 4, 8 23:1, 24 24:16, 24 25:25 26:3, 22 27:7, 16 29:6, 13, 21 33:22 35:22 36:25 39:1, 2 40:7 41:8 42:1 correction 37:8, 10 CORTNEY 2:15 5:19 8:6 cortneyale xander@ken	trisley.co m 2:16 Counsel 7:13 10:13, 23 11:11 22:11 38:13, 22 39:9 40:9 Counsels 5:16 couple 8:12 20:15 course 34:11 court 8:2 cover 9:4 cross 37:12 CSMA 15:12 < D > Data 4:8 14:5, 6, 13 15:14, 24, 25 16:3, 4, 19 21:5, 21 23:11 25:24 DATE 1:16 5:3	39:20 42:1 DATED 40:13 day 39:4 40:13 41:5, 15 42:1 declaratio n 7:19 9:11, 13, 18 11:25 12:8 13:4, 21 14:7, 9 15:1 18:14, 20 33:2, 17 36:1 37:9 38:2 declare 42:1 definition 9:7, 9, 16 11:16 Denver 2:6 depends 21:1 Deponent 42:1 DEPOSITION 1:12 5:10, 25 26:13 27:10 42:1	describe 11:21 33:1 described 15:11 17:15 describes 12:3, 23 15:24 16:12 describing 9:9, 16 24:24 DESCRIPTIO N 4:4 9:21 10:3, 7, 8 descriptio ns 29:12 designated 5:7 details 9:22 10:8, 23 device 12:4, 23 13:6, 12, 24 14:12, 18, 24, 25 15:4 21:1 29:4 31:18 35:24 36:9, 12 37:15, 19 devices 13:1, 8,	9, 16 14:17 20:12, 20 21:2, 12 31:18 36:10, 13 diagram 34:23 Dictionary 4:6 9:5 10:1 difference 32:23 different 12:3, 23 13:2 15:5, 17, 21 16:3, 19, 20 24:23 34:24 direct 11:20 directly 21:7 disagree 14:22 16:24, 25 19:10, 11, 13 26:20 27:7, 11 29:25 30:7, 9, 18, 20 31:3, 6, 8, 16
---	--	---	--	---

32:7, 8, 10 34:2, 15 35:5, 8, 9, 11, 23 disagreed 30:12 disagreein g 26:10 discussed 13:21 14:9 discussing 18:12, 13 24:9 26:19 document 19:22 22:5, 18, 22 23:15 24:14 25:3 28:18, 19, 21 29:1 documentat ions 24:10 27:3 download 4:2 10:19, 24, 25 11:5 downloaded 19:19 Dr 7:16 8:25 11:3, 16	19:18 35:2 37:7 38:4 duly 7:10 41:4 < E > E.g 37:14, 15 earlier 17:19 21:10 39:5 Eastern 5:5 36:18, 22 39:21 effectivel y 20:13 either 12:16 25:19 26:25 employee 22:6 enabling 11:18 entire 19:5 entirely 35:21 environmen t 16:16, 17 29:15, 23 30:4, 14, 25 31:13, 19 32:11, 14	equal 29:1 ERISE 2:3, 20 5:23 error 33:21 37:21 especially 24:22 ESQUIRE 2:7, 15 establish 11:20 ET 1:17, 18 6:1 15:3 36:12 39:23 Ethernet 20:4, 13 everybody 11:13 22:21 exact 37:17 exactly 10:7 19:3 24:12 28:1 37:22 EXAMINATIO N 3:3 7:14 37:5 example 34:19 examples 21:17	Excerpts 4:5 EXHIBIT 4:4 8:1, 22, 23 9:3 10:14, 17 11:5 12:10 19:17 22:15 23:1 28:15, 23 29:2 34:23 36:25 37:2 exhibits 10:19 expect 10:22 expedited 38:25 39:12 explain 30:23 35:11 explained 14:7 < F > fact 21:21 31:6 familiar 19:7, 21 28:7 Figure 20:21 34:22 filed 5:13	fine 8:7 12:13 firm 5:22 first 9:4 20:2 23:16 25:18 41:3 focusing 25:7 follows 7:11 foregoing 40:4 41:7 42:1 forgot 34:12 form 9:19 10:5 13:13 14:20 16:7, 23 19:1, 9 23:6, 25 24:25 26:4, 23 27:17, 24 29:17 30:6, 16 31:2, 15 32:1, 19 33:10 34:17 35:7, 25 formatted 40:7
---	---	--	---	--

formed	38:20	6:23	29:17	HomeRF
29:25	40:9	7:16	30:6, 16	12:1, 3,
30:8	41:7	34:23	31:2, 15	4, 8, 22,
forth		36:15, 24	32:1, 19	24 13:6,
9:25	< G >	governing	33:10	9, 12, 17,
26:15	gateway	6:3	34:6, 7,	20, 24
40:5	36:1	Graham	11, 17	14:2, 17,
forward	general	11:22	35:7	18, 24,
20:15	9:21	great	37:6	25 15:3,
found	10:1, 6,	6:17, 19	38:3	11
37:21	8 15:23	8:20	39:9, 11,	16:12,
38:1	16:3		15	15, 17,
	21:2, 3	< H >	head	19 17:2,
foundation	gentleman'	hand 7:4	15:23	3, 8, 15
24:1	s 25:5	handsets	16:2	18:3, 17,
25:1	Georgia	14:15	18:5, 17	25 19:5,
26:5	2:14	happens	21:19	7, 13, 15
FROM/TO	give	17:20	26:25	20:10,
42:1	8:2, 3	21:22	header	23
full	27:3, 5	happy	23:19	23:23
20:2	33:3	28:11	hear	24:7, 24
40:7	38:10, 19	hardware	6:17	26:3, 21
function	given	15:2	8:17	27:12,
29:14,	41:9	HART	34:9	15, 19
22 30:3,	go	2:7	Hello	28:16
13, 24	11:11	3:5	8:16	29:3, 13,
31:5	12:21	5:21	helpful	21 30:2,
functional	23:5	6:15	28:4	3, 13, 23
ities	25:11	8:6	history	31:12,
33:13, 14	29:2	9:19	9:24	18, 19,
functional	goes	10:5	10:9	24 32:5,
ity	11:20	11:2	hoc	11, 14,
13:2	20:4	13:13	25:19,	17 33:6,
15:5, 17,	going	14:20	25 26:3,	8, 12, 20
18	8:1	16:7, 23	11, 14,	34:3, 15,
30:17,	19:3	19:1, 9	15, 18, 21	25 35:5,
18	22:9	22:15	Hold	11, 13,
31:21,	36:14,	23:5, 25	38:9	16, 17,
22 32:13	19	24:25	Home	21 36:2,
Further	39:19, 21	26:4, 23	4:8	3, 6
6:10	Good	27:17,	20:12	37:15, 20
37:3	5:2	24	23:12	

HomeRF/SWA	independen	interested	issue	know
P 4:7	tly	40:11	8:8	10:22,
23:11	17:7, 8	interface	24:23	23, 24
25:6	industry	11:3	31:20	15:18
honest	24:8	intermedia	32:13	18:15,
27:3, 5	initial	ry 36:10	33:17	24 24:4,
horizontal	INNOVATION	intermedia	its	5, 19
11:4	S 1:8	te 14:12	17:20	25:8
host	5:12	interrupt	30:19	26:18
29:9	6:1	23:4	31:5	27:1, 22
hour	I-node	introduce	< J >	28:13
36:15	13:6, 8,	12:11	Jim	29:11
hundreds	11, 23	introduced	22:6, 23,	32:25
11:19	14:1, 3,	22:13	25 24:3	< L >
< I >	18 15:6,	introducti	JOB 1:21	labeled
identifica	17, 22	on 25:3	jump	22:11
tion	16:1, 5,	investigat	20:15	28:23
10:17	13, 16,	e 27:2	< K >	Lacks
37:2	21 17:5,	IP 5:23	KENT	23:25
identify	11, 18,	IPR2024-	2:11	24:25
5:16	23	01048	Kevin	26:4
28:3	30:18,	1:6	2:20	Lansford
important	19 31:4,	5:13	5:22	22:6, 24,
29:10	11, 17,	isochronou	KIAEI	25 24:3,
include	21, 22	s 13:8	1:15	11, 15
6:5	32:15	14:5, 14	3:3	26:16, 17
14:10	33:15, 18	19:8, 14	5:10	LAW 2:3
included	I-nodes	20:11	6:23, 24	laws 6:2
38:14, 23	13:15	27:13	7:2, 7,	layer
includes	27:16	29:13,	16, 17	25:6, 7
14:10	29:6, 7,	21 30:3,	8:25	left
15:2	16, 24	13, 23	11:3, 16	11:5
including	30:5, 15	31:12,	19:18	left-hand
14:14	31:1, 14	24 32:5,	35:2	20:1
independen	Intel	17 33:8	37:7	23:19
t 17:1,	22:6, 24	34:4, 16,	38:4	Legal
19 31:4,	INTELLECTU	20, 21	41:13	1:19
18	AL 2:3	35:6, 12,	42:1	5:7
	interconne	14, 17	K-I-A-E-I	line
	ctions	36:7, 12	7:2	5:22
	11:18			

37:24		memorize	moment	9:24
42:1	management	19:4	27:23	11:18
lines	29:6, 7	mention	33:25	12:4, 24
11:4	mark 8:3	9:14	38:10,	18:3, 25
37:25	marked	32:15	12, 19	19:7, 13
little	10:14,	mentioned	Monday	20:5, 12,
17:9	17	9:12	1:16	20, 23
LLC 2:11	22:14	17:25	morning	21:6, 12
load 8:2	36:25	37:8	5:2	23:20
LOCATION	37:2	method	6:23	25:13,
1:19	markings	6:9	7:16	18, 19,
33:19	12:15	Michelle	move	20, 25
long	match	1:20	12:6	26:3, 14,
13:3	25:6	5:6	multiple	15, 18,
look	matter	10:22	15:13	21
14:8	5:11	38:7	mute	27:12,
18:19	6:3	40:3, 17	34:6, 9	15
19:3	mean	millions		29:14,
20:2	9:20	11:19	< N >	22 30:2,
21:4	15:18	mind	name	3, 13, 24
24:9	16:8	12:6, 7,	5:6	31:12,
25:16	17:9	10	6:22	14, 24
27:2	18:17	33:22	7:1	32:5, 17
28:11	24:3, 17	34:13	necessaril	33:8
looked	26:15	minus	y 26:7	34:3, 15
26:12	27:20	11:8	38:16	35:5, 12,
looks	28:3, 8	minutes	necessary	16, 21
11:3	30:17	36:16	20:20,	36:3, 6,
loud	32:20,	mistake	25 21:2,	11
34:10	25 35:16	37:16	3, 12, 16,	
	means	mistyped	25 22:2,	networking
< M >	6:4, 7	37:13	3	7:25
MAC	mechanism	misunderst	need	15:3
25:4, 7	14:4	ood	19:2	20:7
main	15:13	31:10	27:1	32:12
20:11	16:20	mobile	39:12	networks
manage	17:3	14:14	needs	23:24
27:16		35:24	22:14	26:11,
managed	mechanisms	36:9, 12	neither	19 36:11
25:19	16:22	37:15, 19	40:9	never
	Media	model	network	27:14
	25:4	14:10	7:23	

New 4:5		36:17,	open	overview
5:8	< 0 >	21 37:1	8:14	24:6, 10
9:5	oath	38:11,	12:8, 16,	25:3, 5
22:21, 22	6:11, 12	17, 21	17, 18	Owners
node	Object	39:3, 7,	operate	1:10
14:4, 13,	9:19	13, 17	23:24	2:17
14 15:7,	10:5	40:1, 18	25:19	5:12, 20
12, 24,	13:13	official	31:7, 11,	
25 16:6	14:20	6:5	12, 24	< P >
17:7, 19,	16:7, 23	Oh 38:17	32:5, 17	p.m
20 31:4,	19:1, 9	Okay	33:8	1:18
18	23:25	6:19	operates	36:18,
32:14	24:25	8:11, 20	31:5	22
35:17	26:4, 23	9:2, 9,	operation	39:21, 23
36:7	27:17,	16 10:3,	30:19	PAGE
nodes	24	12 11:1,	opine	3:3
13:15	29:17	14, 25	18:19	4:4
14:16	30:6, 16	12:7, 9,	26:17	9:4, 6
17:1	31:2, 15	17 13:6,	opined	11:12,
29:12	32:1, 19	10, 19	27:9	13
31:20	33:10	14:18,	opinion	13:11
32:12	34:17	24	27:11	14:2
34:19	35:7	15:16,	oppose	15:11
35:14,	objecting	20 16:5	6:7	19:24,
15, 18,	23:6	18:21	opposed	25 20:2
22 36:4,	Objection	19:24	21:7	22:1
8	37:11	20:1, 9,	opposite	23:14,
North	OFFICE	15, 23	30:12	18, 21
2:12	1:1	21:10,	option	25:11
notary	5:14	20 22:5,	11:5	28:15,
7:11	OFFICER	25 23:7,	order	17, 18,
41:19	1:20	23	38:23	20, 23,
42:1	5:2, 7,	27:22		25 29:1,
Note	24 6:11,	28:15,	originated	2 42:1
21:5	16, 19,	22, 24,	11:21	pages
noted	25 7:3,	25 29:5	originatin	9:3
42:1	12 8:11,	33:22	g 9:25	18:18
noticing	18, 21	34:1	outcome	paper
5:18	10:13	36:17,	40:11	21:23
number	11:7	23 38:3,	Outside	22:23
29:9	22:10	21 39:3,	37:11	23:8, 17
	34:5, 8	7, 13		24:3, 11,

20, 24 25:8 34:22 papers 24:18 Paragraph 14:8 15:1 20:2, 5, 6, 10 21:5 25:16 33:16, 21, 25 37:9, 13, 17, 18, 23 parentheses 37:14, 19 Parkway 2:12 particular 26:12 27:10 parties 6:4, 10, 14 40:10 PATENT 1:1, 2, 7, 10 2:17, 20 5:12, 13, 14, 15, 20 11:22 PAUL 2:7 5:21 23:3 38:8	paul.hart@eriseip.com 2:8 PC 20:12 29:9 35:24 36:9 PDF 28:17 peer 20:12 24:5, 19, 20 peers 21:7, 22 penalties 42:1 Perfect 11:6 perform 33:19 performs 33:13 perjury 42:1 person 6:11 personally 24:7, 8 personnel 6:9 perspective 24:7 Petitioner 1:5 2:9 5:11, 21, 23	PH.D 1:15 41:13 42:1 phone 14:14 34:7 place 28:10 40:5 41:9 platform 1:19 please 5:16 6:21 7:1 10:16 12:21 16:10 23:14 29:19 32:3 33:3 34:6, 13 38:10, 12, 19 plus 11:8 Point 2:12 12:11 14:11 17:8, 25 18:4, 7, 11, 21, 25 20:17, 19, 24 21:8, 11 22:1 25:20,	24 26:2, 22 27:4, 16 28:10, 13 29:5, 14, 22 30:4, 14, 24 31:7, 13, 25 32:6, 18, 21, 24, 25 33:1, 3, 5, 9, 12, 14, 20 34:25 36:2 points 34:24 preferable 39:6 prepared 27:9 PRESENT 2:19 7:11 press 11:12 pretty 28:2 primarily 25:7 probably 22:20 problem 8:10 procedural 6:2 PROCEEDING	5:2, 9, 24 6:8, 16, 19, 25 7:3, 12 8:11, 18, 21 10:13 11:7 22:10, 13, 16 34:5, 8 36:17, 21 37:1 38:11, 17, 21 39:3, 7, 13, 17 PROCEEDING S 1:20 6:11 39:23 40:1, 4, 6, 18 produced 38:24 39:1 PROPERTY 2:3 protocol 25:4 33:18 provide 16:6, 14, 19, 21 17:1, 6, 17, 22 29:6 provides 14:4 15:13, 14, 15 16:16,
--	--	--	--	---

18 17:11, 14, 20 25:3 29:7, 8 32:11 PSTN 7:20 9:7, 10, 12, 15, 17, 21 10:4 11:17 29:8 public 7:11, 22, 24 9:23 41:19 42:1 publicatio n 24:16, 17 publish 24:17 published 24:4 purchasing 39:9 pursuant 6:2 put 8:1 12:10 19:15, 16, 17 22:21 34:6, 9 putting 19:20 < Q >	quality 14:12 question 12:20 15:16 16:9, 25 17:11 18:10, 11, 12 28:4, 12 29:18 30:1, 12, 21 31:4, 10, 17, 20 32:2, 8, 9, 16 33:6, 12 34:13 35:4, 9, 20 questions 33:24 37:4 38:20 quite 8:7 < R > raise 7:4 read 13:25 24:11 25:8 34:18 39:14, 16 42:1 reading 11:9 realize 36:23	really 9:22 17:10 20:25 26:12 27:9 re-ask 12:20 REASON 42:1 recall 18:13 28:1 record 5:3, 8, 17 6:5, 22 22:15 23:16 36:19, 20, 22, 24 37:10 39:19, 22 recorded 40:6 recording 6:6 refer 12:1 reference 9:14 referenced 9:10, 17 referring 20:6 refers 11:17 refresh 8:13	regards 9:13 registrati on 33:19, 20 regularly 24:18 related 40:10 relative 24:22 remember 18:5, 16 37:23 reminding 10:16 REMOTE 1:19 5:7 remotely 5:25 removed 29:15, 23 30:4, 14, 24 31:13 repeat 29:18 32:2 33:6 repeated 37:16 reporter 8:3 represent 5:17 28:9 represents 28:8 require 18:4	26:22 35:24 required 16:5, 13, 21 20:24 21:1 26:3 27:16 29:6 requiremen ts 29:9 requires 18:25 33:14 reserve 39:15 reside 6:13 response 35:4 review 24:5, 19, 20 right 7:4, 17 8:20 10:25 11:6, 16 12:13 16:2 17:6, 23 18:24 20:6, 17 22:7 23:10, 14 25:11 27:2, 23 28:7 32:15
--	--	--	---	---

37:7	30:2	17	services	32:3
39:15	31:6	22:22,	15:24,	34:5
right-	says	23 23:7,	25 16:1,	35:2
hand	11:17	12, 13,	19	38:18
28:21	20:10,	18, 21	set	source
RISLEY	19, 22,	25:13,	13:15	19:3
2:11	25 21:5,	21, 22	14:15	spec
Rongish	15 22:1,	29:3	40:5	18:18
2:20	3, 4	seeing	sharing	specific
5:22	23:20	8:6	12:7	18:18
rough	25:2, 18,	23:17	show	26:19
39:12	23 26:1,	seen	27:19	27:18
route	6 36:3	23:15	sign	28:10
14:12	37:14	sending	39:14, 16	specificall
routed	scope	17:7, 10	signature	ly 9:14
21:7	37:12	Senior	42:1	24:9
routing	screen	2:20	similar	specificat
14:12	8:1	sense	16:1	ion
rules	19:17	15:12	sir	12:1, 3,
6:2, 12	22:22	sentence	7:18, 21	23 14:2
< S >	scroll	20:9, 16	12:2	16:12
S.M.R	9:2	21:5	17:24	17:15
1:8	second	25:18, 23	18:2, 9	19:5
5:11	8:2, 3,	sentences	19:19,	24:15
6:1	13 9:5	20:16	23, 25	27:19
SAFYE	14:8	separate	20:8, 18,	28:16
1:15	20:9	17:1	22 22:8,	36:2
3:3	24:6	31:20	23 23:2,	specified
41:13	30:12	32:13	8, 13	41:9
42:1	33:3	September	25:12	spell
saw	37:24	1:16	slaves	6:21
18:17	section	5:3	20:11	7:1
33:21	23:19	39:1, 4,	S-node	standard
Sayfe	25:13, 17	20	34:20	24:10
5:10	see 8:4,	40:13	S-nodes	39:11
6:23	5, 21, 23,	41:5	29:7	standards
S-A-Y-F-E	25 9:4,	42:1	software	24:9, 22
7:2	7, 22	service	15:2	standing
saying	11:13	14:5, 6	sorry	13:8
26:2	19:3, 18	15:14	18:8	stands
28:13	20:3, 8	16:3, 4	23:3	7:22
	21:8, 9,		26:16	

Stanford 26:16	9:10, 13, 17	table 29:3, 12	tell 7:5	thereof 40:11
START 1:17	11:25	take 5:8	28:11	thing 8:13
starting 5:17	12:8	12:13	ten 36:16	31:5
starts 20:3	18:6, 14	33:4	term 7:20	37:7, 18
state 5:17	37:9	39:11	10:1	38:2
6:21	supported 25:25	taken 5:11, 25	17:25	things 8:12
15:1	supports 20:10	40:4	28:3, 6,	18:19
32:7	Sure 7:19	talk 18:21	9 32:15	28:9
stated 32:9	12:19,	33:17	terminolog y 10:8	think 9:13
statement 19:11	22	talking 18:7, 8	terms 24:21	12:14
21:11	13:10	23:23	33:4, 18	14:1
26:14,	19:21	25:9	testified 7:11	16:2
16, 21	21:24,	26:18	7:11	21:15,
30:8	25	28:14, 18	testify 41:4	18
33:4, 5	23:15	talks 21:23	testimony 6:8, 9	22:13
	24:12	29:3	27:12	24:8
	38:11	TDMA 14:4	41:5, 9	26:25
statements 24:20	SWAP 20:5, 7	TECH 1:9	text 11:9	28:24
STATES 1:1	25:5	5:12	Thank 5:24	36:14,
5:14	swear 7:4	technical 9:22	6:20	15 37:23
11:23	switched 7:22, 24	technology 20:10	7:3, 12,	third 9:3, 6
stating 11:24	9:24	telephone 7:22, 25	18	thought 22:20
stenograph ic 6:6	11:18	9:24	10:15	three 9:3
stipulate 6:14	sworn 7:10	11:18	11:14	11:4
Street 2:4	41:4, 15	14:15	19:19	TIME 1:17, 18
Suite 2:5, 13	42:1	telephones 11:19	22:14	5:4, 5
5:7	System 4:8		34:10	23:16
supplement al 7:19	7:25		38:4, 5,	30:12
	14:10		7, 8	36:15,
	23:11		39:7, 14,	18, 19,
	< T >		17	21, 22
			Thanks 38:6	38:6
				39:21

40:5	trouble	37:22	VIDEOTAPED	ways
41:9	11:9		1:12	30:13
titled	true	< U >	vision	website
23:10	17:5	U.S 1:7	20:7	10:20
25:13	26:14	5:13	Voice	Webster's
today	40:7		4:7	4:5 9:5
26:20	41:8	understand	14:13	Wednesday
Today's	42:1	12:12	23:11	42:1
5:3	truth	16:9		well
toll	7:5, 6	28:7, 25	< W >	7:1
14:12	41:4	30:11	Wait	9:20
top	try	35:3	38:15	13:22
11:4	8:12	understand	want	15:12
15:23	15:20	ing 25:6	8:12	16:12
16:2	32:16		10:14	20:25
18:5, 16	trying	understood	13:10	24:14
21:18	30:11	14:1	18:19	29:12
23:21	turn	23:18	21:24,	32:11
26:25	19:24		25	35:13, 25
Topology	23:14	unfamiliar	22:10	we're
23:20	28:15	11:2	33:22	8:6
25:14	two	UNITED	wanted	13:10
26:13	11:8	1:1	12:9	21:25
TRADEMARK	16:25	5:14	37:10	36:24
1:1	21:6	uses	way	38:15, 17
5:14	type	14:4	10:18,	we've
	13:6, 12,	15:12	19	36:14
transcript	24	utilize	13:15	Wireless
38:14,	14:19,	33:18	14:22	4:7
23, 24,	24 16:1,		19:15,	14:13,
25	3, 22	< V >	16	15
39:10	29:4	vague	21:22	20:13
40:8	36:13	28:2	26:17	23:11
41:8	types	33:12	27:11	WITNESS
transfer	12:4, 23	variety	29:25	1:15
21:6	13:1	29:11	30:8, 21	6:21
TRIAL	16:20	various	31:17	7:10
1:2	36:10	13:1	32:7, 8	9:20
5:15	typing	34:19	35:8	10:6, 18
tried	34:10	Verbatim	40:11	11:6
22:21	typo	37:18		13:14
		video		14:21
		14:13		

16:8, 24	37:1			
19:2, 10	38:9			
22:17	year			
23:3, 7	24:18			
24:2	Yep			
25:2	23:21			
26:6, 24	York 5:8			
27:18,				
25	< Z >			
29:18	Zhang's			
30:7, 17	37:14,			
31:3, 16	19, 24			
32:2, 20	zoom			
33:11	11:9, 10			
34:12,				
18 35:8				
37:13				
38:5				
39:14				
World				
4:5 9:5				
worldwide				
11:17, 19				
< Y >				
Y.M.R				
1:9				
5:12				
Yeah				
8:4, 5,				
9 10:15				
13:25				
20:8				
21:15,				
16				
22:20				
23:7				
24:17				
28:24				
31:10				
34:11				

EXH-1
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WEBSTER'S NEW WORLD™

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BRYAN PFAFFENBERGER

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attack comes at the price of imposing inconveniences (including configuration hassles and slower performance) on Internet users who want to access the external service, such as America Online, a server that has been configured to store Web pages that are frequently accessed by the service's members. When members request these pages, the server provides the copy it has stored rather than requesting the page from the external Internet. Members see Web pages more quickly and the network experiences a lighter load, but these benefits come at a price: The displayed page may be out-of-date.

PrtScr See *Print Screen*.

PS/2 mouse A mouse with a special connector that fits into a mouse port. PS/2 mouse devices, or mouse devices equipped with PS/2 connectors, do not require a serial port to operate and are much simpler to install.

PS/2 mouse port A mouse port on the back of the computer's case that enables the user to connect any mouse with a PS/2 mouse connector. This port enables users to connect a mouse without using a serial port or having to deal with the port conflict issues that such a connection might cause.

pseudoanonymous remailer In the Internet, an e-mail forwarding service that enables Internet users to send anonymous e-mail or to post anonymously to Usenet. These services maintain records that preserve the sender's true identity, so they are not truly anonymous. See *anonymous remailer*.

pseudocode An algorithm expressed in English to conceptualize a program before coding it in a programming language. Pseudocode cannot be compiled; it is for human use only.

PSN Acronym for processor serial number. A unique serial number assigned to each microprocessor in such a way that it can be used to record this

number. Web sites could use the PSN to determine which computer is accessing the site; if this number were matched with an individual's name, it would be possible to track an individual's Web usage with precision. In response to criticism from privacy advocates, Intel shipped Pentium IIIs with PSN switched off. However, the function can be switched back on by programs that evade user monitoring. See *GUID*.

PSTN Acronym for public switched telephone network. The worldwide network of switched telephone interconnections, enabling hundreds of millions of telephones worldwide to establish direct connections. Originating in 1876 with Alexander Graham Bell's patent, the PSTN began with a number of local, manually switched analog networks, which were gradually interconnected as standards emerged. By the 1950s and 1960s, most local switching networks had made the transition from manual switching, which requires a human operator, to electronic switching, which enables direct dialing. In the industrialized nations today, much of the switching network employs digital technology, with the exception of the local loop, which is still primarily analog due to the antiquated wiring found in older homes. ISDN provides an international standard for the extension of digital telephony to homes and offices. Worldwide telephone standards are governed by the International Telecommunications Union (ITU), a division of the United Nations.

public data network (PDN) A wide area network (WAN) that makes long-distance data communication services available to organizations and individuals. PDNs are extensively used by corporations to enable secure communication with branch offices, field agents, and suppliers, as well as to implement Electronic Data Interchange (EDI) transaction processing. PDNs set up custom, dedicated connections, called leased lines, which are much more secure than the Internet because they are not used by anyone other than the network's authorized corporate users. There

HomeRF™/SWAP: A Wireless Voice and Data System for the Home

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Abstract

The HomeRF Working Group is an industry association comprised of over 100 companies from the computer, telecommunications, and consumer electronics industries. This group has developed an open specification for a voice and data network for the home called the Shared Wireless Access Protocol, or SWAP. The SWAP specification for wireless voice and data networking within the home will enable a new class of mobile consumer devices that draw from the power and content of the Internet and the Home PC. If cable modems and xDSL represent the "last mile" access to the home, then HomeRF's mission with SWAP could be called the "very last 150 feet" within and around the home. HomeRF has the broad backing of the major corporate stakeholders for networking within the home and is optimized specifically for the cost/performance point needed for consumers. The technology leverages the existing PC-industry infrastructure around the Internet, TCP/IP and Ethernet and adds a standard way to connect to the PSTN for voice telephony. First products should appear in early 2000 and future versions with enhanced features and/or higher data rates should follow by 1-2 years.

Home RF Working Group

The mission of the Home RF Working Group is:

To bring about the existence of a broad range of interoperable consumer devices by establishing an open industry specification for unlicensed RF digital communications between PCs and between PCs and these devices anywhere in and around the home.

Introduction

This document provides an overview of the MAC protocol for SWAP. The MAC protocol is designed to carry both voice and data traffic and interoperate with the Public Switched Telephone Network (PSTN) using a subset of the DECT (Digital Enhanced Cordless Telecommunications) standard.

The system is designed to operate in the ISM band and uses a frequency hopping radio. The MAC includes a TDMA (Time Division Multiple Access) service to support the delivery of isochronous data (e.g. interactive voice), and a CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance) service, derived from the IEEE 802.11 draft standard for Wireless LAN [802.11], to support the delivery of asynchronous data and provide good data throughput. The MAC is designed to operate in the presence of other ISM band RF systems and interferers (e.g. microwave ovens).

The system uses the DECT higher layers to provide the functionality necessary to support telephony calls and supports DECT at the MAC level by incorporating one DECT A field and two B-fields into voice data packets transmitted on the network.

Main System Parameters

- Frequency hopping network, Hop period = 20ms
- Frequency range: 2.4GHz ISM band
- Transmission power: 100mW
- Bit Rate: 0.8 Mbps using 2FSK modulation
1.6 Mbps using 4FSK modulation
- Range: > 40m
- Supported stations: 4 simultaneous handsets, 48-bit IEEE MAC address
- Voice connections: up to 4 fully protected¹
- Data security: Session based, Stream cipher
- Data compression: LZRW3-A algorithm
- 48-bit Network ID (NWID): Enables concurrent operation of multiple co-located networks.

¹ All voice calls are routed through a Control Point. The system supports 4 fully protected external voice calls, 2 internal/intercom voice calls, or up to 8 partially protected external voice calls while still providing support for concurrent data traffic.

Network Topology

The network can accommodate an almost unlimited number of nodes. These nodes can be a mixture of 5 basic types:

- Control Point (CP) that supports voice services and power management.
- Control Point that supports power management only.
- Voice Terminal that only uses the TDMA access mechanism to communicate with a Control Point.
- Data Node that uses the CSMA/CA access mechanism and can communicate with a Control Point and other data nodes.
- Voice and Data Node which can use both access mechanisms.

The network can operate as either an ad-hoc network or as a managed network under the control of a Control Point. In an ad-hoc network all stations are equal and control of the network is distributed between the stations. Since there is no Control Point only data communication is supported in an ad-hoc network.

Medium Access Control (MAC) Architecture

The MAC provides two services:

- An asynchronous (CSMA/CA) data service.
- An isochronous (TDMA) voice service.

The MAC protocol uses a superframe, which incorporates two contention-free periods (CFP) and a contention period. The start of the superframe is the point at which a station begins to hop to a new channel and ends immediately before the station starts to hop to the next channel. The duration of the superframe is fixed and is the same as the hop period. The access mechanism used during each CFP is TDMA, whilst the access mechanism used during the contention period is CSMA/CA. The following figure shows the overall structure of the superframe.

The contention free periods (CFP1 and CFP2) only exist in a Managed Network. If no Control Point is present then the CSMA/CA contention period occupies the whole superframe.

TDMA Access Mechanism

A Control Point manages access to the medium during the contention free periods. Each CFP is divided into a number of pairs of TDMA, one per TDMA connection. The first TDMA slot in each pair is used by the CP (downlink slot) and the second TDMA slot is used by the node (uplink slot).

The CFP at the *end* of the superframe is used for the *initial transmission* of TDMA data. The CFP at the *beginning* of the superframe is used for the *retransmission* of TDMA data that was not received correctly. The two CFPs are separated by a hop (giving frequency diversity). This structure also minimises the delay between transmission of the original data and any retransmissions which may be required.

The service slot is used by a voice terminal to send management messages to a Control Point.

Voice data is transmitted in a TDMA uplink or downlink slot using the Voice Data message. This message is always transmitted at 2FSK and includes the DECT A field (used for control information) and an extended DECT B field (which contains speech data equivalent to 20ms of 32 kbit/s ADPCM data).

CSMA/CA Access Mechanism

A CSMA/CA access mechanism is used during the contention period of the superframe. This mechanism is similar to Ethernet (802.3), the main difference being that the contention is slotted and that unicast packets are followed by MAC level acknowledgements.

The CSMA/CA access procedure is designed to provide all nodes with fair access to the medium by using a contention window and backoff counter. Before any node transmits a packet it selects a backoff counter (a number of contention slots) and then starts listening. When the medium has been clear for a DIFS period it decrements its backoff counter for each free contention slot. When the backoff counter expires the node transmits the message. Whenever the medium is busy the countdown is suspended and only resumes when the medium has been free for a DIFS period. Performing a backoff before transmission reduces the probability that responses from multiple nodes responding to a broadcast message on an otherwise idle network collide.

If a retransmission is required because of a collision or transmission failure the size of the collision window is increased from an initial value of 8, exponentially, up to a maximum of 64 to avoid congestion.

SIFS Period = 142us : This is the time from a node receiving the last bit of a packet to transmitting the first bit of a response (e.g. an Acknowledgement) onto the air.

DIFS Period = 309us : When the channel is free for a DIFS period it indicates that the previous packet exchange is complete and other nodes may contend for the channel.

Slot Time = 167us : The contention slot time is designed to allow a node to detect if another node has started transmission in the contention slot before theirs, and thus hold off.

Packet Format

There are 3 different packet types:

- Data
- Management
- Control

All packets use the same PHY header and MAC header.

The physical layer (PHY) packet consists of a header followed by the MAC layer data unit. The PHY supports operation at 1Mbps (using 2FSK

modulation) and at 2Mbps (using 4FSK modulation). The PHY header is 26 octets long if a frame uses 2FSK modulation, and 34 octets for 4FSK modulation. Only unicast MSDUs may be transmitted at 4FSK.

Conclusion

This paper has presented an overview of the MAC for a new, home oriented RF wireless communications system designed to support both voice and ethernet-type data. The presentation at the conference will not only include details of the MAC protocol, but also information about the physical layer. This communication system will be supported by many companies around the world as digital information transfer in the home becomes more commonplace.

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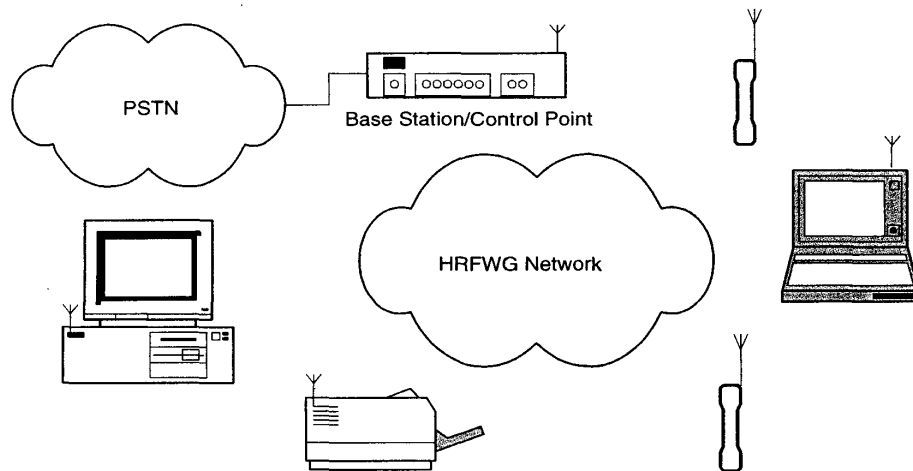


Figure 1: Managed Network with an External Connection

Figure 1

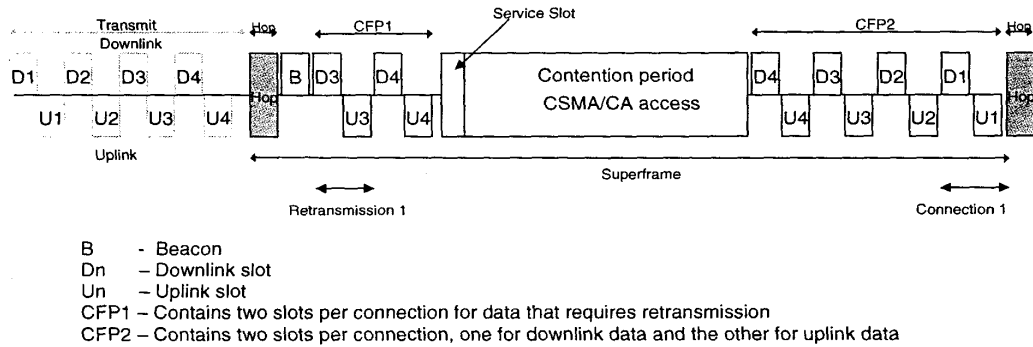
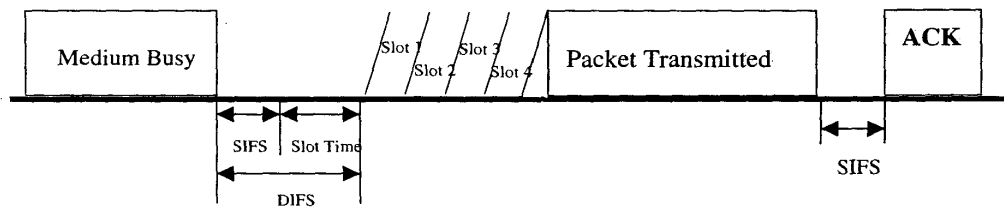


Figure 2: MAC Superframe



- Sender selects a slot (backoff counter) and then decrements the counter whilst the medium is clear
- Medium must be free for a DIFS period before the backoff counter is decremented.
- Example shows transmission of a packet in slot 5.

Figure 3: CSMA/CA Access Mechanism

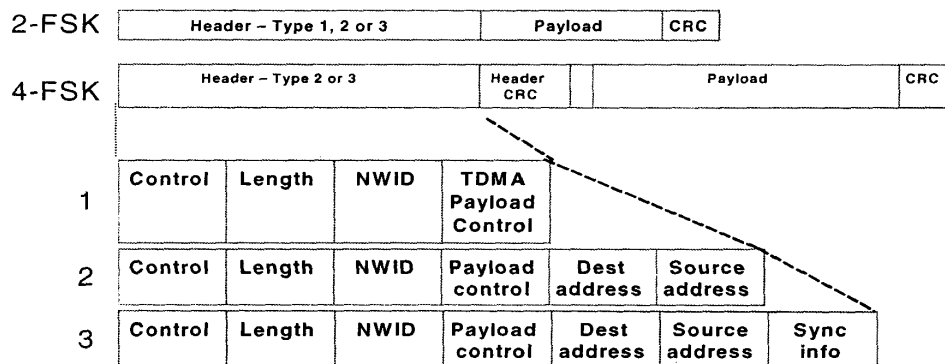


Figure 4: Packet Format

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