UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

HONORABLE DAVID O. CARTER, JUDGE PRESIDING

- - - - - - -

ECHOSTAR SATELLITE CORP., et)
al.,)
)
          Plaintiffs,)
)
     vs.) No. SACV 03-950 DOC
)   Day 2, Volume III
NDS GROUP PLC, et al.,)
)
          Defendants.)
_____)

REPORTER'S TRANSCRIPT OF PROCEEDINGS

Jury Trial

Santa Ana, California

Thursday, April 10, 2008

Debbie Gale, CSR 9472, RPR

Federal Official Court Reporter

United States District Court

411 West 4th Street, Room 1-053

Santa Ana, California 92701

(714) 558-8141

EchoStar 2008-04-10 D2V3

1   APPEARANCES:

2

3   FOR PLAINTIFF ECHOSTAR SATELLITE CORPORATION, ET AL.:

4

            T. WADE WELCH & ASSOCIATES
5   BY: CHAD M. HAGAN
                  CHRISTINE D. WILLETTS
6   ROSS WOOTEN
                  WADE WELCH
7   Attorneys at Law
            2401 Fountainview
8   Suite 700
            Houston, Texas 77057
9   (713) 952-4334

10

11

    FOR DEFENDANT NDS GROUP PLC, ET AL.:
12

            O'MELVENY & MYERS
13   BY: DARIN W. SNYDER
                  DAVID R. EBERHART
14   Attorneys at Law
            275 Embarcadero Center West
15   Suite 2600
            San Francisco, California 94111
16   (415) 984-8700
17   -and-
18   HOGAN & HARTSON
            BY: RICHARD L. STONE
19   KENNETH D. KLEIN
                  Attorneys at Law
20   1999 Avenue of the Stars
            Suite 1400
21   Los Angeles, California 90067
            (310) 785-4600

22

23   ALSO PRESENT:
24   David Moskowitz
            Dov Rubin

25

1   I N D E X

2

3   WITNESSES   DIRECT CROSS REDIRECT RECROSS

4   SHKEDY, Svi

     By Mr. Noll   4   73

5

     By Mr. Snyder   34   79

6

7   EXHIBITS

8   EXHIBIT NO.   IDENTIFICATION   IN EVIDENCE

9   2-A   Draft, Headend   8

              Project Report

10

     98   Final Headend Project   19

11   Report

12   459   E-mail   67

13   789   E-mail   61

14   791   Computer program   65

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1   SANTA ANA, CALIFORNIA, THURSDAY, APRIL 10, 2008

2   Day 2, Volume III

3   (1:00 p.m.)

4   (In the presence of the jury.)

5   THE COURT: All right. We're back in session.

6 The jury's present. All counsel are present. Thank you for

7 your courtesy.

8   Counsel, the witness, Mr. Shkedy, is present with

9 the interpreter. And, Counsel, if you'd like to continue

10 your direct examination. Once again for the record just

11 identify yourself.

12   MR. NOLL: Okay. David Noll for the plaintiffs,

13 Your Honor.

14   THE COURT: Thank you very much.

15   ZVI SHKEDY, PLAINTIFF'S WITNESS, PREVIOUSLY SWORN,

16   RESUMED THE STAND

17   DIRECT EXAMINATION (Continued)

18

19 BY MR. NOLL:

20 Q.   Mr. Shkedy, do you recall, before lunch -- before we

21 took our break, you were talking about the device that NDS

22 has in its offices in Haifa, Israel called the "sniffer."

23 Do you recall that, sir?

24 A.   Yes, sir.

25 Q.   This is a device that NDS has never patented; is that

1 correct?

2 A.   That is correct.

3 Q.   In fact, NDS has never applied for a patent for the

4 sniffer; is that correct?

5 A.   As far as I know, you are correct.

6 Q.   Okay. And you're not aware of NDS providing the

7 sniffer technology to anyone outside of NDS?

8 A.   No.

9 Q.   Okay. I want to talk to you a little bit about --

10 earlier you testified about reverse engineering, what you

11 did to hack the EchoStar Smart Card.

12   Now, we heard you talk a little bit about a focused ion

13 beam, and I think you said that NDS may have leased the

14 focused ion beam. Do you recall saying that?

15 A.   I said that we lease the focused ion beam in '98.

16 Q.   Okay. Now, does -- thank you for the time frame

17 clarification.

18   When did NDS purchase the focused ion beam?

19 A.   We had a contract with a company name Micron from 1998

20 up to about 2000. And we had the FIB leased for this period

21 of time.

22 Q.   So just to be clear, NDS does have in its lab in Haifa

23 a focused ion beam now; is that right?

24 A.   Now, no.

25 Q.   What happened to the one that NDS had?

1   A.   The contract had been terminated on, I think it was

2   2001. And the company didn't want to extend the contract

3   further, the Micron, I mean, the one that --

4   THE INTERPRETER: The leasing company did not want

5   to continue the lease.

6   THE WITNESS: Thank you.

7   BY MR. NOLL:

8   Q.   Going back to the 1998 time frame, which you testified

9   is when the EchoStar hack was done by NDS, would you say

10   that the focused ion beam was a rare piece of equipment?

11   A.   No.

12   Q.   Do you know how many labs around the world had a

13   focused ion beam in 1998?

14   A.   I don't know, but I'm personally went twice to England,

15   to a different laboratory, and I use the FIB over there, the

16   focused ion beam.

17   Q.   Now, when you went to England, did you do that in

18   connection with the EchoStar hack?

19   A.   One time it was connection with the EchoStar. The

20   second time I went for evaluation of one of the NDS chip.

21   Q.   All right. So we've now talked about what you did to

22   extract the codes from EchoStar's Smart Card. So what I

23   want to do now, going forward, is talk about what you did

24   with that information. Okay, sir?

25   A.   Yes, sir.

1   Q.   Now, you're aware of a report that was written by you

2   and David Mordinson concerning the EchoStar hack?

3   A.   Of course.

4   Q.   And this report is called the Headend Project Report;

5   is that correct?

6   A.   It is correct.

7   Q.   And I'm going to hand to you what's been premarked

8   Exhibit 2 and ask you to take a look at that document, sir.

9   A.   Thank you. Yes, please.

10   Q.   Okay. Do you recognize Exhibit 2, sir?

11   A.   Yes, sir.

12   Q.   And is it correct that this document is the first draft

13   of the Headend Project Report?

14   A.   I don't know if this is a first draft. I have to look

15   further down. But it seems so.

16   MR. SNYDER: For the record, Your Honor, I believe

17   this is Exhibit 2-A.

18   THE COURT: 2-A?

19   THE WITNESS: 2-A, yes.

20   THE COURT: Thank you.

21   THE WITNESS: I don't know if this -- I cannot say

22   whether this is a draft or the final report. I have to go

23   through it. It will take some time. If you want, I can do

24   it.

25

1   BY MR. NOLL:

2   Q.   Okay.   There was two -- there was an initial draft and

3   then a final Headend Project Report; is that correct?

4   A.   Yes.

5   Q.   Okay.   Now, the document that you're looking at, marked

6   2-A, that's a document that was made in Israel by you and

7   David Mordinson; is that correct?

8   A.   It is correct.

9   Q.   And you kept that document in the ordinary course of

10   business in the Haifa lab in Israel; is that correct?

11   A.   We have it not as a hard copy but as a file on the

12   computer.

13   Q.   Okay.

14   MR. NOLL: At this time Plaintiffs offer Exhibit 2

15   into evidence.

16   THE COURT: No objection?

17   MR. SNYDER: No objection to Exhibit 2-A.

18   MR. NOLL: 2-A, I'm sorry.

19   THE COURT: 2-A is received.

20   (Exhibit No. 2-A received in evidence.)

21   BY MR. NOLL:

22   Q.   Take a look, sir, at the top right-hand corner of 2-A.

23   It has an October 27th, 1998 date.   Do you see that, sir?

24   A.   Yes, sir.

25   Q.   Does that refresh your recollection that this was the

1   draft, the initial draft of the Headend Project Report?

2   A.   I can browse through the document and see whether or

3   not this was the final or a draft. In the draft there are a

4   few paragraphs that are missing, and it had been edited

5   afterward to the final version. So I can go through there,

6   and then I will be sure whether or not this is a final or a

7   draft.

8   Q.   Okay. Do you want to look -- would you like to do

9   that?

10   A.   Yes.

11   THE COURT: Do you have my copy of 2-A?

12   MS. WILLETTS: Yes, Your Honor.

13   THE WITNESS: This is the draft. I can recognize

14   it by turning to page 11. And there are two paragraphs that

15   are missing that says "Zvi" that I had to add to the report.

16   So this is a draft.

17   BY MR. NOLL:

18   Q.   Okay, sir. Let's focus your attention back to the

19   first page of Exhibit 2-A, please. I'm going to direct your

20   attention to No. 2, Hardware. Do you see that, sir?

21   A.   Yes.

22   Q.   I'll read for you. Underneath that it says "the

23   SGS Thomson ST16CF54 CPU has a standard Motorola 6805

24   architecture with the following differences."

25   Did I read that correctly?

1   A.   Yes, correct.

2   And may I add something?

3   Q.   Sure.

4   A.   In my deposition I made an error, and I said its

5   architecture is 8501 of Intel, and I found it when I browsed

6   through my deposition about a week ago. So I would like to

7   correct my deposition if it's possible.

8   Q.   Thank you very much, sir.

9   Okay. Now, this particular architecture, this Thomson

10   ST16CF54 architecture, this is a chip that NDS never used;

11   isn't that correct, sir?

12   A.   It is correct.

13   Q.   Okay. And it's also true that during the time frame

14   that you were performing this EchoStar hack in 1998, NDS

15   didn't use any ST microprocessor; isn't that correct?

16   A.   It is correct.

17   Q.   And as far as you know, Mr. Shkedy, NDS had no business

18   relationship with ST in 1998; isn't that correct?

19   A.   As far as I know, you are correct.

20   Q.   And focusing back on this 1998 time frame when you were

21   performing the EchoStar hack, DirecTV's conditional access

22   technology had been compromised; isn't that correct?

23   A.   It is correct.

24   Q.   And NDS was the provider of DirecTV's conditional

25   access at that time?

1   A.   Yes.

2   Q.   The exhibit we're looking at, Exhibit 2-A, this Headend

3   Project Report draft, this wasn't prepared in an effort by

4   NDS in order to fight the compromise of the DirecTV system;

5   is that true, sir?

6   A.   Can you please repeat. I didn't --

7   Q.   Sure. You just testified that the DirecTV system was

8   hacked in 1998, right?

9   A.   Yes.

10   Q.   And focusing on this exhibit, 2-A, this document was

11   not prepared by NDS in any effort to try to fight against

12   the compromise of DirecTV's system, correct?

13   A.   One moment.

14   (Witness confers with interpreter.)

15   THE INTERPRETER: Can you kindly repeat the

16   question?

17   BY MR. NOLL:

18   Q.   Sure. At the time you created this Headend Project

19   Report, Exhibit 2-A --

20   THE INTERPRETER: (Interprets.)

21   BY MR. NOLL:

22   Q.   -- you didn't do so in order to combat against the

23   piracy that DirecTV was suffering.

24   THE INTERPRETER: (Interprets.)

25   THE WITNESS: Of course, no.

1   BY MR. NOLL:

2   Q.   You agree with me, right?

3   A.   Yes, yes.

4   Q.   And, Mr. Shkedy, at the time you did create this

5   report, to your knowledge, EchoStar was secure?

6   A.   As far as I know, yes.

7   Q.   And you would agree with me, sir, that hacking or

8   modifying original access cards so you can watch TV without

9   paying for it is an illegal act?

10   A.   You mean pirating?

11   Q.   Yeah. Is that illegal?

12   A.   Pirating is illegal.

13   Q.   Is watching TV without paying for it illegal?

14   A.   As far as I know -- well, I am not a lawyer, but as far

15   as I know the law, you are right.

16   Q.   Is hacking or modifying access cards illegal?

17   A.   No.

18   Q.   Okay. I'd like to focus your attention on

19   Paragraph 3.5.2. It's page 13 of 32.

20   THE COURT: What exhibit number, again, Counsel?

21   MR. NOLL: 2-A. We're still on 2-A.

22   BY MR. NOLL:

23   Q.   In the center it says, "Cloned and Universal

24   Subscription." I'll read it for you. It says, "this is a

25   classic 3M hack. The subscriber subscribing to a basic

1 package of service for a minimal possible charge can view

2 any services, excluding PPV, even if he/she is not

3 authorized to view them."

4   Did I read that correctly, sir?

5 A.   Yes.

6 Q.   And you just testified, sir, that hacking and watching

7 television without paying for it is an illegal act, right?

8 A.   Watching TV illegal -- I think it's unlawful.

9 Q.   And in Exhibit 2, in the section we're looking at,

10 3.5.2, you're describing how a satellite hacker, or pirate,

11 can view EchoStar's satellite signals without paying for

12 them.

13 A.   Yes. This is what is said in the document.

14 Q.   Okay. I want to move you down to Section 3.5.3

15 entitled Cloned and Universal PPV Entitlement. Do you see

16 that, sir?

17 A.   Yes.

18 Q.   I'm going to read for you the first sentence: "As said

19 above, the IRD allows the subscriber to switch to a PPV

20 service only when an appropriate file, 0B, containing

21 correct information regarding this service, exists on the

22 card. The difficulty in 'faking' the 0B for a particular

23 PPV service is that the ID number is different for each

24 service, even if they have the same content and are

25 broadcast on the same channel, and such ID cannot be easily

1   discovered."

2   Did I read that correctly, sir?

3   A.   Yes.

4   Q.   The long and short of what you're describing here, sir,

5   is that the cloned and universal pay-per-view entitlement

6   hack allows a pirate to watch pay TV without paying for it;

7   is that correct, sir?

8   A.   Yes. If you are modifying the content of the EEPROM,

9   you can do whatever you want.

10   Q.   And focus your attention, sir, to the top of page 13.

11   In the center you can see it says "secret." Do you see

12   that?

13   A.   Which -- no.

14   Q.   Very center, at the top of the page.

15   A.   Oh, yeah, okay.

16   Q.   You and David Mordinson labeled this document "secret";

17   is that correct?

18   A.   Of course.

19   Q.   And nothing in this document relates to NDS's

20   technology; is that correct, sir?

21   A.   I have to elaborate a little bit on your question, with

22   your permission.

23   When you are looking on such a chip or such a system,

24   so you try to find out weak point and to say whether or not

25   we in NDS are suffering from the same type of weaknesses.

1   So you can just transfer information that you study in

2 one chip to the designer to say, "Hey, be alerted. Don't do

3 the same mistake, because otherwise you get whole bunch of

4 weaknesses or compromising of the system. So be careful."

5   So the intention was over here to say that the

6 technology or the ways -- the weaknesses that we found in

7 this chip are relevant to our NDS chip, and be aware of such

8 weaknesses.

9 Q.   Sir, the truth is this Exhibit 2-A does not relate to

10 NDS's technology; isn't that correct, sir?

11   MR. SNYDER: Objection. Asked and answered.

12   THE COURT: Overruled.

13   You can answer, sir.

14   THE WITNESS: Okay. It's regard to the technology

15 that says if there is a weakness in the system, you are

16 prone to hacker -- to pirate attack. So one kind of

17 weakness is exactly what we describe in this document.

18   And then we transfer the information to Jerusalem.

19 Jerusalem is a design group. And we told them, "Look, if

20 you are missing or you are not protecting this type of

21 weaknesses, you are open -- you are wide open to many, many

22 attacks."

23   So what we told Jerusalem or we feedback them is a

24 way that it can be compromised, so be aware and don't expose

25 ourselves to the same type of attack.

1   BY MR. NOLL:

2   Q.   Sir, when we started this examination, do you recall I

3   asked -- I reminded you that I took your deposition in this

4   case, correct?

5   A.   Yes.

6   Q.   And you recall at the time that you gave a deposition,

7   you swore to tell the truth; is that right, sir?

8   A.   Yes.

9   Q.   I didn't haul you off the streets in New York. We had

10   a prearranged meeting time to come and have you sit for your

11   deposition; is that correct?

12   A.   Yes.

13   Q.   You had your lawyers present too; is that right, sir?

14   A.   It is correct.

15   Q.   And your testimony is that Exhibit 2 -- you're now

16   saying something different than you said in your deposition;

17   is that right, sir?

18   A.   I don't think so.

19   Q.   Okay.

20   MR. NOLL: Your Honor, I'd offer as impeachment --

21   THE COURT: Not yet. I'm going to allow you to

22   answer the question again.

23   Your answer concerned technology. He's asking you

24   about technology, not process or method.

25   So maybe I'm confused, but I don't believe he's

1   answered the question yet.

2   MR. NOLL: Okay.

3   THE COURT: Ask it again. You asked about

4   technology, if this technology was the same. He's gone

5   through an answer about process.

6   MR. NOLL: All right.

7   THE COURT: Listen to the question again, sir.

8   BY MR. NOLL:

9   Q.   Nothing in this document, Exhibit 2-A, the draft

10   project, Headend Report, relates to NDS's technology,

11   correct?

12   A.   I want to --

13   THE COURT: Define "technology" for him, Counsel.

14   Maybe that would be helpful.

15   BY MR. NOLL:

16   Q.   Well, you testified that the ST Thomson chip is not a

17   chip that was ever used by NDS, right?

18   A.   Yes.

19   Q.   So the subject of the document is the ST Thomson chip

20   and the hack of that chip, correct?

21   A.   Correct.

22   Q.   So nothing in this document relates to any chip that

23   was ever used by NDS in any of its access cards, correct,

24   sir?

25   A.   It is correct if you are looking only to the chip. But

1   if you are looking at what we call the technology, how to

2   protect a channel, a TV channel against hacker to compromise

3   the system, so over here we say there is another technique

4   that the hacker may use, and please defend ourselves against

5   such an attack.

6   In this instance I think it's related to our

7   technology. So we study weak point in other system, and we

8   try to eliminate them in our design.

9   I hope that I answer your question.

10   MR. NOLL: I mean, I request permission to play

11   the clip, Your Honor.

12   THE COURT: Can I have a copy of that clip,

13   please.

14   MR. NOLL: It's page 274, lines 11 through 15.

15   THE COURT: 11 through 16?

16   MR. NOLL: 11 through 15. Did I say -- it's 247.

17   Did I give the wrong page?

18   MS. WILLETTS: Yeah. (Document handed to court.)

19   THE COURT: You may.

20   MR. NOLL: 274.

21   (Video clip played starting at 1:20 p.m.)

22   (Video clip playing ends at 1:21 p.m.)

23   BY MR. NOLL:

24   Q.   Now, sir, going back to this document being labeled

25   secret, you labeled it secret because you didn't want a

1   hacker to have it; is that correct?

2   A.   Yes, it is correct.

3   Q.   But according to you, the Headend Report, Exhibit 2-A,

4   was given to Mr. Oliver Kommerling; is that correct?

5   A.   Yes.

6   Q.   And as you testified earlier, Mr. Kommerling was one

7   satellite pirate and hacker that NDS had a special

8   relationship with, right?

9   A.   It was an ex-pirate.

10   Q.   Okay. I want to focus your attention on another

11   exhibit, marked 98.

12   MR. NOLL: Please hand him Exhibit 98.

13   MS. WILLETTS: (Complies.)

14   BY MR. NOLL:

15   Q.   Can you identify Exhibit 98, Mr. Shkedy?

16   A.   Yes. This is the final version of the Headend project.

17   Q.   And this is the final version that you and

18   Mr. Mordinson prepared and created; is that correct?

19   A.   Yes.

20   MR. NOLL: At this time plaintiffs offer

21   Exhibit 98 into evidence.

22   MR. SNYDER: No, objection, Your Honor.

23   THE COURT: Received.

24   (Exhibit 98 received in evidence.)

25

1   BY MR. NOLL:

2   Q.   Exhibit 98 is a more complete version of Exhibit 2;

3   isn't that right, Mr. Shkedy?

4   A.   Yes.

5   THE COURT: 2 or 2-A?

6   MR. NOLL: 2-A. I'm sorry, I keep saying that,

7   Your Honor.

8   BY MR. NOLL:

9   Q.   I'm going to focus your attention to page 12,

10   Exhibit 98. Do you see the circuitry on that page,

11   Mr. Shkedy?

12   A.   One moment. Yes.

13   Q.   Now, this circuitry, this is actually a picture of the

14   ST Thomson chip that was reversed and hacked by NDS,

15   correct?

16   A.   Yes.

17   Q.   Let's go to page 16. I'm going to focus your attention

18   on Paragraph 4.

19   A.   Yes.

20   Q.   Okay. Paragraph 4 is entitled 3M Hack in Practice. Do

21   you see that, sir?

22   A.   Yes.

23   Q.   Did I read that correctly?

24   A.   Yes.

25   Q.   3M is an abbreviation for Three-Musketeers; is that

1 right?

2 A.   Yes, it is right.

3 Q.   And the slogan for Three-Musketeers means all for one

4 and one for all?

5 A.   Yes.

6 Q.   And in cyberpiracy talk what that means is you buy a

7 few of the basic channels but you expand the service to get

8 the premium channels for free?

9 A.   Other channels for free, yes.

10 Q.   Okay. Now, I'm going to read for you, sir. It says,

11 "In order to implement -- to try to implement 3M hack in

12 practice, an authorized IRD and its married card of ROM

13 version 003 were taken. The IR3 (sic) and -- and the card

14 were intended for DISH Network USA. Once the card EEPROM

15 contents were downloaded, the card was not used anymore.

16 Its EEPROM image was burned up to another card. And this

17 card was utilized in all 3M hack attempts. The IRD, of

18 course, was disconnected from the telephone line."

19   Did I read that correctly, sir?

20 A.   Yes.

21 Q.   Paragraph 3 of Exhibit 98 explains how you and

22 Mr. Mordinson were attempting to create a 3M hack to use on

23 the DISH Network system in the United States, correct?

24 A.   Yes.

25 Q.   And the IRD refers to the receiver; is that right?

1 A.   Yes. It's also known as a set-top box. I think this

2 is a name that is used in the United States.

3 Q.   It stands for integrated receiver/decoder, correct?

4 A.   Yes.

5 Q.   And you say that the IRD was disconnected from the

6 telephone line, right?

7 A.   Yes.

8 Q.   And you disconnected it from the telephone line because

9 you didn't want the receiver to call DISH Network and notify

10 them that you had subscribed to pay-per-view; isn't that

11 correct, sir?

12 A.   Almost correct. It notify the center about whether or

13 not we are very -- sorry.

14   (Witness confers with interpreter.)

15   THE INTERPRETER: The card informs the center that

16 we have purchased too many movies.

17   THE WITNESS: That we exceed the limit, the debit

18 limit.

19 BY MR. NOLL:

20 Q.   And you didn't want the card to inform the center,

21 because you and Mr. Mordinson were hacking the system, isn't

22 that the truth, sir?

23 A.   No, it was not because we hacked the system but because

24 we made many, many tries of trying to purchase movies, and

25 we didn't -- that we didn't watch. So it's just

1   accumulating the debit, the price.

2   Q.   Let's focus our attention down to Section 4.1 titled

3   DISH Network USA.

4   A.   Okay.

5   Q.   Do you see that, sir?

6   A.   Yes.

7   Q.   And I'll read for you. That section says, "The card

8   initially had a minimal subscription and an option to

9   purchase pay-per-view services."

10   Did I read that correctly?

11   A.   Yes.

12   Q.   Now, earlier you testified you didn't know where the

13   Smart Cards that you hacked had come from.

14   A.   Yes. You are right, of course.

15   Q.   All right. But you knew that at least one of these

16   cards that you were hacking came from a gentleman named Eyel

17   in Fort Lee, New Jersey.

18   A.   Yes, one of the card came from there.

19   Q.   And Reuven Hasak -- do you know who Reuven Hasak is?

20   A.   Yes.

21   Q.   Reuven Hasak is the chief of operational security for

22   NDS; is that right?

23   A.   It is correct.

24   Q.   He's one of the top officers in NDS's organization,

25   right?

1   A.   Yes.

2   Q.   And Reuven Hasak gave you Eyel's name and made

3   arrangements for you to stay at his house in the

4   United States; isn't that right, sir?

5   A.   It is right.

6   Q.   You then went to Eyel's house, correct?

7   A.   We went to their house.

8   Q.   You picked up his receiver and Smart Card?

9   A.   Yes.

10   Q.   And this was in 1998?

11   A.   Yes.

12   Q.   You don't know how much Eyel was paid for the receiver

13   and Smart Card?

14   A.   No.

15   Q.   And David Mordinson, the engineer we'll hear from later

16   in this case, was with you; is that right?

17   A.   Yes, it is correct.

18   Q.   And you did this because you were instructed by NDS to

19   come to the United States in 1998 to test the hack that you

20   were working on of the EchoStar system?

21   A.   No. We came to Fort Lee, to Eyel house, just to

22   monitor the data that flows between the Smart Card and the

23   set-top box using the sniffer that you show previously.

24   Q.   Is monitoring the data with the sniffer part of the

25   hack that you were performing on EchoStar's conditional

1   access system?

2   A.   It's part of the data that we use to test our hack.

3   Q.   And you also went to Canada to purchase receivers and

4   Smart Cards in 1998, sir?

5   A.   Yes.

6   Q.   You went in July or August of 1998, correct?

7   A.   Something like that. I don't remember the date, but

8   around July, August '98.

9   Q.   Okay. Let's focus back on the Headend Project Report

10   for a minute. I want to direct your attention to page 17,

11   Section 4.1.2, titled Universal Subscription.

12   A.   Okay.

13   Q.   Do you see that section, sir?

14   A.   Yes.

15   Q.   This describes a more -- it's a more technical

16   description of the steps necessary for a 3M hack and what a

17   satellite pirate would have to do in order to steal

18   EchoStar's programming, correct?

19   A.   Correct.

20   Q.   I'm gonna focus your attention on appendix C. I

21   believe it's page 27.

22   A.   One moment, please. Yes.

23   Q.   And the title is Memory Access Messages?

24   A.   Yes.

25   Q.   Okay. This is an example of an instruction on how to

1   dump out data from EchoStar's conditional access card's

2   memory?

3   A.   It is report how we did it.

4   Q.   And if someone were to obtain this information, it

5   would give them the technique to dump EchoStar's access

6   cards?

7   A.   Yes.

8   Q.   Focus on where it says EEPROM, E-E-P-R-O-M.

9   A.   Can you guide me where it is?

10   Q.   Let me ask you generally, what is EEPROM, sir?

11   A.   EEPROM is type of a memory. In a chip there are

12   several types of memory. The first one is ROM, R-O-M, which

13   is abbreviation for read-only. And if somebody would like

14   just to have an example, it's like a book. Somebody print

15   it. You just can read it. You cannot modify or writing

16   with a pen.

17   There is another type of memory which is E-PROM or

18   EEPROM, which is -- if you would like an example, is like

19   writing with a pencil. So you write down. It remains, but

20   you can erase and to change it. So EEPROM is kind of a

21   memory that can be written. It is permanent. So even if

22   you remove the power, the data does not change. That you

23   can do using a certain electrical procedure.

24   Q.   Okay.

25   A.   The abbreviation for EEPROM is electrical erasable ROM.

1   The EE is electrical erasable.

2   Q.   So, sir, knowing the structure of the fields of

3   EchoStar's EEPROM code from the ST Thomson card does not

4   make NDS's technology any more secure, correct?

5   A.   It is correct.

6   Q.   I'm going to focus your attention on appendix H on

7   page 39. And I'll read for you. It says --

8   A.   One moment.

9   Q.   I'm sorry. Are you there, sir?

10   A.   Yes.

11   Q.   Appendix H, 3M Hack in Practice.

12   A.   Okay.

13   Q.   Says that at the top?

14   A.   Yes.

15   Q.   Now, what this is describing is the procedure for

16   resetting pay-per-view, which was something we just

17   discussed, correct?

18   A.   Correct.

19   Q.   And through your hacking efforts, you identified a hole

20   in EchoStar's chip; is that right?

21   A.   Yes.

22   Q.   Then you wrote that information down in Exhibit 98,

23   this document that we're looking at here today. Yes?

24   A.   Sorry. Okay. Can you repeat, please?

25   Q.   Yeah. You identified through your hacking effort a

1   hole in EchoStar's chip.

2   A.   Yes.

3   Q.   And then you wrote that information down in the

4   exhibits that we're looking at here today.

5   A.   Yes.

6   Q.   And this document, sir, teaches anyone that reads it

7   how to create a 3M hack of the EchoStar access cards.

8   A.   Yes. And at the same time it teaches NDS how to

9   protect ourselves in not having the same error also.

10   Q.   Mr. Shkedy, you're aware that this lawsuit against NDS

11   concerns EchoStar's conditional access codes being posted on

12   the Internet.

13   A.   Yes.

14   Q.   And let's look back at the Headend Report, Exhibit 2.

15   And we're gonna look at appendix A on page 14.

16   A.   Yes.

17   Q.   Are you there, sir?

18   A.   In which document, please?

19   Q.   Okay.

20   A.   In 98?

21   Q.   No. Exhibit 2.

22   A.   Okay. 2-A. Yes.

23   Q.   Yes. 2-A, page 14 of 32.

24   A.   Okay. One moment. Yes, please.

25   Q.   Okay. I'm gonna focus your attention to the second to

1 last row in this matrix. And if you scroll down or just

2 focus your attention down to the last -- second to the last

3 row in the matrix, if you read across and you see the

4 language in the center column says "Nipper."

5 A.   Yes.

6 Q.   Do you see that, sir?

7 A.   Yes.

8 Q.   When NDS reverse-engineered and hacked EchoStar's

9 system, you discovered the word Nipper in EchoStar's code?

10 A.   Yes. It was --

11   THE COURT: Counsel, I'm sorry. Would you point

12 that out? I didn't see that. I don't think you have the

13 right document up.

14   MR. NOLL: Maybe it's 98.

15   Highlight it, please, Clint.

16   THE COURT: Where are you?

17   MS. WILLETTS: 2-A.

18   THE COURT: Just a moment. Is this 2-A?

19   MR. NOLL: 2-A.

20   THE COURT: And you're at appendix what?

21   MR. NOLL: Appendix A.

22   THE WITNESS: I apologize for the language that

23 EchoStar inserted in the card.

24 BY MR. NOLL:

25 Q.   Okay. You discovered this language in the lab in

1   Haifa, Israel in 1998?

2   A.   Yes, in the code we extracted from the chip. So it was

3   there.

4   Q.   Okay. Let's go to appendix F, same document.

5   A.   Page?

6   Q.   Page 31.

7   Do you see at the top it says "Stack Overwrite

8   Example"?

9   A.   Yes.

10 Q.   And this is the instruction for the EEPROM contents

11 download?

12 A.   This is one example how you can utilize the arrow in

13 the card in order to do whatever you want. So one example

14 is how to dump the EEPROM. Another one is how to modify the

15 permission table and so forth. So you can do many things

16 using the same code.

17 Q.   EEPROM, you just testified a little bit about it

18 earlier. EEPROM is memory that can be changed or rewritten?

19 A.   Yes.

20 Q.   And because you can modify EEPROM, someone posting the

21 EchoStar code on the Internet could do so anonymously. Do

22 you agree with that?

23 A.   Yes.

24 Q.   All you have to do is change the EEPROM to conceal that

25 person's true identity, correct?

1   A.   Correct.

2   Q.   Mr. Shkedy, you don't know who posted EchoStar's codes

3   on the Internet, do you?

4   A.   No, I don't know.

5   Q.   It's your testimony here today under oath in front of

6   this jury that when you change EEPROM, there is no way to

7   determine the source, correct?

8   A.   Correct.

9   Q.   To use your words specifically, if you were doing a

10   good job, you can't trace it.

11   A.   If you are doing a good job, you can conceal your

12   identity, yes.

13   Q.   Now, we discussed earlier how you labeled the document

14   "secret," the Headend Project Report was labeled "secret."

15   Do you remember that?

16   A.   Yes.

17   Q.   Okay. And you wanted to keep it secret, right?

18   A.   Yes. We wanted results should be secret.

19   Q.   But you gave it to Oliver Kommerling, correct?

20   A.   We gave it to him, yes.

21   THE COURT: Gave it to who?

22   THE WITNESS: To Mr. Oliver Kommerling.

23   BY MR. NOLL:

24   Q.   You also gave it to Mr. Chaim Shin-Orr, correct?

25   A.   Yes. He was the head of the group.

1   Q.   And you provided EchoStar's code to all the members of

2   the Haifa team, correct, sir?

3   A.   All the member in Haifa team that worked on the

4   project, partially or fully.

5   Q.   And at some point in time you came to understand that

6   Mr. Kommerling's special relationship with NDS ended, right?

7   A.   Yes.

8   Q.   And it's your belief that that relationship ended

9   because NDS tried to blame Mr. Kommerling for the posting of

10   the Canal+ codes on the Internet?

11   A.   It is correct.

12   Q.   You came to know of an individual named Christopher

13   Tarnovsky in 1997, Mr. Shkedy?

14   A.   Yes.

15   Q.   And it's your testimony that you probably showed

16   Mr. Tarnovsky reverse-engineering techniques on ST Thomson

17   chips, right, sir?

18   A.   Yes, but in 2004.

19   Q.   The EchoStar code could be sent out by e-mail?

20   A.   Everything can be sent by an e-mail.

21   Q.   And you may have e-mailed it to somebody, you just

22   can't recall who, right?

23   A.   I didn't e-mail, I didn't testify so, and I didn't do

24   it.

25   Q.   To your knowledge, NDS never gave a copy of the Headend

1   Project Report to EchoStar, correct?

2   A.   Correct.

3   Q.   NDS never gave a copy of the project Headend Report to

4   NagraStar, correct?

5   A.   Correct.

6   Q.   NDS never gave this report to Kudelski, correct?

7   A.   Correct.

8   Q.   NDS never gave this report to NagraVision?

9   A.   Correct.

10   Q.   Mr. Shkedy, you'll agree with me, sir, that the code

11   that you extracted from EchoStar's Smart Card was the

12   lifeblood of the system?

13   A.   If it would leak, it would be very, very harmful.

14   Q.   This is where all the secrets of the Smart Card were

15   kept, correct?

16   A.   Not all the secrets.

17   Q.   This is where the most important secrets of the Smart

18   Card were kept, sir.

19   A.   It opened the way to read the secret, yes.

20   Q.   In the wrong hands this report, Mr. Shkedy, would allow

21   satellite pirates to steal EchoStar's programming.

22   A.   Yes.

23   Q.   And this same report in the wrong hands would allow a

24   satellite pirate to post EchoStar's secret codes for its

25   Smart Cards on the Internet.

1   A.   Yes.   And this report was not leaked.

2   MR. NOLL: Pass the witness.

3   THE COURT: Cross-examination, please.

4   Would you identify yourself for the record,

5   please.

6   MR. SNYDER: Yes, Your Honor.   Darin Snyder for

7   the defendants, Your Honor.

8   CROSS-EXAMINATION

9   BY MR. SNYDER:

10   Q.   Good afternoon, Mr. Shkedy.

11   A.   Good afternoon.

12   Q.   Mr. Shkedy, I know you've been on the stand for a

13   little while, but you really haven't had a chance to

14   introduce yourself to the jury.   Could you tell the jury

15   where you live, please?

16   A.   I'm living in Israel, in a small town about 25 miles

17   out of Haifa.

18   Q.   Do you have a family, Mr. Shkedy?

19   A.   Yes, I do.   I have a wife and four child and four

20   grandchildren.

21   Q.   Thank you.   Who do you work for?

22   A.   I'm working for NDS-Israel.

23   Q.   And what does NDS do?

24   A.   NDS is supplying conditional access to TV providers.

25   Q.   Okay.   Mr. Shkedy, have you prepared a graphic to help

1   illustrate your testimony about what conditional access

2   systems are?

3   A.   Yes, I did.

4   Q.   Okay.

5   MR. SNYDER: Could you show him demonstrative

6   No. 1, please.

7   Your Honor, may I publish that to the jury?

8   THE COURT: Any objection, Counsel?

9   MR. NOLL: I don't have a copy of it.

10   THE COURT: Not yet.

11   MR. NOLL: No, objection.

12   THE COURT: You may.

13   (Document displayed.)

14   BY MR. SNYDER:

15   Q.   Mr. Shkedy, could you please describe for the jury what

16   a conditional access system is?

17   A.   Yes, I will try.

18   Okay. The story started with the ground station. And

19   the ground station that you can see on the bottom left.

20   They store -- the provider store all the information --

21   movies, sport channel and so forth, news channel -- that

22   they wanted to transmit to its subscribers. Each one of

23   these channel is encrypted, so you cannot watch this channel

24   unless there are certain conditions that I will explain a

25   little bit later.

1   Associated data is also what we call the encryption

2 data, or keys, that help open the encryption of the program.

3 So what we see, we see four blue lines that represent four

4 TV channel, and the red line which represents the keys that

5 is associated data that may help open or decrypt the

6 channel.

7   All this data is transmitted to a satellite that is up

8 in the middle (indicating). And the satellite retransmits

9 this information to the subscriber that has a dish. He

10 receive the channel and the associated data which is

11 transferred to the set-top box, or IRD, which are synonym.

12 And the data is then splitted into two part.

13   The encryption data goes to the Smart Card that is a

14 blue small rectangle that stick out of the set-top box. And

15 the duty of this -- of the Smart Card is to verify whether

16 the subscriber has permission to watch a certain channel.

17 If yes, the Smart Card decrypt, supplies the set-top box

18 with the key, and the set-top box decrypt the channel and

19 display to the subscriber.

20   If the subscriber does not have permission to watch,

21 the set-top -- the Smart Card does not possess the

22 encryption data, does not supply key to the set-top box, and

23 you cannot watch.

24   The battlefield between the pirate and any conditional

25 access provider is over this small Smart Card.

1   Q.   And, Mr. Shkedy, have you prepared a graphic to help

2   illustrate the Smart Card for the jury?

3   A.   Yes, I did.

4   MR. SNYDER: Could you show him Demonstrative

5   No. 2, please.

6   MR. O'DONNELL: (Complies.)

7   MR. NOLL: No objection.

8   MR. SNYDER: May we publish this to the jury, Your

9   Honor?

10   THE COURT: You may. There's not an objection.

11   MR. SNYDER: Thank you.

12   (Document displayed.)

13   BY MR. SNYDER:

14   Q.   Mr. Shkedy, can you describe the Smart Card for the

15   jury, please?

16   A.   Yes. The Smart Card is a piece of plastic the size

17   more or less of a credit card. Okay. In the middle you can

18   see -- which is exposed on the top, the blue rectangle,

19   there is eight contact of a gold color. Underneath this

20   contact there is a small chip, what we call chip or piece of

21   electronic, of the size of about 1/8th of an inch. So the

22   entire card is just empty plastic, and we have a small chip

23   of the size of -- in millimeters it's about 3 or

24   4 millimeter. And in English system is about 1/8th of an

25   inch. Might be a little bit more, might be a little bit

1   less. Okay.

2   The whole battle is whether or not somebody can gain

3   control on this Smart Card. The communication between the

4   Smart Card and the set-top box is done via this eight

5   contact, which actually only five of them are function --

6   functional. The rest are nonfunctional contacts.

7   Q.   And before we talk about some of the work you did

8   related to this case, Mr. Shkedy, allow me to get a little

9   bit of background. Can you describe for the jury your

10 educational background, please?

11 A.   Yes. I'm an electronic engineer. I was graduated in

12 the Israeli Institute of Technology. I hold a bachelor of

13 science degree since 1969. And I hold a master of science

14 from 1884 -- sorry -- 1984. I'm not so old. Sorry.

15   Okay.

16 Q.   Mr. Shkedy, have you been a practicing engineer since

17 1969?

18 A.   Yes, about 39 years.

19 Q.   When did you start working for NDS?

20 A.   '97.

21 Q.   And was -- have you worked continuously for NDS since

22 1997?

23 A.   No. I work two stint. One was from 1997 up to 2001,

24 and I quitted. And then I rejoined NDS 2004 to date.

25 Q.   When you quit NDS in 2001, who did you go to work for?

1   A.   I worked for a company name SanDisk. That is a

2   manufacturer of design of what you know -- memory card.

3   Q.   And did you work for anyone other than SanDisk?

4   A.   Yes. I worked for the government of Israel for about

5   one and a half year.

6   Q.   When you were working for the government of Israel, did

7   you work on classified projects?

8   A.   Yes, I did.

9   Q.   Are you allowed to say anything about the content of

10   those projects?

11   A.   No. I am sorry.

12   Q.   Would it be fair to say, Mr. Shkedy, that the

13   government of Israel relies on you to maintain the secrecy

14   and confidentiality of those projects?

15   A.   Yes.

16   Q.   Now, Mr. Shkedy, I'd like to focus on the time at NDS

17   from 1997 to 2001, okay?

18   A.   Okay.

19   Q.   During that time, what was your title?

20   A.   Principal engineer of the HRC group. HRC is the Haifa

21   Research Center.

22   Q.   And what were you hired to do as the principal engineer

23   of the Haifa Research Center?

24   A.   To evaluate NDS chip to find out weak point and to feed

25   back the design group that is located in Jerusalem about my

1   finding so they can improve the system.

2   Q.   Now, you mentioned the design group was in Jerusalem.

3   Was the Haifa Research Center located in a different place,

4   a different location?

5   A.   Yes. It's about 100-mile from Jerusalem.

6   MR. SNYDER: Okay. Could you show the witness the

7   photograph exhibits, please.

8   May I publish these to the jury, Your Honor?

9   THE COURT: Yes.

10   BY MR. SNYDER:

11   Q.   Mr. Shkedy, can you tell the jury what this is a

12   photograph of?

13   A.   This is an industrial park which is located near Haifa,

14   which is a city in the north of Israel. And there are many

15   companies over there, high-tech companies.

16   Q.   Is the building where the Haifa Research Center was

17   located in this picture?

18   A.   Yes. It's in the center, the cross-shape building.

19   Q.   Perhaps you can turn around and on the large television

20   point it out for the jury, please.

21   A.   Yes. This is the one.

22   MR. SNYDER: Okay. Could you go to the next

23   picture, please.

24   (Picture displayed.)

25

1 BY MR. SNYDER:

2 Q.   Mr. Shkedy, can you tell the jury, please, what this

3 picture is.

4 A.   It's the same building.

5 Q.   Is that the building where the Haifa Research Center

6 was located?

7 A.   Yes. The cross-shaped building in the center.

8   This is a close-up of the same building -- sorry, I had

9 two copies of the same picture. I was confused, sorry.

10   MR. SNYDER: And if you could turn to the next

11 picture, please.

12   (Picture displayed.)

13 BY MR. SNYDER:

14 Q.   And what is this a picture of, Mr. Shkedy?

15 A.   This is the same building. Okay. We move -- in 2005

16 we move from this building to next -- to other building.

17 And this building is now occupied by other companies.

18 Q.   And while the Haifa Research Center was located in this

19 building, what were the other occupants?

20 A.   On the first floor it was Hewlett-Packard, HP.

21 Agilant, A-G-I-L-A-N-T, a small subsidiary.

22   And the second and the fourth floor was Zeron, a chip

23 producer. And we were located on the third floor.

24 Q.   Mr. Shkedy, could you describe for the jury the purpose

25 of the Haifa Research Center?

1   A.   As I mentioned previously, the first one was to

2   evaluate our chip, our NDS chip, to see if there are any

3   weak point, and to feedback to Jerusalem. And other task

4   was to investigate as a candidate to be a platform in our

5   language, our chips that we can input inside the Smart Card.

6   Q.   And when you say evaluate NDS chips, could you explain

7   to the jury what you mean by that?

8   A.   To find out weak point software and how to -- the ways

9   that a pirate may use in order to compromise our system.

10   Q.   Okay. And then there was another task of the Haifa

11   Research Center?

12   A.   Yes, to evaluate other chip.

13   Q.   Okay. And what was the purpose of evaluating other

14   chips?

15   A.   Twofold. First of all, if they meet our standard, then

16   we can use them, or to find out other techniques, idea, that

17   if they are good ideas, we can adopt them, of course,

18   without infringing any patents.

19   Q.   Now, Mr. Shkedy, as part of your work at the Haifa

20   Research Center, did you do any work with a group called

21   operational security?

22   A.   Yes, I did.

23   Q.   What is operational security?

24   A.   In order to fight the pirate, which was one of our

25   tasks, NDS formed to launch two effort. One of them is HRC

1   group, the group that I was a part of it. And the other one

2   is operational security that chases hacker and try to bring

3   them into court, which they succeed many times, to sue them

4   and to send them to jail.

5   Q.   And what relationship did you have as a member of the

6   Haifa Research Center, or HRC, with operational security?

7   A.   The first one was to study techniques and way of

8   thinking from the hacker so that we know -- we will know the

9   enemy so we can fight him. So we adopt techniques, we adopt

10 way of thinking from the hacker, and otherwise I was a point

11 of contact for hacker that had been recruited by NDS, so I

12 can -- and I was the technical point of contact with them.

13 Q.   Was Oliver Kommerling one of those ex-hackers?

14 A.   Yes.

15 Q.   Why were you chosen to be the point of contact between

16 NDS and Oliver Kommerling?

17 A.   The first time that I flew to Germany where his

18 laboratory was located, in order to learn that he teach me

19 techniques, immediately we found out a common language,

20 chemistry, between ourselves. So it was kind of an open

21 channel of mutual appreciation and mutual way of thinking,

22 creative, innovative, and so forth. So we feel that we can

23 work together very well.

24 Q.   Now, the lab of Mr. Kommerling's that you visited in

25 Germany, was that an NDS lab?

1   A.   No, it was his private one.

2   Q.   Did NDS provide him with that lab?

3   A.   Not at the beginning. Afterward we purchased some

4   equipment for him.

5   Q.   This was after he became an NDS consultant?

6   A.   Yes.

7   Q.   Now, as part of your work at the Haifa Research Center,

8   did you reverse-engineer cards?

9   A.   Yes, I did.

10   Q.   Can you explain for the jury what it means to

11   reverse-engineer a card?

12   A.   Yes, okay. To open the chip as I explain previously,

13   to look at them from the hardware and software point of

14   view, to see what are the good point, what are the bad

15   point, where they are well protected, where they are not

16   protected, and to feed back the people in the design group

17   if you find out weak points so that we will not make the

18   same mistake again. And if we are finding -- if we found

19   good or strong point, to adopt the idea and to try to

20   implement it in a better way.

21   Q.   Mr. Shkedy, during your testimony today you've been

22   asked a lot of questions about hacking.

23   A.   Yes.

24   Q.   Is hacking the same as reverse engineering?

25   A.   Yes.

1   Q.   Is hacking or reverse engineering the same as piracy?

2   A.   No.

3   Q.   What is the difference to you between hacking, or

4   reverse engineering, and piracy?

5   A.   Reverse engineering is understanding what is going in a

6   chip. We can enlarge, then, or broaden the idea to any

7   other technology. For example, if you are going to

8   reverse-engineer a car, you find out what our -- how

9   efficient is the motor so you can find out that the motor is

10   okay or is doing well, so you adopt the ideas. And if it is

11   consuming too much gas, okay, you say, "I know what is the

12   weak point of this motor, and I can design a better one

13   overcoming the deficiencies in the design."

14   So by learning from other people mistake, you can just

15   do a better job.

16   Q.   Mr. Shkedy, did the Haifa Research Center

17   reverse-engineer or hack NDS chips?

18   A.   Yes.

19   Q.   And did you also reverse-engineer or hack competitor

20   chips?

21   A.   Yes.

22   Q.   What was the point of reverse-engineering or hacking

23   NDS's own chips?

24   A.   We are not angel. Also we make mistake. So the people

25   in Jerusalem made mistakes. We found them, we feed back to

1   them about any mistakes that they did, and they fix them.

2   Q.   Now, also part of your work at the Haifa Research

3   Center was reverse-engineering other companies' chips,

4   correct?

5   A.   Correct.

6   Q.   Can you identify for the jury some of the other

7   companies' chips that you reverse-engineered?

8   A.   Yes. I did it in -- I started, as I say, it was a

9   Hitachi chip back in 1997.

10   THE COURT: Hitachi?

11   THE WITNESS: Hitachi.

12   BY MR. SNYDER:

13   Q.   Was that the first chip that you reverse-engineered?

14   A.   Yes. And afterward I work on a Dalas chip, which is a

15   secure chip that the hacker and the pirate uses in their

16   product. So we dump the code of the hacker and the pirate,

17   and we saw what are the techniques that they use in order to

18   penetrate our system.

19   THE COURT: I'm sorry. I missed part of that.

20   The Hitachi chip?

21   THE WITNESS: The Hitachi chip was --

22   THE COURT: Just a moment.

23   THE WITNESS: Sorry, sorry.

24   THE COURT: I want to make certain I'm hearing

25   correctly.

1   Hitachi?

2   THE WITNESS: Yes, sir.

3   THE COURT: And the second chip was?

4   THE WITNESS: Dalas chip.

5   THE COURT: Spell that term? Like Dallas, Texas?

6   THE WITNESS: D-A-L-A-S.

7   THE COURT: Okay. Thank you very much. Okay.

8   Thank you.

9   Counsel.

10   THE WITNESS: Okay.

11   BY MR. SNYDER:

12   Q.   Mr. Shkedy, you mentioned that the Dalas chip was the

13   one that was being used by pirates?

14   A.   Yes.

15   Q.   And you reverse-engineered that chip?

16   A.   Yes. I dump the code.

17   Q.   Can you -- is reverse engineering and piracy the same

18   thing?

19   A.   No.

20   Q.   What is the difference between reverse engineering and

21   piracy?

22   A.   Reverse engineering is understanding how something is

23   functioning. Piracy is to take this one with a malintention

24   to make damage.

25   THE INTERPRETER: Cause damage.

1   THE WITNESS: Damage to a system, to a company.

2   BY MR. SNYDER:

3   Q.   Is there anything wrong in your mind with reverse

4   engineering?

5   A.   Not at all. This is the way that --

6   THE INTERPRETER: Humanity?

7   THE WITNESS: That humanity advances. By reverse

8   engineering, you are looking at a system. For example, when

9   you look at a bird and you ask yourself how the bird is

10   flying, you invent the airplane. So this is kind of reverse

11   engineering of nature, but it's the same applied also to

12   technology.

13   BY MR. SNYDER:

14   Q.   Now, do other companies sometimes ask NDS to

15   reverse-engineer their chips?

16   A.   Yes. One of the -- one of them -- I think you know

17   them now -- Thompson, the same one that we

18   reverse-engineering the card and developed month ago. I

19   report them deficiencies in one of their chip, and they fix

20   it.

21   Q.   So the Thompson Company asked NDS to reverse-engineer

22   their chip?

23   A.   Yes.

24   Q.   And why did the Thompson Company ask NDS to do that?

25   A.   Because they thought that we have the capability of

1   doing a good job.

2   Q.   Is reverse engineering something that's unusual?

3   A.   No, it's usual. And it -- first of all, it's legal.

4   And the reason that it's legal is because it is necessary

5   for the humanity.

6   Regarding your question, there is a company in Canada,

7   which name Semiconductor Insight -- it's a small company of

8   140 employees. The only task that they are doing is reverse

9   engineering of chip legally.

10   There is another company, also, Chip World, also in

11   Canada, another one in Europe, and there are a few of them

12   in China.

13   Q.   What was the name of the company in Europe?

14   A.   Raith, R-A-I-T-H.

15   Q.   Mr. Shkedy, were some of the chips that you

16   reverse-engineered competitor chips?

17   A.   Yes.

18   Q.   And were those competitor chips different from the

19   chips that NDS uses?

20   A.   The color is different, but there are many similarities

21   between the chips.

22   Q.   If NDS doesn't use the competitor chip, what is the

23   purpose of reverse engineering those chips?

24   A.   I'll give you an example. Previously I had been asked

25   whether or not there is a -- the memory of the Thompson chip

1   is divided into six parts. And I say, yes. And I overcome

2   by a single shot of laser.

3   COURT REPORTER: Did you say a single shot of a

4   laser?

5   THE WITNESS: Yes. Okay. So the idea of using

6   such a protection is a nice idea. The implementation was

7   not so good. So what we are doing, we are reporting to

8   Jerusalem, and they using same type of protection, hopefully

9   with a better engineering.

10   BY MR. SNYDER:

11   Q.   When you say that it was -- that such a thing was a

12   good idea, what is the "thing" you're referring to?

13   A.   How to protect the memory so you cannot read from one

14   memory space to another memory space. In this case, if the

15   memory space -- if this type of protection would work well,

16   I couldn't read the EEPROM by using the dumps that I show in

17   the document.

18   Q.   Okay.

19   A.   So by neutralize this feature, I could dump the code.

20   Q.   Let me make sure I understand, Mr. Shkedy.

21   The chip had the memory divided into six parts?

22   A.   Yes.

23   Q.   But you were able -- and the purpose of dividing the

24   memory was to make it harder to access that memory or to

25   dump that -- the contents of that memory?

1   A.   Yes.   So if I can install program in the RAM, it cannot

2   read -- I'll use the EEPROM, for example.

3   Q.   But you were able to defeat that security feature that

4   separated the memory into six different parts?

5   A.   Yes.

6   Q.   And how were you able to defeat that security measure?

7   A.   Single shot with a laser.   I think in this case I have

8   use the FIB to bypass the protection, but it can be done

9   with a single shot of laser as well.

10   Q.   And did you later learn that NDS implemented a similar

11   security feature?

12   A.   Security feature that protects a memory, yes.

13   Q.   And did NDS implement it in a way that would protect it

14   against the way that you defeated that security feature?

15   A.   Yes.

16   Q.   How did NDS do that?

17   A.   The moment that you know that you can neutralize this

18   feature easily, so you start to think, and when you start to

19   think, when you know the question, you know how to find an

20   answer.   If you don't know the question, you don't know how

21   to answer.   So when they know the problem, they know how to

22   try to put protect against such a problem.

23   Q.   Mr. Shkedy, you don't work at the design -- on the

24   design teams in Jerusalem, correct?

25   A.   It is correct.

1 Q. So how did you know that NDS implemented this same

2 security idea but in an improved way?

3 A. Because I tried to reverse-engineer the next

4 generation, and it was much harder to me to overcome the

5 protection layers that they inserted.

6 Q. Are there other examples, Mr. Shkedy, of weaknesses

7 that you identified in your reverse engineering that were

8 later corrected in NDS chips?

9 A. Yes. We mentioned previously the instruction latch.

10 and I have said that I could neutralize the instruction

11 latch by putting the needle on one of the line of the

12 instruction latch that you saw in my document. What NDS

13 did, they just dissolved the instruction latch. We don't

14 have any instruction latch, so this type of attack is not

15 relevant anymore to our products. So we learned it from

16 other chip, and we implement solution in our chips.

17 Q. And again, how did you know that NDS had corrected

18 against that defect or weakness in its chips?

19 A. Because we work for more than six months in order to

20 locate the point, and we couldn't find them.

21 Q. Now, Mr. Shkedy, in doing this reverse engineering, is

22 one of the purposes to assist piracy?

23 A. No.

24 Q. Have you ever done anything to assist piracy?

25 A. No.

1 Q.   To the best of your knowledge, has anyone else on the

2 Haifa research team, the team at the Haifa Research Center,

3 done anything to assist piracy?

4 A.   No.

5 Q.   When you started at the Haifa Research Center, who

6 worked on that team?

7 A.   Mr. Chaim Shen-Orr was the head of the group. He came

8 before me. There was another guy named Danny Ratner, which

9 he -- he worked for NDS, but in Jerusalem. I was the

10 principal engineer. And afterwards, a few other people.

11 Q.   What's the largest number of people that ever worked at

12 Haifa?

13 A.   Sorry. Can you repeat?

14 Q.   What is the largest number of people that ever worked

15 on the reverse engineering team or reverse engineering

16 project?

17 A.   Total, at the peak, we were about 12, but not all of

18 them work on the reverse engineering. The core of the

19 reverse engineering is about four to five people.

20 Q.   Now, earlier you were asked some questions about the

21 process that you use to reverse-engineer chips. Do you

22 recall that testimony?

23 A.   Yes.

24 Q.   Okay. And I believe you were describing the reverse

25 engineering you did for the EchoStar chip, the ST Thompson

1   16CF54?

2   A.   Yes.

3   Q.   Is that the same process that you used for

4   reverse-engineering all chips?

5   A.   Yes, basically the same.

6   Q.   Do you use the same process for reverse-engineering NDS

7   chips?

8   A.   Yes.

9   Q.   Do you use the same equipment regardless of the chip

10   that you're reverse-engineering?

11   A.   Yes.

12   Q.   So, for example, you can use a logic analyzer?

13   A.   I need to use a logic analyzer when I reverse NDS chip.

14   Q.   Okay.

15   A.   This is my eyes.

16   Q.   Okay. Do you also use an oscilloscope?

17   A.   This is as an eye.

18   Q.   Mr. Shkedy, you were asked some questions about a

19   focused ion beam. Has NDS ever owned a focused ion beam?

20   A.   Yes. As I say, we have it on lease since '98 until

21   2001.

22   Q.   My question's a little more specific, Mr. Shkedy. I

23   just want to make sure the record's clear. Has NDS ever

24   owned a focused ion beam?

25   A.   No.

1   Q.   You only leased it?

2   A.   Yes.

3   Q.   Are focused ion beams unusual?

4   A.   No, it's a common equipment. It was developed to

5   assist failure analysis effort while you design and -- while

6   you design new chips.

7   Q.   Do you say "failure analysis"?

8   A.   Failure analysis. Yes, I did.

9   Q.   And I believe you said in some of your reverse

10   engineering efforts you leased time on a focused ion beam?

11   A.   Yes.

12   Q.   Is that difficult to do?

13   A.   No, it costs up 2800 pound, and then you have enough

14   time to do what you need.

15   Q.   For how many chips?

16   A.   We did it -- I don't remember the number. It was more

17   than one, but I don't remember the number.

18   Q.   Now, Mr. Shkedy, you also were asked some questions

19   about the Headend Report. Do you recall that?

20   A.   Yes.

21   Q.   And as part of your reverse engineering project, did

22   you also create data or files or information?

23   A.   Yes.

24   Q.   Did you consider that information to be secret or

25   confidential?

1   A.   Yes. And you saw it also on the report that it bills a

2   title "secret."

3   Q.   Can you describe for the jury how you stored the

4   information related to the reverse engineering project, and

5   let's focus on the reverse engineering of the EchoStar card.

6   A.   Okay. We had a separate computer in our facility in

7   Haifa that we store sensitive data on this computer. The

8   normal procedure is to encrypt the data with a program named

9   "PGP."

10   We have another set of computer that is linked to

11   Jerusalem and to the network in Jerusalem for e-mail and

12   communication with Jerusalem.

13   Sometime -- also we have a sometime a separate computer

14   not connected to other computer. The most important one in

15   the sense that I'm talking today is the computer of

16   Mr. David Mordinson, that -- he will be the next witness.

17   Q.   Okay. Who has access to Mr. Mordinson's computer?

18   A.   David -- only David.

19   Q.   And who -- Mr. Mordinson?

20   THE COURT: I'm sorry. Who has access to that

21   computer?

22   A.   Only Mr. David Mordinson.

23   THE COURT: Thank you.

24   BY MR. SNYDER:

25   Q.   And who has access to the secure network at the Haifa

1   Research Center?

2   A.   Only the engineer in Haifa.

3   Q.   Did you ever share any of the information from the

4   EchoStar reverse engineering project with anyone other than

5   the team at the Haifa Research Center?

6   A.   Only with Mr. -- only with Kommerling.

7   Q.   And at that time, was Mr. Kommerling working with NDS?

8   A.   Yes.

9   Q.   Does Mr. Kommerling work for NDS now?

10   A.   No.

11   Q.   Who does Mr. Kommerling work for now?

12   A.   He's a consultant for Atmel and for Nagra. Atmel,

13   A-T-M-E-L.

14   Q.   Nagra, the company that's one of the plaintiffs?

15   A.   Yes.

16   Q.   Other than the team at the Haifa Research Center and

17   Mr. Kommerling, did you share any of the information related

18   to the reverse engineering of the EchoStar card with anyone

19   else?

20   A.   No.

21   Q.   Did you e-mail the Head End Report to anyone?

22   A.   No.

23   Q.   Did you e-mail any part of the information developed

24   during the EchoStar reverse engineering project to anyone?

25   A.   No.

1 Q.   Did you e-mail any of the code that was developed as

2 part of that project to anyone?

3 A.   No.

4 Q.   Now, you were asked earlier, Mr. Shkedy, when you

5 discussed reverse engineering techniques with Christopher

6 Tarnovsky. Do you recall that question?

7 A.   Yes.

8 Q.   When was the first time that you discussed reverse

9 engineering techniques with Christopher Tarnovsky?

10 A.   It was after -- in the second term that I was in NDS,

11 so it was after 2004. I don't remember well if it was 2005

12 or 2004.

13 Q.   Okay. Why did you discuss reverse engineering

14 techniques with Christopher Tarnovsky in 2004?

15 A.   Chris Tarnovsky read the techniques in a paper that

16 were published in USNIX, which is a conference for a

17 security of chips, and the techniques that I used appeared

18 in this paper. He couldn't do it well, and when he visited

19 our laboratory in Israel, I showed him what type of analysis

20 that he did -- or some improvement in the technique that he

21 used.

22 Q.   Mr. Shkedy, before 2004, had you ever discussed reverse

23 engineering techniques with Christopher Tarnovsky?

24 A.   No.

25 Q.   And before -- well, I'll withdraw that question.

1   Did you ever share with Mr. Tarnovsky any of the

2   information from your reverse engineering of an EchoStar

3   card or chip?

4   A.   No.

5   Q.   Did you give Mr. Tarnovsky a copy of the Head End

6   Report?

7   A.   No.

8   Q.   Did you give Mr. Tarnovsky any of the information that

9   you had extracted from the EchoStar card?

10 A.   No.

11 Q.   Did you give Mr. Tarnovsky any of the code or other

12 information that you developed as part of that project?

13 A.   No.

14 Q.   Now, Mr. Shkedy, just a few more questions.

15   Is the Haifa Research Center sometimes referred to as

16 the "Black Hat Team"?

17 A.   Yes.

18 Q.   Where does that name come from?

19 A.   It was a name that was adopted by Mr. Chaim Shen-Orr,

20 which was the head of the group. And he just borrow it from

21 the same group that was constructed at IBM.

22 Q.   And what did the group at IBM do that got it the name

23 the Black Hat Team?

24 A.   From my best of knowledge they did the same task as we

25 did in Haifa.

1   Q.   That was reverse-engineering chips?

2   A.   Yes.

3   Q.   Products?

4   A.   This is what I know.

5   Q.   Mr. Shkedy, was part of your work at the Haifa Research

6   Center analyzing information about competitor chips that was

7   sent to you?

8   A.   Yes.

9   Q.   That would be information that might be sent to you by

10   operational security?

11   A.   Yes.

12   Q.   Could I show you, please, Exhibit 789.

13   Have you seen Exhibit 789 before today, sir?

14   A.   Yes.

15   Q.   Can you tell me generally what it is?

16   A.   This is an e-mail that's sent to me by Mr. Yoni Shiloh.

17   Yoni Shiloh work in the security department, and they sent

18   me an e-mail asking me about an information that appeared in

19   one of the -- in the Internet -- one of the sites over the

20   Internet, sorry -- okay. And what -- the file said that it

21   shows many, many keys that were used in several system like

22   Express View, DISH Network, and Sky Vista in Spain, and they

23   asked me if I recognize 'em. All the system had been

24   designed by Nagra.

25   Q.   Mr. Shkedy, was this an e-mail that was sent to you at

1 your work at the Haifa Research Center?

2 A.   Yes.

3   MR. SNYDER: Your Honor, I move Exhibit 789.

4   MR. NOLL: I haven't seen the exhibit yet,

5 Your Honor.

6   Can you locate a copy for me, please.

7   MR. SNYDER: This was one of the exhibits that we

8 went over last night, Your Honor.

9   MR. NOLL: No objection.

10   THE COURT: Received.

11   (Exhibit No. 789 received in evidence.)

12   MR. SNYDER: Thank you, Your Honor.

13   May I publish the exhibit?

14   THE COURT: You may.

15   (Document displayed.)

16 BY MR. SNYDER:

17 Q.   Mr. Shkedy, can you identify for the jury the date of

18 this e-mail?

19 A.   September 19 --

20 Q.   Maybe you can highlight the date so they can see it,

21 please.

22   I'm sorry, Mr. Shkedy. What is the date?

23 A.   September '99.

24 Q.   What is being sent to you in this e-mail?

25 A.   Those are the key that had been used -- that are used

1   in several Nagra system, all of them based on the same chip

2   and the same system.

3   Q.   And these keys were being sent to you in 1999?

4   A.   Yes.

5   Q.   What is the importance of the keys in the system?

6   A.   As I explain it previously in the first slide about

7   what is a conditional access, the moment that you have the

8   key, so you can decrypt all the programs that are sent to

9   the satellite down to the earth.

10   Q.   Where were these keys found on the Internet?

11   A.   A site called DISHPlex.com.

12   Q.   Is that described in the e-mail?

13   A.   Yes, it's the second line in the message.

14   Q.   So in the second line where it says,

15   HTTP:\\www.DISHPlex.com?

16   A.   Yes, this is what it said.

17   Q.   Okay. Thank you, Mr. Shkedy.

18   Could you please look at Exhibit 459. Can you tell me

19   generally, Mr. Shkedy, what Exhibit 459 is?

20   A.   One moment, please. I don't recognize it. It will

21   take me some time -- It's kind of a pirate activity, but

22   I -- I don't know.

23   Q.   You don't recall this e-mail, Mr. Shkedy?

24   A.   No.

25   Q.   Okay. Could I get you, please, to look at Exhibit 791?

1   THE COURT: Just a moment, Counsel.

2   The last was 459?

3   MR. SNYDER: Should have been 459.

4   THE COURT: This is the document that we went over

5   Saturday?

6   MR. SNYDER: I believe we looked --

7   THE COURT: And this refers to the Russians and

8   the Bulgarians? Are you sure you gave me the right one?

9   THE WITNESS: This is the wrong one, I think.

10   THE COURT: You might have given me the wrong

11   document.

12   Okay. Thank you very much. I didn't think that

13   that was the correct document, Counsel.

14   BY MR. SNYDER:

15   Q.   Do you have Exhibit 791 in front of you, Mr. Shkedy?

16   A.   Yes.

17   Q.   Can you tell me generally what that exhibit is?

18   A.   Generally speaking, it's the same type of information

19   or help that we gave to first-line security. They pick up

20   files from the network, and they ask us to identify what is

21   the content. In this case, it's a part of a program that

22   appeared on the Internet, the second part. And it sees like

23   a regular program written in assembly language, not in human

24   one, not in human language, and they asked us whether or not

25   we can identify the file.

1   Q.   And this was an e-mail that was sent to you as part of

2   your work at the Haifa Research Center --

3   A.   Yes.

4   Q.   -- in October of 1999?

5   A.   Yes.

6   THE COURT: Counsel, can you clarify once again

7   who the gentleman Yehonatan Shiloh is? I don't know if the

8   jury knows.

9   MR. SNYDER: Sure.

10   BY MR. SNYDER:

11   Q.   Mr. Shkedy, who is Yehonatan Shiloh?

12   A.   Okay. We are pronouncing it Yoni Shiloh, but he is one

13   of the team -- of the operational security team working

14   under the name -- sorry -- is working in the operational

15   security team under the supervision of Mr. Reuven Hasak.

16   And I work with him during this -- this time in evaluating

17   data that he got from the Internet.

18   Q.   And that was part of your work at the Haifa Research

19   Center?

20   A.   Yes, I was a point of contact for such activity.

21   THE COURT: So, in other words, to be clear, he is

22   part of the NDS?

23   MR. SNYDER: He is part of the NDS operational

24   security, yes.

25   THE COURT: Very good.

1   MR. SNYDER: Your Honor, I move Exhibit 791.

2   THE COURT: Any objection?

3   BY MR. NOLL: No, Your Honor.

4   THE COURT: Received.

5   (Exhibit No. 791 received in evidence.)

6   MR. SNYDER: May I publish it to the jury?

7   THE COURT: You may.

8   BY MR. SNYDER:

9   Q.   Mr. Shkedy, could you point out for the jury where it

10 identifies the date of this e-mail?

11 A.   Yes, it's in the second line. It's October '99.

12 Q.   Okay. And then could you look down to the first body

13 of the e-mail, about four lines down, where it says: "This

14 is the first of two files"?

15 A.   Yes.

16 Q.   Do you see that? It says: "This is the first of two

17 files, are the disassembled version of the E-Star ROM info

18 that was posted on pound DISH Network."

19   Do you see that?

20 A.   Yes.

21 Q.   What does that mean?

22 A.   That means that somebody extracted the code of the

23 EchoStar. E-Star is EchoStar, and they put the code on the

24 Internet on the site named DISHPlex.

25 Q.   And why is that important?

1   A.   Because somebody could dump the code of the EchoStar

2   card ROM and to put it on the Net. I mean, it was a very

3   good hack to the pirate.

4   Q.   This shows that someone had dumped the EchoStar ROM?

5   A.   Yes.

6   Q.   In 1999?

7   A.   Yes.

8   Q.   And had put it on the Internet?

9   A.   Yes.

10   Q.   And what was the web site where this was found?

11   A.   DISHPlex.com.

12   Q.   Okay. If we could go back, please, Mr. Shkedy, to

13   Exhibit 459 -- we'll try and get you the right exhibit this

14   time. I apologize for confusing everyone.

15   A.   Okay.

16   Q.   Can you describe generally, Mr. Shkedy, what

17   Exhibit 459 is?

18   A.   The same type of activity as the previous two files --

19   two exhibits. And this is a response to an e-mail that was

20   sent to me by Mr. Yoni Shiloh, the same one sent previous

21   two files. And the -- there is an attachment of a file.

22   And they asked me to identify what is the content of this

23   file.

24   And what I told him, that the file is not part of the

25   Smart Card. Might be that it is part of the IRD, what we

1   called the set-top box previously.

2   Q.   So Mr. Shkedy, this is -- the bottom -- the original

3   e-mail is an e-mail from Mr. Shiloh to you?

4   A.   Yes.

5   Q.   And the upper portion is your response to Mr. Shiloh's

6   message?

7   A.   Yes.

8   Q.   And this e-mail exchange was done as part of your work

9   at the Haifa Research Center?

10   A.   Yes.

11   MR. SNYDER: Your Honor, I move Exhibit 459.

12   THE COURT: Any objection?

13   MR. NOLL: No objection.

14   THE COURT: Received.

15   (Exhibit No. 459 received in evidence.)

16   MR. SNYDER: May we publish it, Your Honor?

17   THE COURT: You may.

18   MR. SNYDER: Can you blow up the upper portion,

19   please?

20   BY MR. SNYDER:

21   Q.   What is the date of this exchange between you and

22   Mr. Shiloh?

23   A.   October '99.

24   Q.   And what is the information that Mr. Shiloh had

25   forwarded on to you?

1 A.   It's kind of a file that he found on the DISHPlex site,

2 and they asked me to identify the content of the file.

3 Q.   And what did you tell Mr. Shiloh was the content of the

4 file?

5 A.   First of all, that the code is not out of the Smart

6 Card that we have in our disposal. And secondly, that this

7 might be from the IRD, if at all. I mean, we were not sure

8 what is the content of the file. So in this case, we failed

9 to identify the file.

10 Q.   And what was the website that this was found on?

11 A.   DISH -- DISHPlex.

12 Q.   Mr. Shkedy, if I can go back -- you were asked a few

13 questions about your trips to the United States. Do you

14 recall that?

15 A.   Yes.

16 Q.   As part of the reverse engineering of the EchoStar

17 card, how many trips, did you make to the United States?

18 A.   Two to the United States and one to Canada.

19 Q.   Okay. So let's try and take those one at a time.

20 A.   Okay.

21 Q.   Where did you go on the first trip to the

22 United States?

23 A.   To Fort Lee, to the house of a guy named Eyal, E-Y-A-L.

24 Q.   And what did do you when you were in Fort Lee?

25 A.   We tried to monitor the transaction or the data that

1   goes between the set-top box and the card, what we refer to

2   previously, the sniffing.

3   Q.   Okay. And while you were there, did you receive any

4   EchoStar programming that you weren't authorized to receive?

5   A.   No. Actually, the card failed after a while, and we

6   couldn't accomplish the tasks that we -- that we traveled

7   for.

8   Q.   Did you decrypt any television programming from

9   EchoStar that you weren't authorized to decrypt?

10   A.   No.

11   Q.   When was the second time that you came to the United

12   States as part of the EchoStar project?

13   A.   A little bit afterward. I don't remember if it was one

14   or two months, something like that. And we went to

15   Maryland, to one of NDS employee named Veret Anikster,

16   V-E-R-E-T, A-N-I-K-S-T-E-R.

17   THE COURT: Just a moment. A-N-I-K-S-T-E-R.

18   THE INTERPRETER: Would the Court with for the

19   interpreter to do spellings?

20   THE COURT: I have A-N-I-K-S-T-E-R.

21   THE INTERPRETER: That's correct.

22   THE COURT: Thank you.

23   BY MR. SNYDER:

24   Q.   Mr. Shkedy, what did you do on that second trip to the

25   United States?

1 A.   We try again to monitor the data that flows between the

2 Smart Card and the IRD.

3 Q.   And were you successful this time?

4 A.   No.

5 Q.   As part of that visit to the United States, did you

6 receive any EchoStar programming that you weren't authorized

7 to receive?

8 A.   No.

9 Q.   Did you decrypt any EchoStar programming that you

10 weren't authorized to decrypt?

11 A.   No.

12 Q.   Now, you made one more trip to North America, correct?

13 A.   Yes.

14 Q.   Why did you come to the United States or Canada as part

15 of the reverse engineering project? Why didn't you do the

16 work in Israel?

17 A.   Okay. I will use my fist with -- okay. This is a

18 globe. Here is United States. Here is Israel. The

19 satellite is -- hang over United States. In Israel, we are

20 in the shadow. We cannot receive any signal from the

21 satellite that is hang up over the United States. So we

22 didn't have any other option but to go to the United States,

23 or to North America, actually.

24 Q.   So if you wanted to log the information between the IRD

25 and the Smart Card, were you able to do that in Israel?

1   A.   No.

2   Q.   You had to go to North America to do that?

3   A.   Only in North America. In professional world, it would

4   be the footprint of the satellite does not cover Israel.

5   But just to show that I know some technical words -- okay.

6   Q.   Mr. Shkedy, you made a third trip to North America as

7   part of the project?

8   A.   Yes.

9   Q.   And where did you go that time?

10   A.   To Canada -- Windsor, Canada.

11   Q.   And what did you do in Windsor, Canada?

12   A.   We try to verify whether or not we accomplished the

13   task of reverse-engineering the EchoStar card. And the

14   reason is to verify whether or not there are still as a

15   security measure that we didn't find in our

16   reverse-engineering effort in Israel, so just a verification

17   that we found a security measure and they don't hide any

18   other tricks in the card.

19   Q.   And did you understand that anything you were doing in

20   Canada was wrong or illegal?

21   A.   As far as I know, it's legal.

22   Q.   Now, Mr. Shkedy, did you share the results of any of

23   the information you collected on your trips to the

24   United States or Canada with Chris Tarnovsky?

25   A.   No.

1 Q.   Did you share any -- did you share any of the results

2 of your visits to the United States or Canada with any

3 pirates?

4 A.   No.

5 Q.   Did you -- was -- did you share any of the information

6 from the EchoStar reverse-engineering project with any

7 pirates?

8 A.   No.

9 Q.   Was any of the information from the EchoStar

10 reverse-engineering project used to assist piracy?

11 A.   No.

12 Q.   Was that one of the purposes of the project?

13 A.   No.

14 Q.   Has any of the reverse engineering that you have done

15 been done for the purpose of assisting piracy?

16 A.   No.

17 Q.   Is the purpose of the Haifa research facility to fight

18 piracy, Mr. Shkedy?

19 A.   Yes, this is our main task.

20   MR. SNYDER: No further questions, Your Honor.

21   THE COURT: Redirect.

22   Once again, introduce yourself back to the record

23 so I have a clear record.

24   MR. NOLL: Thank you, Your Honor.

25   David Noll on behalf of plaintiffs.

1   REDIRECT EXAMINATION

2 BY MR. NOLL:

3 Q.   I want to cover a few points that you just made in your

4 examination by Mr. Snyder, Mr. Shkedy.

5   One of the things you just testified to is that Israel

6 is in the shadow when you tried to demonstrate to the jury

7 the way the satellite spot beam works. Do you recall that?

8 A.   Yes.

9 Q.   Truth is, Mr. Shkedy, Israel is not in the shadow. The

10 footprint that EchoStar broadcasts its signal is to the

11 United States; is that correct?

12 A.   Yes.

13 Q.   You looked at Exhibits 459, 784, and 791. Do you

14 recall that, sir?

15 A.   Those are the three e-mails that I --

16 Q.   Yeah.

17 A.   Okay. Yes.

18 Q.   Yeah, your counsel just showed those to you, correct?

19 A.   Okay. Yes.

20 Q.   And you recall those exhibits dealt with a web address

21 called -- dealing with DISHPlex. Do you recall that?

22 A.   Yes.

23 Q.   Okay. Now, the DISHPlex -- there's some code posted or

24 something that appears to be something like code in 791, and

25 you testified that it related to ROM.

1 A. Yes.

2 Q. Okay. When somebody has a ROM of a conditional access

3 system, they don't have the ability to write to the access

4 card; is that correct?

5 A. It is correct.

6 Q. Yeah. So in order to write to the access card, you

7 need the EEPROM, which we discussed was demonstrated in the

8 Headend Report, correct?

9 A. Correct.

10 Q. And these exhibits, they don't contain EEPROM. Is that

11 right, sir?

12 A. It is right.

13 Q. In fact, Exhibit 459 -- you analyzed the code from the

14 DISHPlex website, and you say in your e-mail that the code

15 is not part of the Smart Card.

16 A. Yes.

17 Q. And you knew that because you already had the code in

18 your possession from a year earlier in 1998; isn't that

19 correct, sir?

20 A. Yes.

21 Q. You testified earlier about two tasks that NDS has for

22 its lab in Haifa, Israel. Do you recall that, sir?

23 A. Yes.

24 Q. First task is NDS tries to find weak points in its

25 chips, correct?

1   A.   Correct.

2   Q.   And the second task is NDS evaluates other chips from

3   competitors, correct?

4   A.   Yes.

5   Q.   Okay. And you testified that you flew to the

6   United States two times concerning the EchoStar hack,

7   correct?

8   A.   Correct.

9   Q.   You came over here from Israel in order to obtain

10 EchoStar access cards, correct?

11 A.   (No audible response.)

12 Q.   You came over here to test -- excuse me -- you came

13 over here to test your hack of the EchoStar access cards.

14 A.   In Canada.

15 Q.   That's right. You did that in Canada one time, right?

16 A.   Canada, and twice in the United States.

17 Q.   And we understand from your testimony that the chips

18 that are in these access cards come from -- that is, the

19 EchoStar access cards -- come from a company called

20 ST Thompson, correct?

21 A.   The chips is come from ST Thompson, yes.

22 Q.   And in order to test the EchoStar access cards, you got

23 the cards from NDS's operational security, right?

24 A.   Right.

25 Q.   And isn't it true, sir, that you could have just worked

1 directly with ST Thompson in order to evaluate the chips

2 that they put out in the market?

3 A.   It could be done also, yes, we did it also now with

4 ST Thompson, but they didn't contact us at that time.

5 Q.   You didn't do it that way, did you?

6 A.   We didn't do it that way, yes.

7 Q.   And you also testified that reverse engineering is

8 understanding how something functions.

9 A.   Yes.

10 Q.   Giving the Headend project report to a satellite

11 hacker, Mr. Shkedy, does not further any reverse

12 engineering. Do to agree with that?

13 A.   Sorry. Can you repeat, please?

14 Q.   Yeah. You recall the Headend project report you did

15 concerning the hack of the EchoStar system, correct?

16 A.   Yes.

17 Q.   And your counsel elicited testimony from you that you

18 believe that's just reverse engineering, correct?

19 A.   Yes.

20 Q.   Now, if you or anyone at NDS was to give that Headend

21 project report to a satellite pirate or hacker, that

22 wouldn't be in furtherance of reverse engineering. Do you

23 agree with me?

24 A.   Sorry? Can you repeat?

25   THE COURT: That has a double negative.

1   THE WITNESS: I think that I didn't got some of

2 the word and --

3 BY MR. NOLL:

4 Q.   I'll make it simple.

5 A.   Okay.

6 Q.   Giving the Headend project report that deals with the

7 EchoStar hack to a satellite pirate or hacker is not reverse

8 engineering, correct?

9   THE INTERPRETER: (Interprets.)

10   THE WITNESS: Okay. You are right. We didn't

11 give it.

12 BY MR. NOLL:

13 Q.   Can you think of any good reason, Mr. Shkedy, that NDS

14 would have had to give the Headend project report to

15 Christopher Tarnovsky?

16 A.   No.

17 Q.   Right. And you agree with me, sir, if the evidence

18 shows that NDS gave that Headend project report to

19 Christopher Tarnovsky, that that act was not in furtherance

20 of reverse engineering?

21 A.   I can testify only on the part where I was involved

22 until 2001. Until 2001 we didn't give any -- any report to

23 Mr. Tarnovsky.

24 Q.   Okay. And in your testimony with -- when your counsel

25 was examining you, you made a distinction between piracy and

1   reverse engineering. Do you recall that?

2   A.   Yes.

3   Q.   And we already talked about reverse engineering. But

4   you said piracy -- and I'll use your words -- is to cause

5   damage to another company, correct?

6   A.   Correct, or to take advantage of selling something,

7   forgery or something like that. So I use the word "damage."

8   But you have to take it in the sense to make damage or to

9   make illegal profit, something like that.

10   Q.   And you agree with me, sir, that if this jury right

11   here finds that Christopher Tarnovsky posted EchoStar's

12   codes on the Internet, that would be piracy, sir?

13   A.   This is a question or a process? I don't know.

14   Q.   You would also agree with me, sir, that if this jury

15   finds that it's illegal, correct?

16   A.   It -- I think it is illegal, yes.

17   Q.   And based on your definition of piracy, this jury finds

18   that Christopher Tarnovsky did those acts, it would cause

19   damage to EchoStar, sir; isn't that correct?

20   A.   This is legal advice, or this is -- I don't know if I'm

21   capable of answering this question.

22   Q.   Okay.

23   BY MR. NOLL: No further questions.

24   THE COURT: Recross.

25

1   RECROSS-EXAMINATION

2   THE COURT: This is Mr. Snyder on behalf of NDS.

3   BY MR. SNYDER:

4   Q.   Just a couple of questions, Mr. Shkedy. I think there

5   may be some confusion about the difference between a

6   footprint and a shadow for a satellite.

7   A.   Okay.

8   Q.   EchoStar's satellite that beams transmissions to the

9   United States and to North America -- can you receive that

10   signal in Israel?

11   A.   No.

12   Q.   So if you wanted to log the communications between an

13   IRD, a set-top box, and a Smart Card, would you -- were you

14   able to do that in Israel?

15   A.   No.

16   Q.   Did you have to travel to North America to do that?

17   A.   Yes. May I give an example? Let's assume that we have

18   a flashlight and a sphere, or the sun which is shining. And

19   so we have day on one side; we have night on the other side.

20   From the night side, you cannot see the sun, so you cannot

21   see the transmission.

22   Okay. The satellite act like a sun. And the

23   transmissions is like whether or not we have -- we have

24   light or not. So if you have this globe, we have this

25   satellite over here transmitting its transmission onto the

1 globe, you can receive the signal only on one side of the

2 globe and not from the other side where Israel is located.

3 Q. And, unlike the sun, Mr. Shkedy, is the satellite set

4 up so that it's always over the same part of the earth?

5 A. Yes. The technical word is "geostationary."

6 Q. Geostationary?

7 A. Which mean it hang up always above the same point on

8 the globe.

9 Q. And Mr. Shkedy, you were also asked some questions

10 about giving the Headend report to pirates. Did you give

11 the Headend report to any pirates?

12 A. No.

13   MR. SNYDER: Thank you, Mr. Shkedy.

14   THE WITNESS: Thank you.

15   THE COURT: All right. Now, we're going to take a

16 recess until -- about 20 minutes this time. I need just

17 about five or ten minutes with counsel.

18   You're admonished not to discuss this matter

19 amongst yourselves nor to form or express any opinion

20 concerning this case.

21   Thank you very much.

22   Sir, if you would remain for just a moment.

23   THE WITNESS: Sir.

24   (The jury exits the courtroom.)

25   (Outside the presence of the jury.)

1   THE COURT: All right. Counsel, if you would be

2   seated for just one moment, we'll remain on the record.

3   The jury is no longer present. All counsel are

4   present.

5   I don't propose to enter into this lawsuit in the

6   presence of the jury unless there's an adverse inference

7   being drawn by the Court. With this particular witness, he

8   has every likelihood of returning, so as a courtesy I can

9   speak to you now, or just put you on notice that in all

10   likelihood he's returning.

11   You can have my thoughts.

12   (To the witness:) Sir, if you would remain outside

13   for just a moment, and we'll call you back in just a moment.

14   THE WITNESS: Okay.

15   THE COURT: But that's up to you. It will become

16   clear why if one of the parties request in the future, but

17   as I said, I can divulge a thought to you and have you each

18   deal with it, but I will not do this in front of the jury.

19   MR. SNYDER: Please, Your Honor.

20   THE COURT: The gentleman is no longer present.

21   There's a tremendous disconnect. If you listen to

22   the gentleman, he disassociates himself from a pirate. He

23   keeps tossing in "ex-pirate," referring to Kommerling. So

24   my notes show that on direct examination the gentleman

25   testified that the Headend report was given to Oliver

1   Kommerling, Mr. Shen-Orr, and all members of the Haifa team.

2   When he uses the word "pirate," he doesn't include

3   Mr. Kommerling. He defines Mr. Kommerling as an ex-pirate.

4   I'm going to joke with you a moment -- I don't know if they

5   have retirement systems or what, but the end result is

6   there's a disconnect between the two of you.

7   You've labored hard to say that he doesn't

8   disclose this report. To a pirate, that's definitional.

9   Mr. Kommerling may not be a pirate. He may have been a

10   pirate at one time, but now he's a retired pirate.

11   If you two want to leave that where it is, maybe

12   he's not coming back, but within 72 hours if there's concern

13   about his questioning, he's back on that plane.

14   The second thing is, I don't know, because it's

15   not clear from this examination, what year Mr. Kommerling

16   received this information. In other words, the question's

17   been asked, when did Kommerling get the information about

18   the Headend reports. But it's not clear what year. Do

19   either one of you know?

20   MR. SNYDER: I believe it was about the time of

21   the project, Your Honor. I'm not sure that anyone knows

22   precisely, but the 1998 period.

23   MR. HAGAN: We have, Your Honor, and that's the

24   best evidence, is mid-1998.

25   THE COURT: Did that come out in front of the

1   jury? Does anybody know?

2   MR. HAGAN: I do not.

3   THE COURT: I'll leave you in a quandary: How

4   much he's inconvenienced, how many times he comes back,

5   maybe never. All right, Counsel. You'll deal with it how

6   you want to. I'll have him back on the stand and just

7   admonish him in front of the jury that he's subject to a

8   72-hour recall.

9   Take a recess until five after the hour.

10   MR. HAGAN: Thank you, Judge.

11   (Recess is held at 2:48 p.m.)

12   (Further proceedings reported by Sharon

13   Seffens in Volume IV.)

14   -oOo-

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3   CERTIFICATE

4

5   I hereby certify that pursuant to Section 753,

6   Title 28, United States Code, the foregoing is a true and

7   correct transcript of the stenographically reported

8   proceedings held in the above-entitled matter and that the

9   transcript page format is in conformance with the

10   regulations of the Judicial Conference of the United States.

11

12   Date: April 11, 2008

13

14

15   _____

             DEBBIE GALE, U.S. COURT REPORTER

16   CSR NO. 9472, RPR

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23:18 24:8,13
24:22 27:3
29:23 30:13
33:11,14,18
36:13,15,17,21
36:25 37:2,14
37:16,17,22
38:3,4 39:2 42:5
44:11 48:18
56:5 57:18 59:3
59:9 66:2,25
68:6,17 69:1,5
70:2,25 71:13
71:18 74:4,6,15
79:13
cards 12:8,16
17:23 23:13,16
25:4 26:6 28:7
33:25 44:8
75:10,13,18,19
75:22,23
card's 26:1
careful 15:4
CARTER 1:3
case 16:4 24:16
38:8 50:14 51:7
63:21 68:8
80:20
cause 47:25 78:4
78:18
center 2:14 12:23
14:11,14 22:12
22:15,20 29:4
39:21,23 40:3
40:16,18 41:5,7
41:18,25 42:11
42:20 43:6 44:7
45:16 46:3 53:2
53:5 57:1,5,16
59:15 60:6 61:1
64:2,19 67:9
CENTRAL 1:2
certain 26:23
35:24 36:16
46:24
CERTIFICATE
84:3
certify 84:5
CHAD 2:5
Chaim 31:24 53:7

59:19
chance 34:13
change 26:20,22
30:24 31:6
changed 30:18
channel 13:25
18:2,2 35:21,21
35:23,23 36:4,6
36:10,16,18
43:21
channels 21:7,8,9
charge 13:1
chases 43:2
chemistry 43:20
chief 23:21
child 34:19
China 49:12
chip 6:20 10:10
14:23 15:2,7,7
17:16,17,19,20
17:22,25 20:14
26:11 27:20
28:1 30:2 37:20
37:20,22 39:24
41:22 42:2,2,12
44:12 45:6 46:9
46:13,14,15,20
46:21 47:3,4,12
47:15 48:19,22
49:9,10,22,25
50:21 52:16
53:25 54:9,13
59:3 62:1
chips 32:17 42:5,6
42:14 45:17,20
45:23 46:3,7
48:15 49:15,16
49:18,19,21,23
52:8,16,18
53:21 54:4,7
55:6,15 58:17
60:1,6 74:25
75:2,17,21 76:1
chosen 43:15
Chris 58:15 71:24
CHRISTINE 2:5
Christopher
32:12 58:5,9,14
58:23 77:15,19
78:11,18

circuitry 20:10,13
city 40:14
clarification 5:17
clarify 64:6
classic 12:25
classified 39:7
clear 5:22 54:23
64:21 72:23
81:16 82:15,18
Clint 29:15
clip 18:11,12,21
18:22
cloned 12:23
13:15 14:5
close-up 41:8
code 27:3 29:9
30:2,16,21 32:1
32:19 33:10
46:16 47:16
50:19 58:1
59:11 65:22,23
66:1 68:5 73:23
73:24 74:13,14
74:17 84:6
codes 6:22 28:11
31:2 32:10
33:24 78:12
collected 71:23
color 37:19 49:20
column 29:4
combat 11:22
come 16:10 23:13
24:19 59:18
70:14 75:18,19
75:21 82:25
comes 83:4
coming 82:12
common 43:19
55:4
communication
38:3 56:12
communications
79:12
companies 40:15
40:15 41:17
46:3,7 48:14
company 5:19 6:2
6:4 39:1 48:1,21
48:24 49:6,7,10
49:13 57:14

75:19 78:5
competitor 45:19
49:16,18,22
60:6
competitors 75:3
complete 20:2
Complies 19:13
37:6
compromise 11:4
11:12 18:2 42:9
compromised
10:22 15:24
compromising
15:4
computer 3:14
8:12 56:6,7,10
56:13,14,15,17
56:21
conceal 30:24
31:11
concern 82:12
concerned 16:23
concerning 7:2
75:6 76:15
80:20
concerns 28:11
conditional 10:21
10:24 24:25
26:1 28:11
34:24 35:1,16
36:24 62:7 74:2
conditions 35:24
conference 58:16
84:10
confers 11:14
22:14
confidential
55:25
confidentiality
39:14
conformance
84:9
confused 16:25
41:9
confusing 66:14
confusion 79:5
connected 56:14
connection 6:18
6:19
consider 55:24

constructed 59:21
consultant 44:5
57:12
consuming 45:11
contact 37:19,20
38:5 43:11,12
43:15 64:20
76:4
contacts 38:6
contain 74:10
containing 13:20
content 13:24
14:8 39:9 63:21
66:22 68:2,3,8
contents 21:15
30:10 50:25
continue 4:9 6:5
Continued 4:17
continuously
38:21
contract 5:19 6:1
6:2
control 38:3
copies 41:9
copy 8:11 9:11
18:12 32:25
33:3 35:9 59:5
61:6
core 53:18
corner 8:22
CORP 1:5
CORPORATI...
2:3
correct 5:1,2,4,5
7:5,6,12 8:3,7,8
8:10 10:1,7,11
10:12,15,16,18
10:19,22,23
11:12 13:21
14:7,17,20
15:10 16:4,11
16:14 17:11,20
17:21,23,25
19:1,2,4,18
20:15 21:23
22:3,11,12
23:23 24:6,17
25:6,18,19 27:4
27:5,17,18
30:25 31:1,7,8

31:19,24 32:2
32:11 33:1,2,4,5
33:6,7,9,15 46:4
46:5 51:24,25
63:13 69:21
70:12 73:11,18
74:4,5,8,9,19,25
75:1,3,7,8,10,20
76:15,18 77:8
78:5,6,15,19
84:7
corrected 52:8,17
correctly 9:25
13:4 14:2 20:23
21:19 23:10
46:25
costs 55:13
counsel 4:6,8,9
12:20 17:13
29:11 35:8 47:9
63:1,13 64:6
73:18 76:17
77:24 80:17
81:1,3 83:5
couple 79:4
course 7:3 8:9
11:25 14:18
21:18 23:14
42:17
court 1:1,21,22
4:5,14 7:18,20
8:16,19 9:11
12:20 15:12
16:21 17:3,7,13
18:12,15,18,19
19:23 20:5
29:11,16,18,20
31:21 34:3 35:8
35:10,12 37:10
40:9 43:3 46:10
46:19,22,24
47:3,5,7 50:3
56:20,23 61:10
61:14 63:1,4,7
63:10 64:6,21
64:25 65:2,4,7
67:12,14,17
69:17,18,20,22
72:21 76:25
78:24 79:2

80:15 81:1,7,15
81:20 82:25
83:3 84:15
courtesy 4:7 81:8
courtroom 80:24
cover 71:4 73:3
CPU 9:23
create 12:4 21:22
28:7 55:22
created 11:18
19:18
creative 43:22
credit 37:17
CROSS 3:3
Cross-examinat...
34:3,8
cross-shape 40:18
cross-shaped 41:7
CSR 1:21 84:16
cyberpiracy 21:6

D

D 2:5,19 3:1
Dalas 46:14 47:4
47:12
Dallas 47:5
damage 47:24,25
48:1 78:5,7,8,19
Danny 53:8
Darin 2:13 34:6
data 24:22,24
25:2 26:1,22
36:1,2,5,7,10,12
36:13,22 55:22
56:7,8 64:17
68:25 70:1
date 8:23 25:7
38:24 61:17,20
61:22 65:10
67:21 84:12
David 1:3 2:13,24
4:12 7:2 8:7
14:16 24:15
56:16,18,18,22
72:25
day 1:8 4:2 79:19
deal 81:18 83:5
dealing 73:21
deals 77:6
dealt 73:20

Debbie 1:21 84:15
debit 22:17 23:1
decrypt 36:5,17
36:18 62:8 69:8
69:9 70:9,10
defeat 51:3,6
defeated 51:14
defect 52:18
defend 18:4
DEFENDANT
2:11
defendants 1:9
34:7
deficiencies 45:13
48:19
Define 17:13
defines 82:3
definition 78:17
definitional 82:8
degree 38:13
demonstrate 73:6
demonstrated
74:7
demonstrative
35:5 37:4
department 60:17
deposition 10:4,6
10:7 16:3,6,11
16:16
describe 15:17
35:15 37:14
38:9 41:24 56:3
66:16
described 62:12
describes 25:15
description 25:16
describing 13:10
14:4 27:15
53:24
design 15:19 18:8
39:2,25 40:2
44:16 45:12,13
51:23,24 55:5,6
designed 60:24
designer 15:2
determine 31:7
developed 48:18
55:4 57:23 58:1
59:12
device 4:21,25

difference 45:3
47:20 79:5
differences 9:24
different 6:15
13:23 16:16
40:3,4 49:18,20
51:4
difficult 55:12
difficulty 13:22
direct 3:3 4:10,17
9:19 25:10
81:24
directly 76:1
DirecTV 11:4,7
11:23
DirecTV's 10:21
10:24 11:12
disassembled
65:17
disassociates
81:22
disclose 82:8
disconnect 81:21
82:6
disconnected
21:18 22:5,8
discovered 14:1
29:9,25
discuss 58:13
80:18
discussed 27:17
31:13 58:5,8,22
74:7
dish 21:14,23
22:9 23:3 36:9
60:22 65:18
68:11
DISHPlex 65:24
68:1,11 73:21
73:23 74:14
DISHPlex.com
62:11 66:11
display 36:19
displayed 35:13
37:12 40:24
41:12 61:15
disposal 68:6
dissolved 52:13
distinction 77:25
District 1:1,2,22

divided 50:1,21
dividing 50:23
divulge 81:17
DOC 1:7
document 7:8,12
8:5,6,9 9:2
11:10 13:13
14:16,19 15:17
17:9,19,22
18:18,24 27:23
28:6,18 29:13
30:4 31:13
35:13 37:12
50:17 52:12
61:15 63:4,11
63:13
doing 31:9,11
45:10 49:1,8
50:7 52:21
71:19
double 76:25
Dov 2:24
download 30:11
downloaded
21:15
draft 3:9 7:12,14
7:22 8:2 9:1,1,3
9:3,7,13,16 11:3
17:9
drawn 81:7
dump 26:1,5
30:14 46:16
47:16 50:19,25
66:1
dumped 66:4
dumps 50:16
duty 36:15
D-A-L-A-S 47:6
D2V3 1:25

E

E 3:1
earlier 5:10 19:6
23:12 30:18
31:13 53:20
58:4 74:18,21
earth 62:9 80:4
easily 13:25 51:18
EBERHART
2:13

EchoStar 1:5,25
  2:3 5:11 6:9,18
  6:19 7:2 10:14
  10:21 12:5
  24:20 28:7
  29:23 30:21
  32:19 33:1
  53:25 56:5 57:4
  57:18,24 59:2,9
  65:23,23 66:1,4
  68:16 69:4,9,12
  70:6,9 71:13
  72:6,9 73:10
  75:6,10,13,19
  75:22 76:15
  77:7 78:19
EchoStar's 6:22
  13:11 24:25
  25:18 26:1,5
  27:3,20 28:1,11
  29:8,9 31:2 32:1
  33:11,21,24
  78:11 79:8
edited 9:4
educational 38:10
EE 27:1
EEPROM 14:8
  21:14,16 26:8
  26:10,11,18,20
  26:25 27:3
  30:10,14,17,18
  30:20,24 31:6
  50:16 51:2 74:7
  74:10
efficient 45:9
effort 11:3,11
  27:25 42:25
  55:5 71:16
efforts 27:19
  55:10
eight 37:19 38:4
either 82:19
elaborate 14:21
electrical 26:23
  26:25 27:1
electronic 37:21
  38:11
elicited 76:17
eliminate 18:8
em 60:23

Embarcadero
  2:14
employee 69:15
employees 49:8
empty 37:22
encrypt 56:8
encrypted 35:23
encryption 36:1,2
  36:13,22
ended 32:6,8
ends 18:22
enemy 43:9
engineer 24:15
  38:11,16 39:20
  39:22 53:10
  57:2
engineering 5:10
  44:24 45:1,4,5
  47:17,20,22
  48:4,8,11 49:2,9
  49:23 50:9 52:7
  52:21 53:15,15
  53:18,19,25
  55:10,21 56:4,5
  57:4,18,24 58:5
  58:9,13,23 59:2
  68:16 70:15
  72:14 76:7,12
  76:18,22 77:8
  77:20 78:1,3
England 6:14,17
English 37:24
enlarge 45:6
enter 81:5
entire 37:22
entitled 13:15
  20:20
entitlement 13:15
  14:5
equipment 6:10
  44:4 54:9 55:4
erasable 26:25
  27:1
erase 26:20
error 10:4 28:9
et 1:5,8 2:3,11
Europe 49:11,13
evaluate 39:24
  42:2,6,12 76:1
evaluates 75:2

evaluating 42:13
  64:16
evaluation 6:20
evidence 3:8 8:15
  8:20 19:21,24
  61:11 65:5
  67:15 77:17
  82:24
exactly 15:17
examination 4:10
  4:17 16:2 73:1,4
  81:24 82:15
examining 77:25
example 25:25
  26:14,18 30:8
  30:12,13 45:7
  48:8 49:24 51:2
  54:12 79:17
examples 52:6
exceed 22:17
exchange 67:8,21
excluding 13:2
excuse 75:12
exhibit 3:8 7:8,10
  7:17 8:14,17,20
  9:19 11:2,2,10
  11:19 12:20
  13:9 15:9 16:15
  17:9 19:3,11,12
  19:15,21,24
  20:2,2,10 21:21
  27:22 28:14,21
  60:12,13 61:3,4
  61:11,13 62:18
  62:19,25 63:15
  63:17 65:1,5
  66:13,13,17
  67:11,15 74:13
exhibits 3:7 28:4
  40:7 61:7 66:19
  73:13,20 74:10
exists 13:21
exits 80:24
expand 21:7
explain 35:24
  42:6 44:10,12
  62:6
explains 21:21
expose 15:24
exposed 37:18

express 60:22
  80:19
extend 6:2
extract 6:22
extracted 30:2
  33:11 59:9
  65:22
ex-hackers 43:13
ex-pirate 19:9
  81:23 82:3
Eyal 68:23
eye 54:17
Eyel 23:16 24:12
  24:21
Eyel's 24:2,6
eyes 54:15
E-E-P-R-O-M
  26:8
e-mail 3:12,13
  32:19,20,23
  56:11 57:21,23
  58:1 60:16,18
  60:25 61:18,24
  62:12,23 64:1
  65:10,13 66:19
  67:3,3,8 74:14
e-mailed 32:21
e-mails 73:15
E-PROM 26:17
E-Star 65:17,23
E-Y-A-L 68:23

                  F

F 30:4
facility 56:6 72:17
fact 5:3 74:13
failed 68:8 69:5
failure 55:5,7,8
fair 39:12
faking 13:22
family 34:18
far 5:5 10:17,19
  12:6,14,14
  71:21
feature 50:19
  51:3,11,12,14
  51:18
Federal 1:21
feed 39:24 44:16
  45:25

feedback 15:23
  42:3
feel 43:22
FIB 5:20 6:15
  51:8
fields 27:2
fight 11:4,11
  42:24 43:9
  72:17
file 8:11 13:20
  60:20 63:25
  66:21,23,24
  68:1,2,4,8,9
files 55:22 63:20
  65:14,17 66:18
  66:21
final 3:10 7:22 8:3
  9:3,5,6 19:16,17
find 14:24 39:24
  42:8,16 44:17
  45:8,9 51:19
  52:20 71:15
  74:24
finding 40:1
  44:18
finds 78:11,15,17
first 7:12,14 9:19
  13:18 26:12
  41:20 42:1,15
  43:7,17 46:13
  49:3 58:8 62:6
  65:12,14,16
  68:5,21 74:24
first-line 63:19
fist 70:17
five 38:5 53:19
  80:17 83:9
fix 46:1 48:19
flashlight 79:18
flew 43:17 75:5
floor 41:20,22,23
flows 24:22 70:1
flying 48:10
focus 9:18 12:18
  14:10 19:10
  20:9,17 23:2
  25:9,20 26:8
  27:6 28:25 29:2
  39:16 56:5
focused 5:12,14

5:15,18,23 6:10
6:13,16 54:19
54:19,24 55:3
55:10
focusing 10:20
11:10
following 9:24
footprint 71:4
73:10 79:6
foregoing 84:6
forgery 78:7
form 80:19
format 84:9
formed 42:25
Fort 23:17 24:21
68:23,24
forth 30:15 35:21
43:22
forward 6:23
forwarded 67:25
found 10:5 15:6
43:19 44:18
45:25 62:10
66:10 68:1,10
71:17
Fountainview 2:7
four 34:19,19
36:3,3 53:19
65:13
fourth 41:22
frame 5:16 6:8
10:13,20
Francisco 2:15
free 21:8,9
front 31:5 63:15
81:18 82:25
83:7
fully 32:4
function 38:5
functional 38:6
functioning 47:23
functions 76:8
further 6:3 7:15
72:20 76:11
78:23 83:12
furtherance
76:22 77:19
future 81:16

___
G
___

gain 38:2
Gale 1:21 84:15
gas 45:11
generally 26:10
60:15 62:19
63:17,18 66:16
generation 52:4
gentleman 23:16
64:7 81:20,22
81:24
geostationary
80:5,6
Germany 43:17
43:25
give 18:17 26:5
49:24 59:5,8,11
76:20 77:11,14
77:22 79:17
80:10
given 19:4 63:10
81:25
giving 76:10 77:6
80:10
globe 70:18 79:24
80:1,2,8
go 7:22 9:5 20:17
30:4 38:25
40:22 66:12
68:12,21 70:22
71:2,9
goes 36:13 69:1
going 6:8,23 7:7
9:19 13:18
16:21 18:24
20:9,17 21:10
27:6 45:5,7
80:15 82:4
gold 37:19
gonna 25:20
28:15,25
good 31:10,11
34:10,11 42:17
44:14,19 49:1
50:7,12 64:25
66:3 77:13
government 39:4
39:6,13
graduated 38:11
grandchildren
34:20

graphic 34:25
37:1
ground 35:18,19
group 1:8 2:11
15:19 31:25
39:20,25 40:2
42:20 43:1,1
44:16 53:7
59:20,21,22
guide 26:9
guy 53:8 68:23

___
H
___

H 27:6,11
hack 5:11 6:9,18
7:2 10:14,21
12:25 14:6
17:20 20:20
21:11,17,22
24:19,25 25:2
25:16 27:11
28:7 45:17,19
66:3 75:6,13
76:15 77:7
hacked 11:8
20:14 22:23
23:13 29:8
hacker 13:10
15:16 18:2,4
19:1,7 43:2,8,10
43:11 46:15,16
76:11,21 77:7
hacking 12:7,16
13:6 22:21
23:16 27:19,25
44:22,24 45:1,3
45:22
HAGAN 2:5
82:23 83:2,10
Haifa 4:22 5:22
8:10 30:1 32:2,3
34:17 39:20,23
40:3,13,16 41:5
41:18,25 42:10
42:19 43:6 44:7
45:16 46:2 53:2
53:2,5,12 56:7
56:25 57:2,5,16
59:15,25 60:5
61:1 64:2,18

67:9 72:17
74:22 82:1
half 39:5
hand 7:7 19:12
handed 18:18
hands 33:20,23
hang 70:19,21
80:7
happened 5:25
hard 8:11 82:7
harder 50:24 52:4
hardware 9:20
44:13
harmful 33:13
HARTSON 2:18
Hasak 23:19,19
23:21 24:2
64:15
Hat 59:16,23
haul 16:9
head 31:25 53:7
57:21 59:5,20
Headend 3:9,10
7:4,13 8:3 9:1
11:2,18 17:10
19:3,16 25:9
28:14 31:14
32:25 33:3
55:19 74:8
76:10,14,20
77:6,14,18
80:10,11 81:25
82:18
hear 24:15
heard 5:12
hearing 46:24
held 83:11 84:8
help 34:25 36:2,5
37:1 63:19
helpful 17:14
Hewlett-Packard
41:20
Hey 15:2
he/she 13:2
hide 71:17
highlight 29:15
61:20
high-tech 40:15
hired 39:22
Hitachi 46:9,10

46:11,20,21
47:1
HOGAN 2:18
hold 38:12,13
hole 27:19 28:1
Honor 4:13 7:16
9:12 16:20
18:11 19:22
20:7 34:6,7 35:7
37:9 40:8 61:3,5
61:8,12 65:1,3
67:11,16 72:20
72:24 81:19
82:21,23
HONORABLE
1:3
hope 18:9
hopefully 50:8
hour 83:9
hours 82:12
house 24:3,6,7,21
68:23
Houston 2:8
HP 41:20
HRC 39:20,20
42:25 43:6
HTTP 62:15
human 63:23,24
humanity 48:6,7
49:5

___
I
___

IBM 59:21,22
ID 13:23,25
idea 42:16 44:19
45:6 50:5,6,12
52:2
ideas 42:17 45:10
IDENTIFICAT...
3:8
identified 27:19
27:25 52:7
identifies 65:10
identify 4:11
19:15 34:4 46:6
61:17 63:20,25
66:22 68:2,9
identity 30:25
31:12
III 1:8 4:2

illegal 12:9,11,12
  12:13,16 13:7,8
  71:20 78:9,15
  78:16
illustrate 35:1
  37:2
image 21:16
immediately
  43:19
impeachment
  16:20
implement 21:11
  21:11 44:20
  51:13 52:16
implementation
  50:6
implemented
  51:10 52:1
importance 62:5
important 33:17
  56:14 65:25
improve 40:1
improved 52:2
improvement
  58:20
inch 37:21,25
include 82:2
inconvenienced
  83:4
indicating 36:8
individual 32:12
industrial 40:13
inference 81:6
info 65:17
inform 22:20
information 6:24
  13:21 15:1,18
  26:4 27:22 28:3
  35:20 36:9
  55:22,24 56:4
  57:3,17,23 59:2
  59:8,12 60:6,9
  60:18 63:18
  67:24 70:24
  71:23 72:5,9
  82:16,17
informs 22:15
infringing 42:18
initial 8:2 9:1
initially 23:8

innovative 43:22
input 42:5
inserted 29:23
  52:5
inside 42:5
Insight 49:7
install 51:1
instance 18:6
Institute 38:12
instructed 24:18
instruction 25:25
  30:10 52:9,10
  52:12,13,14
integrated 22:3
Intel 10:5
intended 21:14
intention 15:5
Internet 28:12
  30:21 31:3
  32:10 33:25
  60:19,20 62:10
  63:22 64:17
  65:24 66:8
  78:12
interpreter 4:9
  6:4 11:14,15,20
  11:24 22:14,15
  47:25 48:6
  69:18,19,21
  77:9
Interprets 11:20
  11:24 77:9
introduce 34:14
  72:22
invent 48:10
investigate 42:4
involved 77:21
ion 5:12,14,15,18
  5:23 6:10,13,16
  54:19,19,24
  55:3,10
IRD 13:19 21:12
  21:17,25 22:5
  36:11 66:25
  68:7 70:2,24
  79:13
IR3 21:13
Israel 4:22 8:6,10
  30:1 34:16 39:4
  39:6,13 40:14

58:19 70:16,18
70:19,25 71:4
71:16 73:5,9
74:22 75:9
79:10,14 80:2
Israeli 38:12
IV 83:13

_____
J
_____
jail 43:4
Jersey 23:17
Jerusalem 15:18
  15:19,23 39:25
  40:2,5 42:3
  45:25 50:8
  51:24 53:9
  56:11,11,12
job 31:10,11
  45:15 49:1
joke 82:4
Judge 1:3 83:10
Judicial 84:10
July 25:6,8
jury 1:15 4:4 31:6
  34:14,14 35:7
  35:15 37:2,8,15
  38:9 40:8,11,20
  41:2,24 42:7
  44:10 46:6 56:3
  61:17 64:8 65:6
  65:9 73:6 78:10
  78:14,17 80:24
  80:25 81:3,6,18
  83:1,7
jury's 4:6

_____
K
_____
keep 20:6 31:17
keeps 81:23
KENNETH 2:19
kept 8:9 33:15,18
key 36:18,22
  61:25 62:8
keys 36:2,4 60:21
  62:3,5,10
kind 15:16 26:20
  43:20 48:10
  62:21 68:1
kindly 11:15
KLEIN 2:19

knew 23:15 74:17
know 5:5 6:12,14
  7:14,21 10:17
  10:19 12:6,14
  12:15 23:12,19
  24:12 31:2,4
  32:12 34:12
  39:2 43:8,8
  45:11 48:16
  51:17,19,19,20
  51:20,21,21
  52:1,17 60:4
  62:22 64:7 71:5
  71:21 78:13,20
  82:4,14,19 83:1
knowing 27:2
knowledge 12:5
  32:25 53:1
  59:24
known 22:1
knows 64:8 82:21
Kommerling 19:4
  19:6 31:19,22
  32:9 43:13,16
  57:6,7,9,11,17
  81:23 82:1,3,3,9
  82:15,17
Kommerling's
  32:6 43:24
Kudelski 33:6

_____
L
_____
L 2:18
lab 5:22 8:10
  29:25 43:24,25
  44:2 74:22
labeled 14:16
  18:24,25 31:13
  31:14
laboratory 6:15
  43:18 58:19
labored 82:7
labs 6:12
language 29:4,22
  29:25 42:5
  43:19 63:23,24
large 40:19
largest 53:11,14
laser 50:2,4 51:7
  51:9

latch 52:9,11,12
  52:13,14
launch 42:25
law 2:7,14,19
  12:15
lawsuit 28:10
  81:5
lawyer 12:14
lawyers 16:13
layers 52:5
leak 33:13
leaked 34:1
learn 43:18 51:10
learned 52:15
learning 45:14
lease 5:15 6:5
  54:20
leased 5:13,20
  55:1,10
leasing 6:4
leave 82:11 83:3
Lee 23:17 24:21
  68:23,24
left 35:19
legal 49:3,4 71:21
  78:20
legally 49:9
let's 9:18 20:17
  23:2 25:9 28:14
  30:4 56:5 68:19
  79:17
lifeblood 33:12
light 79:24
likelihood 81:8,10
limit 22:17,18
line 21:18 22:6,8
  36:4 52:11
  62:13,14 65:11
lines 18:14 36:3
  65:13
linked 56:10
listen 17:7 81:21
little 5:9,12 14:21
  30:17 34:13
  35:25 37:25,25
  38:8 54:22
  69:13
live 34:15
living 34:16
locate 52:20 61:6

located 39:25
40:3,13,17 41:6
41:18,23 43:18
80:2
location 40:4
log 70:24 79:12
logic 54:12,13
long 14:4
longer 81:3,20
look 7:8,14 8:22
9:8 15:19 28:14
28:15 44:13
48:9 62:18,25
65:12
looked 63:6 73:13
looking 8:5 11:2
13:9 14:23
17:25 18:1
27:23 28:4 48:8
Los 2:21
lot 44:22
lunch 4:20

M

M 2:5
main 72:19
maintain 39:13
malintention
47:23
manufacturer
39:2
marked 8:5 19:11
market 76:2
married 21:12
Maryland 69:15
master 38:13
matrix 29:1,3
matter 80:18 84:8
mean 6:3 12:10
18:10 42:7
65:21 66:2 68:7
80:7
means 21:3,6
44:10 65:22
measure 51:6
71:15,17
meet 42:15
meeting 16:10
member 32:3
43:5

members 32:1
82:1
memory 25:23
26:2,11,12,17
26:21 30:18
39:2 49:25
50:13,14,14,15
50:21,24,24,25
51:4,12
mentioned 40:2
42:1 47:12 52:9
message 62:13
67:6
Messages 25:23
method 16:24
Micron 5:19 6:3
microprocessor
10:15
middle 36:8 37:17
mid-1998 82:24
miles 34:16
millimeter 37:24
millimeters 37:23
mind 48:3
minimal 13:1
23:8
minute 25:10
minutes 80:16,17
missed 46:19
missing 9:4,15
15:20
mistake 15:3
44:18 45:14,24
mistakes 45:25
46:1
modify 26:15
30:14,20
modifying 12:8
12:16 14:8
moment 11:13
20:12 25:22
27:8 28:24
29:18 46:22
51:17 62:7,20
63:1 69:17
80:22 81:2,13
81:13 82:4
monitor 24:22
68:25 70:1
monitoring 24:24

month 48:18
months 52:19
69:14
Mordinson 7:2
8:7 14:16 19:18
21:22 22:21
24:15 56:16,19
56:22
Mordinson's
56:17
Moskowitz 2:24
motor 45:9,9,12
Motorola 9:23
move 13:14 41:15
41:16 61:3 65:1
67:11
movies 22:16,24
35:21
mutual 43:21,21
MYERS 2:12

N

N 3:1
Nagra 57:12,14
60:24 62:1
NagraStar 33:4
NagraVision 33:8
name 5:19 22:2
24:2 39:1 49:7
49:13 59:18,19
59:22 64:14
named 23:16
32:12 53:8 56:8
65:24 68:23
69:15
nature 48:11
NDS 1:8 2:11 4:21
4:25 5:3,6,7,13
5:18,22,25 6:9
6:20 10:10,14
10:17,24 11:4
11:11 14:25
15:7 17:17,23
19:7 20:14
23:22 24:18
28:8,10 29:8
32:6,9,25 33:3,6
33:8 34:23,24
38:19,21,24,25
39:16,24 42:2,6

42:25 43:11,16
43:25 44:2,5
45:17 48:14,21
48:24 49:19,22
51:10,13,16
52:1,8,12,17
53:9 54:6,13,19
54:23 57:7,9
58:10 64:22,23
69:15 74:21,24
75:2 76:20
77:13,18 79:2
NDS's 14:19
15:10 17:10
23:24 27:4
45:23 75:23
NDS-Israel 34:22
near 40:13
necessary 25:16
49:4
need 54:13 55:14
74:7 80:16
needle 52:11
negative 76:25
Net 66:2
network 21:14,23
22:9 23:3 56:11
56:25 60:22
63:20 65:18
neutralize 50:19
51:17 52:10
never 4:25 5:3
10:10 32:25
33:3,6,8 83:5
new 16:9 23:17
55:6
news 35:21
nice 50:6
night 61:8 79:19
79:20
Nipper 29:4,9
Noll 3:4 4:12,12
4:19 6:7 8:1,14
8:18,21 9:17
11:17,21 12:1
12:21,22 16:1
16:20 17:2,6,8
17:15 18:10,14
18:16,20,23
19:12,14,20

20:1,6,8 22:19
29:14,19,21,24
31:23 34:2 35:9
35:11 37:7 61:4
61:9 65:3 67:13
72:24,25 73:2
77:3,12 78:23
nonfunctional
38:6
normal 56:8
north 40:14 70:12
70:23 71:2,3,6
79:9,16
notes 81:24
notice 81:9
notify 22:9,12
number 12:20
13:23 53:11,14
55:16,17

O

O 1:3
oath 31:5
objection 8:16,17
15:11 19:22
35:8,11 37:7,10
61:9 65:2 67:12
67:13
obtain 26:4 75:9
occupants 41:19
occupied 41:17
October 8:23 64:4
65:11 67:23
offer 8:14 16:20
19:20
officers 23:24
offices 4:22
Official 1:21
Oh 14:15
okay 4:12 5:6,9
5:16 6:24 7:10
8:2,5,13 9:8,18
10:9,13 12:18
13:14 14:15
15:14 16:19
17:2 19:10
20:20 21:10
23:4 25:9,12,25
26:24 27:12,24
28:19,22,24,25

29:25 30:4
31:17 34:25
35:4,18 37:17
38:1,15 39:17
39:18 40:6,22
41:15 42:10,13
44:12 45:10,11
47:7,7,10 50:5
50:18 53:24
54:14,16 56:6
56:17 58:13
60:20 62:17,25
63:12 64:12
65:12 66:12,15
68:19,20 69:3
70:17,17 71:5
73:17,19,23
74:2 75:5 77:5
77:10,24 78:22
79:7,22 81:14
old 38:14
Oliver 19:4 31:19
31:22 43:13,16
81:25
once 4:10 21:14
64:6 72:22
oOo 83:14 84:1
open 15:21,21
36:2,5 43:20
44:12
opened 33:19
operational 23:21
42:21,23 43:2,6
60:10 64:13,14
64:23 75:23
opinion 80:19
option 23:8 70:22
order 11:4,22
21:11 25:17
30:13 42:9,24
43:18 46:17
52:19 74:6 75:9
75:22 76:1
ordinary 8:9
organization
23:24
original 12:8 67:2
oscilloscope 54:16
outside 5:7 80:25
81:12

overcome 50:1
52:4
overcoming 45:13
Overruled 15:12
Overwrite 30:7
owned 54:19,24
O'DONNELL
37:6
O'MELVENY
2:12

_____
P
package 13:1
page 9:14,19
12:19 14:10,14
18:14,17 20:9
20:10,17 25:10
25:21 27:7
28:15,23 30:5,6
84:9
paid 24:12
paper 58:15,18
Paragraph 12:19
20:18,20 21:21
paragraphs 9:4
9:14
park 40:13
part 24:24 25:2
36:12 42:19
43:1 44:7 46:2
46:19 55:21
57:23 58:2
59:12 60:5
63:21,22 64:1
64:18,22,23
66:24,25 67:8
68:16 69:12
70:5,14 71:7
74:15 77:21
80:4
partially 32:4
particular 10:9
13:22 81:7
parties 81:16
parts 50:1,21 51:4
Pass 34:2
patent 5:3
patented 4:25
patents 42:18
pay 14:6

paying 12:9,13
13:7,11 14:6
pay-per-view
14:5 22:10 23:9
27:16
peak 53:17
pen 26:16
pencil 26:19
penetrate 46:18
people 44:16
45:14,24 53:10
53:11,14,19
performing 10:14
10:21 24:25
period 5:20 82:22
permanent 26:21
permission 14:22
18:10 30:15
36:16,20
personally 6:14
person's 30:25
PGP 56:9
photograph 40:7
40:12
pick 63:19
picked 24:8
picture 20:13
40:17,23,24
41:3,9,11,12,14
piece 6:10 37:16
37:20
piracy 11:23 45:1
45:4 47:17,21
47:23 52:22,24
53:3 72:10,15
72:18 77:25
78:4,12,17
pirate 13:10 14:6
15:16 19:7
25:17 33:24
36:24 42:9,24
46:15,16 62:21
66:3 76:21 77:7
81:22 82:2,8,9
82:10,10
pirates 33:21
47:13 72:3,7
80:10,11
pirating 12:10,12
place 40:3

PLAINTIFF 2:3
plaintiffs 1:6 4:12
8:14 19:20
57:14 72:25
PLAINTIFF'S
4:15
plane 82:13
plastic 37:16,22
platform 42:4
play 18:10
played 18:21
playing 18:22
PLC 1:8 2:11
please 7:9 9:19
11:6 18:4,13
19:12 25:22
27:24 28:18,24
29:15 34:3,5,15
35:6,15 37:5,15
38:10 40:7,20
40:23 41:2,11
60:12 61:6,21
62:18,20,25
66:12 67:19
76:13 81:19
point 14:24 18:7
29:11 32:5
39:24 40:20
42:3,8 43:10,12
43:15 44:13,14
44:15,19 45:12
45:22 52:20
64:20 65:9 80:7
points 44:17 73:3
74:24
portion 67:5,18
possess 36:21
possession 74:18
possible 10:7 13:1
post 33:24
posted 28:11 31:2
65:18 73:23
78:11
posting 30:20
32:9
pound 55:13
65:18
power 26:22
PPV 13:2,15,19
13:23

practice 20:20
21:12 27:11
practicing 38:16
prearranged
16:10
precisely 82:22
premarked 7:7
premium 21:8
prepared 11:3,11
19:18 34:25
37:1
presence 4:4
80:25 81:6
present 2:23 4:6,6
4:8 16:13 81:3,4
81:20
PRESIDING 1:3
previous 66:18,20
previously 4:15
24:23 42:1
44:12 49:24
52:9 62:6 67:1
69:2
price 23:1
principal 39:20
39:22 53:10
print 26:14
private 44:1
probably 32:15
problem 51:21,22
procedure 26:23
27:15 56:8
proceedings 1:14
83:12 84:8
process 16:24
17:5 53:21 54:3
54:6 78:13
producer 41:23
product 46:16
products 52:15
60:3
professional 71:3
profit 78:9
program 3:14
36:2 51:1 56:8
63:21,23
programming
25:18 33:21
69:4,8 70:6,9
programs 62:8

project 3:9,10 7:4
  7:13 8:3 9:1
  11:3,18 17:10
  19:16 25:9
  31:14 32:4 33:1
  33:3 53:16
  55:21 56:4 57:4
  57:24 58:2
  59:12 69:12
  70:15 71:7 72:6
  72:10,12 76:10
  76:14,21 77:6
  77:14,18 82:21
projects 39:7,10
  39:14
prone 15:16
pronouncing
  64:12
propose 81:5
protect 18:2 28:9
  50:13 51:13,22
protected 44:15
  44:16
protecting 15:20
protection 50:6,8
  50:15 51:8 52:5
protects 51:12
provide 44:2
provided 32:1
provider 10:24
  35:20 36:25
providers 34:24
providing 5:6
publish 35:7 37:8
  40:8 61:13 65:6
  67:16
published 58:16
purchase 5:18
  22:24 23:9 25:3
purchased 22:16
  44:3
purpose 41:24
  42:13 49:23
  50:23 72:15,17
purposes 52:22
  72:12
pursuant 84:5
put 51:22 65:23
  66:2,8 76:2 81:9
putting 52:11

p.m 4:3 18:21,22
  83:11

Q
---
quandary 83:3
question 11:16
  14:21 16:22
  17:1,7 18:9 49:6
  51:19,20 58:6
  58:25 78:13,21
questioning 82:13
questions 44:22
  53:20 54:18
  55:18 59:14
  68:13 72:20
  78:23 79:4 80:9
question's 54:22
  82:16
quit 38:25
quitted 38:24

R

R 2:13
Raith 49:14
RAM 51:1
rare 6:10
Ratner 53:8
read 9:22,25
  12:24 13:4,18
  14:2 20:23
  21:10,19 23:7
  23:10 26:15
  27:7 29:3 33:19
  50:13,16 51:2
  58:15
reads 28:6
read-only 26:13
really 34:13
reason 49:4 71:14
  77:13
recall 4:20,23
  5:14 16:2,6
  32:22 53:22
  55:19 58:6
  62:23 68:14
  73:7,14,20,21
  74:22 76:14
  78:1 83:8
receive 36:10 69:3
  69:4 70:6,7,20

  79:9 80:1
received 8:19,20
  19:23,24 61:10
  61:11 65:4,5
  67:14,15 82:16
receiver 21:25
  22:9 24:8,12
receivers 25:3
receiver/decoder
  22:3
recess 80:16 83:9
  83:11
recognize 7:10
  9:13 60:23
  62:20
recollection 8:25
record 4:10 7:16
  34:4 72:22,23
  81:2
record's 54:23
Recross 3:3 78:24
RECROSS-EX...
  79:1
recruited 43:11
rectangle 36:14
  37:18
red 36:4
Redirect 3:3
  72:21 73:1
refer 69:1
referred 59:15
referring 50:12
  81:23
refers 21:25 63:7
refresh 8:25
regard 15:14
regarding 13:21
  49:6
regardless 54:9
regular 63:23
regulations 84:10
rejoined 38:24
relate 15:9
related 18:6 38:8
  56:4 57:17
  73:25
relates 14:19
  17:10,22
relationship
  10:18 19:8 32:6

  32:8 43:5
relevant 15:7
  52:15
relies 39:13
remain 80:22
  81:2,12
remains 26:19
remember 25:7
  31:15 55:16,17
  58:11 69:13
reminded 16:3
remove 26:22
repeat 11:6,15
  27:24 53:13
  76:13,24
report 3:9,11 7:1
  7:4,4,13,22 8:3
  9:1,15 11:3,19
  12:5 17:10 19:3
  25:9 26:3 28:14
  31:14 33:1,3,6,8
  33:20,23 34:1
  48:19 55:19
  56:1 57:21 59:6
  74:8 76:10,14
  76:21 77:6,14
  77:18,22 80:10
  80:11 81:25
  82:8
reported 83:12
  84:7
Reporter 1:21
  50:3 84:15
REPORTER'S
  1:14
reporting 50:7
reports 82:18
represent 36:3
represents 36:4
request 18:10
  81:16
research 39:21,23
  40:3,16 41:5,18
  41:25 42:11,20
  43:6 44:7 45:16
  46:2 53:2,2,5
  57:1,5,16 59:15
  60:5 61:1 64:2
  64:18 67:9
  72:17

resetting 27:16
response 66:19
  67:5 75:11
rest 38:6
result 82:5
results 31:18
  71:22 72:1
RESUMED 4:16
retired 82:10
retirement 82:5
retransmits 36:8
returning 81:8,10
Reuven 23:19,19
  23:21 24:2
  64:15
reverse 5:10
  44:24 45:1,4,5
  47:17,20,22
  48:3,7,10 49:2,8
  49:23 52:7,21
  53:15,15,18,19
  53:24 54:13
  55:9,21 56:4,5
  57:4,18,24 58:5
  58:8,13,22 59:2
  68:16 70:15
  72:14 76:7,11
  76:18,22 77:7
  77:20 78:1,3
reversed 20:14
reverse-engineer
  44:8,11 45:8,17
  45:19 48:15,21
  52:3 53:21
reverse-enginee...
  29:8 46:7,13
  47:15 49:16
reverse-enginee...
  32:16 45:22
  46:3 48:18 54:4
  54:6,10 60:1
  71:13,16 72:6
  72:10
rewritten 30:18
RICHARD 2:18
right 4:5 5:23
  6:21 11:8 12:2
  12:15 13:7 16:7
  16:13,17 17:6
  17:17 19:8 20:3

21:1,2,25 22:6
23:14,15,22,25
24:4,5,16 27:20
29:13 31:17
32:6,17,22 63:8
66:13 74:11,12
75:15,15,23,24
77:10,17 78:10
80:15 81:1 83:5
right-hand 8:22
ROM 21:12 26:12
26:25 65:17
66:2,4 73:25
74:2
Room 1:22
ROSS 2:6
row 29:1,3
RPR 1:21 84:16
Rubin 2:24
Russians 63:7
R-A-I-T-H 49:14
R-O-M 26:12

S

SACV 1:7
San 2:15
SanDisk 39:1,3
Santa 1:16,23 4:1
satellite 1:5 2:3
13:10,11 19:7
25:17 33:21,24
36:7,8 62:9
70:19,21 71:4
73:7 76:10,21
77:7 79:6,8,22
79:25 80:3
Saturday 63:5
saw 46:17 52:12
56:1
saying 5:14 16:16
20:6
says 9:15,22
12:23,24 14:11
15:15 21:10
23:7 26:8 27:7
27:13 29:4 30:7
62:14 65:13,16
science 38:13,13
scroll 29:1
seated 81:2

second 6:20 28:25
29:2 41:22 47:3
58:10 62:13,14
63:22 65:11
69:11,24 75:2
82:14
secondly 68:6
secrecy 39:13
secret 14:11,16
18:25,25 31:14
31:14,17,18
33:19,24 55:24
56:2
secrets 33:14,16
33:17
section 13:9,14
23:2,7 25:11,13
84:5
secure 12:5 27:4
46:15 56:25
security 23:21
42:21,23 43:2,6
51:3,6,11,12,14
52:2 58:17
60:10,17 63:19
64:13,15,24
71:15,17 75:23
see 8:23 9:2,20
13:15 14:11,11
20:10,21 23:5
25:13 29:3,6,12
30:7 35:19 36:3
36:3 37:18 42:2
44:14 61:20
65:16,19 79:20
79:21
seen 60:13 61:4
sees 63:22
Seffens 83:13
selling 78:6
Semiconductor
49:7
send 43:4
sense 56:15 78:8
sensitive 56:7
sent 32:19,20 60:7
60:9,16,17,25
61:24 62:3,8
64:1 66:20,20
sentence 13:18

separate 56:6,13
separated 51:4
September 61:19
61:23
service 13:1,20,21
13:23,24 21:7
services 13:2 23:9
session 4:5
set 56:10 80:3
set-top 22:1 24:23
36:11,14,17,18
36:21,22 38:4
67:1 69:1 79:13
SGS 9:23
shadow 70:20
73:6,9 79:6
share 57:3,17
59:1 71:22 72:1
72:1,5
Sharon 83:12
Shen-Orr 53:7
59:19 82:1
Shiloh 60:16,17
64:7,11,12
66:20 67:3,22
67:24 68:3
Shiloh's 67:5
shining 79:18
Shin-Orr 31:24
Shkedy 3:4 4:8,15
4:20 10:17 12:4
19:15 20:3,11
28:10 31:2
32:13 33:10,20
34:10,12,18,25
35:15 37:1,14
38:8,16 39:12
39:16 40:11
41:2,14,24
42:19 44:21
45:16 47:12
49:15 50:20
51:23 52:6,21
54:18,22 55:18
58:4,22 59:14
60:5,25 61:17
61:22 62:17,19
62:23 63:15
64:11 65:9
66:12,16 67:2

68:12 69:24
71:6,22 72:18
73:4,9 76:11
77:13 79:4 80:3
80:9,13
short 14:4
shot 50:2,3 51:7,9
show 24:23 35:5
37:4 40:6 50:16
60:12 71:5
81:24
showed 32:15
58:19 73:18
shows 60:21 66:4
77:18
sic 21:13
side 79:19,19,20
80:1,2
signal 70:20 73:10
79:10 80:1
signals 13:11
similar 51:10
similarities 49:20
simple 77:4
single 50:2,3 51:7
51:9
sir 4:23,24 6:24
6:25 7:8,10,11
8:22,23,24 9:18
9:20 10:8,11
11:5 12:7 13:4,6
13:16 14:2,4,7
14:10,20 15:9
15:10,13 16:2,7
16:13,17 17:7
17:24 18:24
20:21 21:10,19
22:11,22 23:5
24:4 25:4,13
26:10 27:2,9
28:6,17 29:6
32:2,17 33:10
33:18 47:2
60:13 73:14
74:11,19,22
75:25 77:17
78:10,12,14,19
80:22,23 81:12
sit 16:10
site 62:11 65:24

66:10 68:1
sites 60:19
six 50:1,21 51:4
52:19
size 37:16,21,23
Sky 60:22
slide 62:6
slogan 21:3
small 34:16 36:14
36:25 37:20,22
41:21 49:7
Smart 5:11 6:22
23:13 24:8,13
24:22 25:4
33:11,14,17,25
36:13,15,17,21
36:25 37:2,14
37:16 38:3,4
42:5 66:25 68:5
70:2,25 74:15
79:13
sniffer 4:22 5:4,7
24:23,24
sniffing 69:2
Snyder 2:13 3:5
7:16 8:17 15:11
19:22 34:6,6,9
35:5,14 37:4,8
37:11,13 40:6
40:10,22 41:1
41:10,13 46:12
47:11 48:2,13
50:10 56:24
61:3,7,12,16
63:3,6,14 64:9
64:10,23 65:1,6
65:8 67:11,16
67:18,20 69:23
72:20 73:4 79:2
79:3 80:13
81:19 82:20
software 42:8
44:13
solution 52:16
somebody 26:13
26:14 32:21
38:2 65:22 66:1
74:2
sorry 8:18 20:6
22:13 27:9,24

29:11 38:14,14
39:11 41:8,9
46:19,23,23
53:13 56:20
60:20 61:22
64:14 76:13,24
source 31:7
space 50:14,14,15
Spain 60:22
speak 81:9
speaking 63:18
special 19:7 32:6
specific 54:22
specifically 31:9
Spell 47:5
spellings 69:19
sphere 79:18
splitted 36:12
sport 35:21
spot 73:7
ST 10:15,18 17:16
17:19 20:14
27:3 32:16
53:25 75:20,21
76:1,4
Stack 30:7
stand 4:16 34:12
83:6
standard 9:23
42:15
stands 22:3
Stars 2:20
start 38:19 51:18
51:18
started 16:2 35:18
46:8 53:5
starting 18:21
States 1:1,22
21:23 22:2 24:4
24:19 68:13,17
68:18,22 69:12
69:25 70:5,14
70:18,19,21,22
71:24 72:2
73:11 75:6,16
79:9 84:6,10
station 35:18,19
stay 24:3
steal 25:17 33:21
stenographically

84:7
steps 25:16
stick 36:14
stint 38:23
STONE 2:18
store 35:20,20
56:7
stored 56:3
story 35:18
Street 1:22
streets 16:9
strong 44:19
structure 27:2
study 15:1 18:7
43:7
ST16CF54 9:23
10:10
subject 17:19
83:7
subscribed 22:10
subscriber 12:25
13:19 36:9,16
36:19,20
subscribers 35:22
subscribing 12:25
subscription
12:24 23:8
25:11
subsidiary 41:21
succeed 43:3
successful 70:3
sue 43:3
suffering 11:23
14:25
Suite 2:8,15,20
sun 79:18,20,22
80:3
supervision 64:15
supplies 36:17
supply 36:22
supplying 34:24
sure 9:6 10:3 11:7
11:18 50:20
54:23 63:8 64:9
68:7 82:21
Svi 3:4
switch 13:19
swore 16:7
SWORN 4:15
synonym 36:11

system 11:4,7,12
14:23 15:4,15
18:3,7 21:23
22:21,23 24:20
25:1 29:9 33:12
35:16 37:24
40:1 42:9 46:18
48:1,8 60:21,23
62:1,2,5 74:3
76:15
systems 35:2 82:5

─────────
T
─────────
T 2:4
table 30:15
take 7:8,23 8:22
47:23 62:21
68:19 78:6,8
80:15 83:9
taken 21:13
talk 5:9,12 6:23
21:6 38:7
talked 6:21 78:3
talking 4:21 56:15
Tarnovsky 32:13
32:16 58:6,9,14
58:15,23 59:1,5
59:8,11 71:24
77:15,19,23
78:11,18
task 42:3,10 49:8
59:24 71:13
72:19 74:24
75:2
tasks 42:25 69:6
74:21
teach 43:18
teaches 28:6,8
team 32:2,3 53:2
53:2,6,15 57:5
57:16 59:16,23
64:13,13,15
82:1
teams 51:24
technical 25:15
43:12 71:5 80:5
technique 18:3
26:5 58:20
techniques 32:16
42:16 43:7,9,19

46:17 58:5,9,14
58:15,17,23
technology 5:7
10:22 14:20
15:6,10,14
16:23,24 17:4,4
17:10,13 18:1,7
27:4 38:12 45:7
48:12
telephone 21:18
22:6,8
television 13:7
40:19 69:8
tell 16:7 34:14
40:11 41:2
60:15 62:18
63:17 68:3
ten 80:17
term 47:5 58:10
terminated 6:1
test 24:19 25:2
75:12,13,22
testified 5:10 6:8
11:7 13:6 17:16
19:6 23:12
30:17 73:5,25
74:21 75:5 76:7
81:25
testify 32:23
77:21
testimony 16:15
31:5 32:15 35:1
44:21 53:22
75:17 76:17
77:24
Texas 2:8 47:5
thank 4:6,14 5:16
6:6 7:9,20 10:8
34:21 37:11
47:7,8 56:23
61:12 62:17
63:12 69:22
72:24 80:13,14
80:21 83:10
thing 47:18 50:11
50:12 82:14
things 30:15 73:5
think 5:13 6:1
13:8 16:18 18:6
22:1 29:12

48:16 51:7,18
51:19 63:9,12
77:1,13 78:16
79:4
thinking 43:8,10
43:21
third 41:23 71:6
Thompson 48:17
48:21,24 49:25
53:25 75:20,21
76:1,4
Thomson 9:23
10:9 17:16,19
20:14 27:3
32:16
thought 48:25
81:17
thoughts 81:11
three 73:15
Three-Muskete...
20:25 21:3
Thursday 1:17
4:1
time 5:16,21 6:8
6:19,20 7:23
8:14 10:13,20
10:25 11:18
12:4 16:6,10
19:20 28:8 32:5
39:16,19 43:17
55:10,14 57:7
58:8 62:21
64:16 66:14
68:19 69:11
70:3 71:9 75:15
76:4 80:16
82:10,20
times 43:3 75:6
83:4
title 25:23 39:19
56:2 84:6
titled 23:2 25:11
today 27:23 28:4
31:5 44:21
56:15 60:13
told 15:19,23
66:24
top 8:22 14:10,14
23:24 27:13
30:7 37:18

tossing 81:23
Total 53:17
town 34:16
trace 31:10
transaction 68:25
transcript 1:14
 84:7,9
transfer 15:1,18
transferred 36:11
transmission
 79:21,25
transmissions
 79:8,23
transmit 35:22
transmitted 36:7
transmitting
 79:25
travel 79:16
traveled 69:6
tremendous
 81:21
Trial 1:15
tricks 71:18
tried 32:9 52:3
 68:25 73:6
tries 22:24 74:24
trip 68:21 69:24
 70:12 71:6
trips 68:13,17
 71:23
true 10:13 11:5
 30:25 75:25
 84:6
truth 15:9 16:7
 22:22 73:9
try 11:11 14:24
 18:8 21:11
 35:17 43:2
 44:19 51:22
 66:13 68:19
 70:1 71:12
trying 22:24
turn 40:19 41:10
turning 9:14
TV 12:8,13 13:8
 14:6 18:2 34:24
 36:4
twice 6:14 75:16
two 8:2 9:14
 36:12 38:23

41:9 42:25
 65:14,16 66:18
 66:19,21 68:18
 69:14 74:21
 75:6 82:6,11
Twofold 42:15
type 14:25 15:20
 15:25 26:11,17
 50:8,15 52:14
 58:19 63:18
 66:18
types 26:12

U

Underneath 9:22
 37:19
understand 32:5
 50:20 71:19
 75:17
understanding
 45:5 47:22 76:8
United 1:1,22
 21:23 22:2 24:4
 24:19 68:13,17
 68:18,22 69:11
 69:25 70:5,14
 70:18,19,21,22
 71:24 72:2
 73:11 75:6,16
 79:9 84:6,10
universal 12:23
 13:15 14:5
 25:11
unlawful 13:8
unusual 49:2 55:3
upper 67:5,18
USA 21:14 23:3
use 6:15 10:15
 18:4 21:22 25:2
 31:9 42:9,16
 46:17 49:22
 51:2,8 53:21
 54:6,9,12,13,16
 70:17 78:4,7
uses 46:15 49:19
 82:2
USNIX 58:16
usual 49:3
utilize 30:12
utilized 21:17

U.S 84:15

V

Veret 69:15
verification 71:16
verify 36:15 71:12
 71:14
version 9:5 19:16
 19:17 20:2
 21:13 65:17
Video 18:21,22
view 13:1,3,11
 44:14 60:22
visit 70:5
visited 43:24
 58:18
visits 72:2
Vista 60:22
Volume 1:8 4:2
 83:13
vs 1:7
V-E-R-E-T 69:16

W

W 2:13
WADE 2:4,6
want 5:9 6:2,4,23
 7:23 9:8 13:14
 14:9 17:12
 18:25 19:10
 22:9,20 25:10
 30:13 46:24
 54:23 73:3
 82:11 83:6
wanted 31:17,18
 35:22 70:24
 79:12
wasn't 11:3
watch 12:8 14:6
 22:25 35:23
 36:16,20,23
watching 12:13
 13:6,8
way 15:24 31:6
 33:19 43:7,10
 43:21 44:20
 48:5 51:13,14
 52:2 73:7 76:5,6
ways 15:6 42:8
weak 14:24 18:7

39:24 42:3,8
 44:17 45:12
 74:24
weakness 15:15
 15:17 52:18
weaknesses 14:25
 15:4,6,8,21 52:6
web 66:10 73:20
website 68:10
 74:14
week 10:6
WELCH 2:4,6
went 6:14,17,20
 24:6,7 25:3,6
 61:8 63:4 69:14
weren't 69:4,9
 70:6,10
West 1:22 2:14
we'll 24:15 66:13
 81:2,13
we're 4:5 11:2
 12:21 13:9
 27:23 28:4,15
 80:15
we've 6:21
wide 15:21
wife 34:19
WILLETTS 2:5
 9:12 18:18
 19:13 29:17
Windsor 71:10,11
withdraw 58:25
witness 4:8,15 6:6
 7:19,21 9:13
 11:14,25 15:14
 22:14,17 29:22
 31:22 34:2 40:6
 46:11,21,23
 47:2,4,6,10 48:1
 48:7 50:5 56:16
 63:9 77:1,10
 80:14,23 81:7
 81:12,14
WITNESSES 3:3
WOOTEN 2:6
word 29:9 77:2
 78:7 80:5 82:2
words 31:9 64:21
 71:5 78:4 82:16
work 34:21 38:7

38:23,25 39:3,7
 42:19,20 43:23
 44:7 46:2,14
 50:15 51:23
 52:19 53:18
 57:9,11 60:5,17
 61:1 64:2,16,18
 67:8 70:16
worked 32:3
 38:21 39:1,4
 53:6,9,11,14
 75:25
working 24:20
 34:22 38:19
 39:6 57:7 64:13
 64:14
works 73:7
world 6:12 49:10
 71:3
wouldn't 76:22
write 26:19 74:3,6
writing 26:15,19
written 7:1 26:21
 63:23
wrong 18:17
 33:20,23 48:3
 63:9,10 71:20
wrote 27:22 28:3
www.DISHPlex...
 62:15

X

X 3:1

Y

yeah 12:11 14:15
 18:18 27:25
 73:16,18 74:6
 76:14
year 39:5 74:18
 82:15,18
years 38:18
Yehonatan 64:7
 64:11
Yoni 60:16,17
 64:12 66:20
York 16:9

Z

Zeron 41:22

Zvi 4:15 9:15

0

0B 13:20,22
003 21:13
03-950 1:7

1

1 35:6
1-053 1:22
1/8th 37:21,24
1:00 4:3
1:20 18:21
1:21 18:22
10 1:17 4:1
100-mile 40:5
11 9:14 18:14,15
  18:16 84:12
12 20:9 53:17
13 12:19 14:10
14 28:15,23
140 49:8
1400 2:20
15 18:14,16
16 18:15 20:17
16CF54 54:1
17 25:10
1884 38:14
19 3:10 61:19
1969 38:13,17
1984 38:14
1997 32:13 38:22
  38:23 39:17
  46:9
1998 5:19 6:8,13
  8:23 10:14,18
  10:20 11:8
  24:10,19 25:4,6
  30:1 74:18
  82:22
1999 2:20 62:3
  64:4 66:6

2

2 1:8 4:2 7:8,10
  8:14 9:20 13:9
  16:15 20:2,5
  28:14,21 37:5
2-A 3:9 7:17,18
  7:19 8:6,17,18

  8:19,20,22 9:11
  9:19 11:2,10,19
  12:21,21 15:9
  17:9 19:3 20:5,6
  28:22,23 29:17
  29:18,19
2:48 83:11
20 80:16
2000 5:20
2001 6:2 38:23,25
  39:17 54:21
  77:22,22
2004 32:18 38:24
  58:11,12,14,22
2005 41:15 58:11
2008 1:17 4:1
  84:12
2008-04-10 1:25
2401 2:7
247 18:16
25 34:16
2600 2:15
27 25:21
27th 8:23
274 18:14,20
275 2:14
28 84:6
2800 55:13

3

3 21:21 37:23
3M 12:25 20:20
  20:25 21:11,17
  21:22 25:16
  27:11 28:7
3.5.2 12:19 13:10
3.5.3 13:14
31 30:6
310 2:21
32 12:19 28:23
34 3:5
39 27:7 38:18

4

4 3:4 20:18,20
  37:24
4th 1:22
4.1 23:2
4.1.2 25:11
411 1:22

415 2:16
459 3:12 62:18,19
  63:2,3 66:13,17
  67:11,15 73:13
  74:13

5

558-8141 1:23

6

61 3:13
65 3:14
67 3:12
6805 9:23

7

700 2:8
713 2:9
714 1:23
72 82:12
72-hour 83:8
73 3:4
753 84:5
77057 2:8
784 73:13
785-4600 2:21
789 3:13 60:12,13
  61:3,11
79 3:5
791 3:14 62:25
  63:15 65:1,5
  73:13,24

8

8 3:9
8501 10:5

9

90067 2:21
92701 1:23
94111 2:15
9472 1:21 84:16
952-4334 2:9
97 38:20
98 3:10 5:15
  19:11,12,15,21
  19:24 20:2,10
  21:21 25:8
  27:22 28:20
  29:14 54:20
984-8700 2:16

99 61:23 65:11
  67:23