UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

SOUTHERN DIVISION AT SANTA ANA

HONORABLE JAMES V. SELNA, JUDGE PRESIDING

CERTIFIED TRANSCRIPT

MR TECHNOLOGIES, GMBH, Plaintiff and Counterclaim Defendant, vs. WESTERN DIGITAL TECHNOLOGIES, INC., Defendant and Counterclaim Plaintiff.	SACV NO. 8:22-cv-01599-JVS-DVM DAY 3, VOLUME II

REPORTER'S TRANSCRIPT OF PROCEEDINGS

JURY TRIAL

SANTA ANA, CALIFORNIA

THURSDAY, JULY 18, 2024

1:29 P.M.

DEBORAH D. PARKER, CSR 10342
OFFICIAL COURT REPORTER
UNITED STATES DISTRICT COURT
411 WEST FOURTH STREET
SUITE 1-053
SANTA ANA, CALIFORNIA 92701
(657) 229-4305
transcripts@ddparker.com

01:54:39 1 are reasonable?
2 A I felt Mr. Bergman's groupings are reasonable and
3 correspond to Western Digital's product lines and market
4 segments that include consumer, which are the external
01:54:55 5 client, the color, and cloud storage, the Ultrastar
6 products.
7 Q So let's talk about benefits of the invention to
8 Western Digital.
9 What is the main benefit that Western Digital
01:55:14 10 obtains from its infringement of the patents?
11 A So the main benefit was the ability to increase areal
12 density in the product.
13 Q What is areal density?
14 A So yes, it's a funny word. Areal refers to an area.
01:55:29 15 And usually we refer to it in inches squared.
16 And then the density part refers to the number of
17 bits that can fit within that given inch. And its measured
18 in, you know, typically, for the products we're talking
19 about, billions of bits per square inch or trillions of bits
01:55:49 20 per square inch.
21 Q Why is areal density important?
22 A Areal density is important because it determines the
23 capacity of the hard drive. So the disk has a given area on
24 it, and how much bits you can fit on the disk will determine
01:56:05 25 the capacity. Typically, people look at hard drives by how

01:56:09 1 much data they store, so the capacity of the drive.
2 Q So higher areal density equals higher storage capacity?
3 A Correct.
4 Q Did Western Digital have anything to say to support
01:56:31 5 your analysis?
6 A Yes. Dr. Srinivasan, as you saw in the video
7 testimony, said the holy grail of magnetic storage has
8 always been to try to pack more and more storage into that
9 given platter size.
01:56:48 10 Q And in your 25-plus years of experience in the
11 industry, is that consistent?
12 A That's very accurate. You can call it the holy grail,
13 the north star, the first thing you think about in morning,
14 whatever superlatives you would like to add to that.
01:57:05 15 Q Did Dr. Ikeda provide testimony supporting that?
16 A Yes. Dr. Ikeda also said that increasing areal density
17 is the most important objective.
18 Q So earlier, you were talking about the trilemma and how
19 the invention helps to reduce bit size.
01:57:27 20 Can you just kind of give an example to illustrate
21 how decreasing bit size helps increase areal density?
22 A Sure. So what I'm showing here is on a very small
23 portion of the disk, a section that would hold 8 bits. So
24 this would be -- this given area, whatever small dimension
01:57:48 25 that is, there would be 8 bits there.

01:57:50 1 So if we made the bits smaller, we could fit more
2 bits into that given small area, and this then would
3 increase the areal density, in this case going from 8 bits
4 to 18 bits per unit area.
01:58:11 5 Q And does -- what does Dr. Seuss' invention have to do
6 with what we just saw?
7 A Dr. Seuss' invention is what enabled this by breaking
8 through the superparamagnetic limit, separating the
9 stability from the right field in the trilemma.
01:58:33 10 Q Are there Western Digital documents that support what
11 you just said, that -- attributing these areal density
12 increases and therefore storage capacity gains, to
13 Dr. Seuss?
14 A Yes, there are.
01:58:51 15 Q So here, we have JX 2030.
16 Dr. Re, did you rely on -- and you can turn to
17 that in your binder.
18 Did you rely on this presentation in your
19 analysis?
01:59:03 20 A I did.
21 MR. CHANG: Your Honor, we move in JX 2030.
22 MR. LUMISH: No objection, Your Honor.
23 THE COURT: 2030 will be received.
24 *(Plaintiff's Exhibit 2030 received in evidence.)*
25 ////

01:59:14 1 BY MR. CHANG:
2 Q Can you explain what we see here on this slide?
3 A Yes. This was a presentation that, again,
4 Dr. Srinivasan gave and referred to in his video testimony.
01:59:25 5 And it says "The Media 'Trilemma'," which again we've talked
6 to a great deal, reducing the size of the bits, losing
7 stability so you have to increase anisotropy and then not
8 being able to write the media.
9 And he asks the question how to overcome this.
01:59:44 10 Q What do we see on the very next slide?
11 A So on the very next slide, he states:
12 "Enter the 'Exchange-Spring'."
13 Q And that figure on the right, that says
14 "Exchange-Spring Media," what is that?
01:59:59 15 A So that is actually a figure from one of Dr. Seuss'
16 papers that was based on this invention. What you see on
17 the top of the figure here is, again, a graded anisotropy
18 structure going from soft to moderate to high. Remember, I
19 said that disks have magnetic material on both sides. So in
02:00:29 20 this case, the right field would be coming from the bottom
21 of the depth structure.
22 Q So here, the substrate -- throughout your entire
23 presentation, we have the substrate on the bottom, right?
24 A Correct.
02:00:42 25 Q But here, the substrate is on the top?

02:00:44 1 A Yes.
2 Q Okay. And so if you were to flip it so that the
3 substrate was on the bottom, where would the hard storage
4 layer be?
02:00:50 5 A It would be on the bottom.
6 Q And what would be on top of the hard storage layer?
7 A The moderate and soft anisotropy layers.
8 Q Which is called?
9 A The nucleation host.
02:01:07 10 Q And is this from the same presentation?
11 A Yes, correct. This is the summary slide.
12 MR. CHANG: Okay. Can we blow up what's there in
13 the red box.
14 *(The document was published in open court.)*
02:01:20 15 BY MR. CHANG:
16 Q And, Dr. Re, can you speak to that, please?
17 A Yes. So what's stated here is:
18 "The 'exchange-spring' principle has
19 guided most of the advances in PMR media
02:01:35 20 since inception."
21 Q And what is the figure right next to that statement?
22 A That's a figure from Dr. Seuss' paper.
23 Q And in your experience in this field, do you agree with
24 that statement?
02:01:49 25 A Yes, I do agree with that statement.

02:02:00 1 Q Now, do you recall yesterday, in opening statements,
2 Western Digital said that the changes are small and
3 incremental over time.
4 Do you remember that?
02:02:16 5 A Yes.
6 Q Do you agree that some changes are, in fact, small and
7 incremental over time?
8 A No. Some changes are actually groundbreaking. And as
9 I said, this one broke the superparamagnetic limit, which
02:02:35 10 many researchers in the field have been trying to figure
11 out, but it was just assumed that this was not separatable,
12 the stability from the rightability. But Dr. Seuss'
13 invention -- again, to my surprise -- showed a way to do
14 that.
02:02:49 15 Q Fair to say that his invention is the foundation on
16 which modern PMR media is built?
17 A Yes, I think that's fair to say.
18 Q Now, we talked about areal density and capacity.
19 Are there other benefits of the invention related
02:03:09 20 to that?
21 A Yes. There's a number of other benefits. We've kind
22 of talked about the top three, which relate to the trilemma.
23 The invention, though, also improved the writeability of the
24 disk and something called overwrite.
02:03:28 25 Q What is "overwrite"?

02:03:29 1 A "Overwrite" is the ability to write over previously
2 written data on the disk.
3 Q The next bullet: "Better Grain Segregation."
4 Can you explain how the invention helps with that?
02:03:40 5 A Yes. Dr. Seuss' invention allowed the alloys to be
6 optimized for better grain segregation. And also --
7 Q How about the signal-to-noise ratio, or SNR?
8 A So the SNR, again the signal-to-noise ratio, was
9 improved by Dr. Seuss' invention, as I'll show you.
02:04:04 10 Q So how does it do that?
11 A Basically, it improves the writeability so that you're
12 writing cleaner, more well-defined transitions, and also
13 allows you to use alloys that will allow that to happen.
14 Q Harder alloy?
02:04:23 15 A Harder alloys.
16 Q What about adjacent track interference? Can you just
17 explain what that is?
18 A Sure. So a track -- you know, if you have your little
19 disk, the circumferential data, it's called the track. And
02:04:37 20 there will be lots of tracks packed next to each other. So
21 if you're trying to write on one track, the fields from the
22 write head could interfere with data that's next to that
23 track, the adjacent track.
24 And what Dr. Seuss' invention did related a bit
02:04:53 25 even to the item below it, but it confined the fields better

02:04:59 1 so there was less adjacent track erasure.
2 Q Does that relate to your garden hose analogy from
3 before?
4 A Yes, that was like the garden hose.
02:05:12 5 Q And have you seen evidence from Western Digital that it
6 achieves these benefits from its use of the invention?
7 A I have.
8 Q Did you see that testimony from Dr. Ikeda?
9 A Yes. Dr. Ikeda stated:
02:05:32 10 "So to reduce grain size required the
11 use of multiple ECC [sic] structures."
12 Q What is the "multiple ECL structure" he's referring to?
13 A ECL, I'm sorry.
14 So the ECL structure is basically how many break
02:05:48 15 layers, also how many mag layers are in the structure.
16 Q So throughout your infringement analysis, we've been
17 looking at a lot of products. Are those all multiple ECL
18 structures?
19 A Yes, they are.
02:06:02 20 Q And what did Dr. Ikeda have to say about as you
21 increase the number of G-layers and ECL layers, what effect
22 that does on areal density?
23 A So he states:
24 "Going from two to three to four to five
02:06:19 25 to six, all contribute to increasing

04:12:47 1 Q Do you want me to zoom in on something else?
2 A No, I've got it. It's a consistent growth. But yes.
3 Q Fair enough. Let me show you that.
4 MR. LUMISH: So can you pull up, please,
04:12:55 5 Mr. Schmoller --
6 BY MR. LUMISH:
7 Q You're talking about the colored dots across the top,
8 right?
9 A Yes.
04:13:01 10 Q When you say "consistent growth"?
11 A Well, the -- this area before is a consistent growth of
12 50-some percent.
13 Q Okay. So -- and then it actually starts to decline in
14 growth after 2004.
04:13:17 15 A Correct.
16 Q Areal density?
17 A Yes. Since we've reached the superparamagnetic limit.
18 *(Court Reporter requests clarification for the*
19 *record.)*
04:13:24 20 THE WITNESS: The superparamagnetic limit.
21 Starting to have issues with that.
22 BY MR. LUMISH:
23 Q The entry there at 2024 -- I'm sorry, excuse me -- 2004
24 is two years before Dr. Seuss filed his patent application,
04:13:36 25 right?

04:13:37 1 A That's correct.
2 MR. LUMISH: And Mr. Schmoller, will you bring up
3 all of that -- the latter half of the timeline, so from 2004
4 to the end so we can see all of the entries for those years,
04:13:46 5 please. And the dates. Thank you.
6 *(The document was published in open court.)*
7 BY MR. LUMISH:
8 Q Okay. This is your list of innovations driving areal
9 density in your presentation in 2015, right?
04:13:58 10 A Yes.
11 Q And each of one of the entries has a bullet before it.
12 The first one says "PMR," second one says "TMR head," and so
13 forth, right?
14 A Right.
04:14:10 15 Q There's 13 of them that you list.
16 A Okay.
17 Q Now, let's go back to that superparamagnetic limit.
18 You told the jury today that the inventions in the two
19 patents in this case solved this trilemma underneath the
04:14:30 20 superparamagnetic limit, right?
21 A Which it did.
22 Q You said it solved it.
23 A Yes.
24 Q And you said it was something you thought or people in
04:14:37 25 the field thought was unsolvable before that.

04:14:42 1 A Yes.
2 Q You thought it was crazy when you first heard it. That
3 was your testimony.
4 A It was.
04:14:47 5 Q And it was this decoupling of the coercive field from
6 thermostability.
7 A That's what it did.
8 Q Okay. Take your time and look, sir. In all of your
9 entries of innovations driving areal density growth, you
04:15:03 10 don't mention decoupling the course of the field from
11 thermostability.
12 A So the audience -- this is true. The audience for this
13 talk, though, is a general tech talk. So basically, what
14 I'm doing with this talk is giving at-a-boys and pats on the
04:15:20 15 back to the various -- since all of the departments reported
16 to me. So I'm saying thank you to the head team. Thank you
17 to the channel team. Thank you to the -- you know, all the
18 various teams, the drive team, et cetera. And I have PMR
19 listed there as a thanks to the media team as they were
04:15:37 20 moving forward.
21 So this is not meant to be necessarily a technical
22 paper that's going to be reviewed. This is a cheering, a
23 rally call for the employees that worked for me.
24 Q Can you answer my question, though, please?
04:15:53 25 A Did I say "yes" to it before --

04:15:55 1 Q So it's true that in all your entries from 2004 on, you
2 don't mention anything about decoupling the coercive filed
3 from ^thermostability in order to solve the
4 superparamagnetic limit?
04:16:11 5 A As I mentioned, the media team was already -- had many
6 pats on the back, so I didn't mention that. I mentioned
7 this for the other teams.
8 Q Are you suggesting here that Seagate innovated PMR?
9 They're the inventors of PMR?
04:16:26 10 A No, they aren't the inventors. That was 1971, I think.
11 Iwasaki Shun.
12 Q You don't mention Dr. Seuss, of course, in this list?
13 A I don't mention anyone in this list.
14 Q Right. You don't mention nucleation hosts?
04:16:42 15 A No. That would be way in the weeds for a general talk
16 like this was.
17 Q Well, so this talk is 2015, right?
18 A Sure.
19 Q And you have testified in this case that Seagate uses
04:16:57 20 Dr. Seuss' inventions in the patents in this case.
21 A That's correct.
22 Q And that they'd done so since 2010.
23 A That's probably the right date. I don't remember
24 exactly.
04:17:08 25 Q Can we agree that it's roughly around 2010, or at least

04:17:12 1 by 2010, that you believe Seagate was using the patents in
2 this case?
3 A Yes.
4 Q And they were continuing to use it, in your testimony
04:17:21 5 in this case, up until you left in 2018.
6 A Correct.
7 Q And you don't list any innovations of Seagate using
8 those technologies to improve areal density growth.
9 A As I said, this talk is not meant -- this talk is meant
04:17:38 10 to be a pat on the back to the other groups. It's not meant
11 for that.
12 Q But the other groups would be the ones who would
13 implement these claimed inventions if they were in Seagate's
14 products, right?
04:17:50 15 A At this point, the media team had a new building and
16 lots of money, and I didn't think I needed to do that.
17 Q Didn't need to mention it?
18 A It's a talk for my employees.
19 Q So you do show PMR as the first entry when you have
04:18:06 20 this 52-percent growth in areal density, correct?
21 A Correct.
22 Q And TMR is listed there. That's tunneling
23 magnetoresistance?
24 A That's correct.
04:18:18 25 Q Can we agree that Dr. Seuss didn't invent either of

04:18:20 1 those two things?
2 A No. Seagate was the first to use that.
3 Q And I won't go through all 13. But can we agree that
4 Dr. Seuss didn't invent any of the entries that you have
04:18:30 5 from 2004 to the end of your timeline in JX 1295?
6 A That's fair.
7 Q And you've testified in the past that TMR was a
8 revolutionary technology, right?
9 A Using a specific definition of revolutionary, but I
04:18:55 10 would say TMR is a revolutionary technology with any
11 definition.
12 Q And you told the jury before that -- that Dr. Seuss'
13 two patents in this case are the foundation on which modern
14 PMR media is built.
04:19:09 15 A It is exemplified in all the data we've looked at, yes.
16 Q If Dr. Seuss' two patents in this case were the
17 foundation on which modern PMR were built and you were using
18 it at Seagate for the eight years you were there, surely,
19 sir, you would have credited Dr. Seuss, at some point, for
04:19:37 20 having contributed all of that value to Seagate, right?
21 A I wouldn't do that in a talk like this, no.
22 Q I don't even mean in this talk. I mean ever, in any
23 form. Surely, you would have done that.
24 A I'm sure my employees did. I would not give talks like
04:19:52 25 that in my role.

04:19:54 1 Q You never, as the CTO of Seagate, credited Dr. Seuss
2 with having improved areal density at Seagate?
3 A Some of the 4,000 people who worked for me did, though.
4 Q You never did that, did you, sir?
04:20:08 5 A I did not personally.
6 Q And you know that in his deposition -- you said you
7 read all the depositions -- Dr. Seuss testified in this case
8 that nobody from MR Technologies has even talked to Seagate?
9 A If that's what he said, then I believe that.
04:20:27 10 Q You've not shown the jury any documents in this case
11 where you personally credit Dr. Seuss and say that his
12 patents in this case -- not his body of work, but the two
13 patents in this case were a revolutionary breakthrough in
14 areal density and PMR media; is that true?
04:20:49 15 A Could you repeat that, that I didn't --
16 Q Sure. You have not shown to the jury a single document
17 where you ever said -- separated from being in this
18 courtroom as a hired expert -- that Dr. Seuss' two patents
19 in this case were a revolutionary foundational breakthrough
04:21:08 20 that improved areal density in PMR media?
21 A As I said, I might not have personally, but many people
22 within my team did.
23 Q In fact, sir, the truth is you had never even seen the
24 two patents in this case before you were hired to be an
04:21:25 25 expert against Western Digital again.

04:21:27 1 A I retired in 2018. So I was gone from Seagate by the
2 time the patents issued, as you said.
3 Q Can you answer my question, please?
4 A No, I have not seen those patents until after they
04:21:39 5 issued.
6 Q And you were hired in this case?
7 A Was hired in this case many years after they issued.
8 But yes.
9 Q I just want to make sure my question is answered.
04:21:51 10 You never saw the patents in this case until you
11 were hired as an expert in this case?
12 A That's true. Because I wasn't looking at patents after
13 I retired.
14 MR. LUMISH: Your Honor, I pass the witness.
04:22:14 15 THE COURT: Do you know how much time you'll have?
16 MR. CHANG: Probably about 20 minutes, half hour.
17 I can get started for 10 minutes.
18 THE COURT: That's fine. We'll stop at 4:30,
19 though.
04:22:35 20 REDIRECT EXAMINATION
21 BY MR. CHANG:
22 Q Dr. Re, Mr. Lumish asked you some questions about
23 whether the G1 hard storage layers in the accused products,
24 whether they can, on their own, store data. Do you remember
04:22:48 25 that?

1 CERTIFICATE

2 I hereby certify that pursuant to Section 753,
3 Title 28, United States Code, the foregoing is a true and
4 correct transcript of the stenographically reported
5 proceedings held in the above-entitled matter and that the
6 transcript page format is in conformance with the
7 regulations of the Judicial Conference of the United States.
8
9 Date: July 19, 2024
10
11
12 /s/DEBORAH D. PARKER
DEBORAH D. PARKER, OFFICIAL REPORTER
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