UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROCHIP TECHNOLOGY INC.,	)	Inter Parties Review
	)	No. IPR2024-00228
Petitioner,	)	No. IPR2024-00495
	)	No. IPR2024-00229
vs.	)	No. IPR2024-00230
	)	No. PGR2024-00011
APTIV TECHNOLOGIES AG,	)	
	)	
Patent Owner.	)	
_____	)	

VIDEOTAPED DEPOSITION OF ERIC WELCH

Menlo Park, California

Thursday, October 10, 2024

REPORTED BY: Derek L. Hoagland

CSR No. 13445

Veritext Legal Solutions
Calendar-CA@veritext.com 866-299-5127

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROCHIP TECHNOLOGY INC.,	)	Inter Parties Review
	)	No. IPR2024-00228
Petitioner,	)	No. IPR2024-00495
	)	No. IPR2024-00229
vs.	)	No. IPR2024-00230
	)	No. PGR2024-00011
APTIV TECHNOLOGIES AG,	)	
	)	
Patent Owner.	)	
_____	)	

VIDEOTAPED DEPOSITION OF ERIC WELCH, taken before Derek L. Hoagland, a Certified Shorthand Reporter for the State of California, commencing at 9:10 a.m., Thursday, October 10, 2024, at Orrick Herrington & Sutcliffe LLP, 1000 Marsh Road Menlo Park, California, Menlo Park, California.

APPEARANCES:

COUNSEL FOR PETITIONER
ORRICK, HERRINGTON & SUTCLIFFE LLP
1000 Marsh Road
Menlo Park, CA 94025-1015
BY: TRAVIS JENSEN, ESQ.
tjensen@orrick.com

COUNSEL FOR PATENT OWNER
MORRISON & FOERSTER LLP
2100 L Street, NW Suite 900
Washington DC 20037
BY: ADAM R. BRAUSA, ESQ.
415.268.6053
abrausa@mofo.com
-- AND --
MORRISON & FOERSTER LLP
425 Market Street
San Francisco, California 94105
BY: ERIC C. WIENER, ESQ.
415.268.6080
ewiener@mofo.com
-- and --
BY: CLINTON W. EWELL, ESQ.
cewell@mofo.com

ALSO PRESENT
Peter Yaroschuk

I N D E X

WITNESS	PAGE
ERIC WELCH	
Examination by Mr. Brausa	7, 284
Examination by Mr. Jensen	263, 287

QUESTIONS WITH INSTRUCTIONS NOT TO ANSWER

PAGE	LINE
128	9

E X H I B I T S

EXHIBIT	DESCRIPTION	MARKED
Exhibit 2019	US Patent Publication Number 2009/0024746	16
Exhibit 2020	Declaration of Eric Welch, Exhibit 2050, From the IPR 2020-01391	96
Exhibit 2021	Errata Sheet	118

9:10 a.m. P R O C E E D I N G S

09:09:52

THE VIDEOGRAPHER: Good morning. We are going on the record at 9:10 a.m. on October 10th, 2024. Please note that microphones are sensitive and may pick up whispering, private conversations and cellular interference. Please turn off all cell phones or place them away from the microphones, as they can interfere with the deposition audio. Audio and video recording will continue to take place unless all parties agree to go off the record. 09:09:52 09:10:13 09:10:21 09:10:25 09:10:30 09:10:34 09:10:36 09:10:41 09:10:46

This is Media No. 1 of the video-recorded deposition of Eric Welch taken by counsel for patent owner in the matter of Microchip Technology Incorporated versus Aptiv Technologies AG before the Patent Trial and Appeal Board, Case Numbers IPR2024-00228, IPR2024-00229, IPR2024-00230, IPR2024-00495, PGR2024-00011. This deposition is being held at 1000 Marsh Road Menlo Park, California. 09:10:47 09:10:51 09:10:56 09:11:00 09:11:07 09:11:19 09:11:35 09:11:41

My name is Pete Yaroschuk from the firm Veritext. I am the videographer. The court reporter is Derek Hoagland from the firm Veritext. I am not related to any party in this action, nor am I financially interested in the outcome. 09:11:41 09:11:44 09:11:48 09:11:51 09:11:55

Counsel, all present in the room, please now 09:11:56

state your appearances and affiliations for the record. 09:11:59
If there are any objections to proceeding, please state 09:12:03
them at the time of your appearance, beginning with the 09:12:07
noticing attorney. 09:12:09
MR. BRAUSA: Thank you. Adam Brausa from the 09:12:11
Morrison Foerster firm on behalf of Patent Owners Aptiv 09:12:15
Technologies AG and Aptiv Technologies Limited. I'm 09:12:18
joined by my colleagues Clint Ewell and Eric Wiener, 09:12:21
also from the Morrison Foerster firm. 09:12:25
MR. JENSEN: This is Travis Jensen from the law 09:12:27
firm Orrick Herrington & Sutcliffe on behalf of the 09:12:30
petitioner Microchip Technology Incorporated. 09:12:33
THE VIDEOGRAPHER: Thank you. 09:12:37
MR. JENSEN: And could I just ask, did we have 09:12:37
anybody on remote as well? 09:12:40
MR. BRAUSA: I think our colleague Andrew 09:12:41
joins -- Jones is on realtime. So if -- if there's an 09:12:43
additional realtime, Andrew Jones, also from -- 09:12:47
MR. JENSEN: Okay. 09:12:47
MR. BRAUSA: -- the Morrison Foerster firm may 09:12:51
be periodically following realtime. 09:12:52
MR. JENSEN: Thank you. 09:12:54
THE VIDEOGRAPHER: Would the court reporter 09:12:55
please swear in the witness. 09:12:56
(Whereupon, the deponent is duly sworn by the 09:13:05

court reporter.) 09:13:05

MR. BRAUSA: Good morning, Mr. Welch. Could you 09:13:08
just state your name for the record. 09:13:10

THE DEPONENT: My name is Eric Welch. 09:13:12

ERIC WELCH,

having first been duly sworn,

was examined and testified as follows:

EXAMINATION

BY MR. BRAUSA: 09:13:13

Q. And where do you currently reside? 09:13:13

A. I live in Berkeley, California. 09:13:15

Q. What's your current job? 09:13:17

A. I am president of Bramson Welch & Associates, 09:13:18
Inc. 09:13:21

Q. How long have you held that position? 09:13:22

A. About 15 -- 15-plus years. 09:13:23

Q. Okay. And what does Bramson Welch & Associates 09:13:26
do? 09:13:30

A. We are a consulting firm. We do technology and 09:13:30
embedded systems. We work a lot with USB. And I also 09:13:33
have an expert witness practice. 09:13:38

Q. Okay. When you say doing -- I guess, let me 09:13:40
back up. 09:13:44

The consulting work that you mentioned, you consider that separate from the your expert witness practice? 09:13:45 09:13:48 09:13:50

A. It's physically and financially separate in the sense that the clients are never the same. There's often technology overlap, though. 09:13:51 09:13:55 09:13:57

Q. Okay. And how long have you had an active expert witness practice? 09:13:58 09:14:04

A. My first deposition was in 1980. I didn't do much after that until -- the recent work dates from 2015. 09:14:07 09:14:11 09:14:18

Q. Okay. So you've been deposed before, correct? 09:14:18

A. Four or five times, that's correct. 09:14:21

Q. And so the general flow is, I will ask questions; if you know the answer, you do the best of your ability to provide an answer. 09:14:25 09:14:27 09:14:29

Can you agree to do that? 09:14:31

A. I can agree to do that. 09:14:32

Q. And if anything I say is unclear or uncertain, you will ask me to clarify? 09:14:33 09:14:36

A. Yes, I will. 09:14:38

Q. And I will do my best, and I would ask you do your best too, to not talk over one another so the court reporter can take down a clean transcript. 09:14:39 09:14:42 09:14:45

A. That seems entirely reasonable. 09:14:47

Q. Okay. Is there anything that would prevent you from providing truthful and accurate testimony here today? 09:14:49 09:14:51 09:14:53

A. Nothing I'm aware of. 09:14:54

Q. When were you retained by Microchip in this matter? 09:14:56 09:14:59

A. Approximately May of 2023. 09:15:00

Q. Okay. And you've authored several expert declarations across the five proceedings we're here to talk about today? 09:15:04 09:15:08 09:15:12

A. That's correct. 09:15:13

Q. Those were all served in the end of December 2023, fair? 09:15:14 09:15:17

A. That's my memory, yes. 09:15:18

Q. Okay. In the course of your work as an expert witness, your expert witness practice, do you have an ordinary approach that you employ to analyze patent problems and things of this nature? 09:15:19 09:15:26 09:15:29 09:15:33

MR. JENSEN: Object to form. 09:15:36

THE DEPONENT: Well, it's my practice to -- to start with and focus on the language of the patents in question. And I go from there to my own experience. I consider the relevant viewpoint of a POSITA as of, you know, the agreed and/or stated original date of the patents, and I go from there. 09:15:38 09:15:43 09:15:46 09:15:52 09:15:57 09:16:03

BY MR. BRAUSA: 09:16:05

Q. Okay. And so it's fair to say the first thing you do is you read the patents and you read the claims? 09:16:06 09:16:09

A. That's correct. 09:16:11

Q. Okay. And you employed that approach in the proceedings here on behalf of Microchip? 09:16:11 09:16:15

A. I did, yes. 09:16:17

Q. Okay. And so your analysis started with the claims of the patents and then you took it from there? 09:16:18 09:16:19

A. That's correct. 09:16:22

Q. Okay. At your consulting firm, what -- who is the Bramson in Bramson Welch? 09:16:22 09:16:33

A. My brother-in-law, Jeremy Bramson. 09:16:35

Q. Okay. And are there any other employees at Bramson Welch? 09:16:38 09:16:42

A. We have a staff of seven in all. 09:16:43

Q. Okay. Did any of the other individuals at Bramson Welch & Associates assist or aid you in any way in formulating your opinions in these proceedings? 09:16:45 09:16:47 09:16:51

A. No. This is all entirely on me. 09:16:53

Q. Okay. Speaking about you personally, can you estimate what percentage of your compensation in a given year is related to consulting work at Bramson Welch versus your expert witness practice? 09:16:56 09:17:00 09:17:05 09:17:09

A. Well, it varies considerably. But, for example, 09:17:11

over the last three years, it's 20 to 25 percent expert and 75 percent other kinds of consulting. 09:17:14 09:17:18

Q. Okay. And so in the course of being an expert witness as early as 1980, but then since 2015, you have at least been exposed to the legal standards for patent invalidity and patent infringement, understanding that you're not an attorney? 09:17:21 09:17:26 09:17:34 09:17:37 09:17:40

A. I am not an attorney, and yes, I -- I have been exposed to the legal standards, that's correct. 09:17:41 09:17:44

Q. Okay. Prior to working at Bramson Welch & Associates, what did you do? 09:17:46 09:17:56

A. I was vice president of engineering and chief technology officer at the firm of InnoSys Incorporated from 1976 until 2007. 09:17:56 09:18:02 09:18:07

Q. And Keyspan was a division of InnoSys? 09:18:10

A. Keyspan was a division of InnoSys, that's right. 09:18:14

Q. And during your time at Keyspan, you had occasion to be named as an inventor on several patent applications. Those are listed in your CV? 09:18:16 09:18:19 09:18:22

A. That's correct. 09:18:24

Q. And did any of those inventions have anything to do with USB? 09:18:25 09:18:29

A. One of them did, yes. One of them was a host -- I'm sorry, a network-attached host controller. 09:18:29 09:18:35

Q. Okay. And did you consider that to be a 09:18:37

patentable invention from your perspective? 09:18:39

A. I did, yes. 09:18:41

Q. Do you know whether a patent ever issued? 09:18:42

A. I do not believe it ever was. The Keyspan 09:18:45

business was sold and ownership of the patents and all 09:18:50

the intellectual properties went to somebody else. 09:18:53

Q. Okay. What did you consider to be inventive 09:18:56

about that particular work? 09:18:58

MR. JENSEN: Object to form. 09:19:01

THE DEPONENT: The -- the existing geography, if 09:19:02

you will, for USB con -- host controllers, there were 09:19:11

several different kinds outlined in the specifications 09:19:15

and on the market, so ours, as far as I know, was the 09:19:18

first instance of a USB host controller which was not 09:19:27

attached to a PC or another type of computer on -- on 09:19:32

its bus, you know, a PCI or ISA bus or something. 09:19:36

Instead, it was connected over a local area network. 09:19:41

This invention was in the early 2000s. WiFi was not 09:19:45

quite as common then, or we would have used that, but we 09:19:53

focused on Ethernet connectivity in that device. There 09:19:57

are -- there are numerous other details about things 09:20:00

that were in the claims for that invention having to do 09:20:03

with the way host protocol stacks work, the way vendor 09:20:05

and third-party device drivers work. A key part of 09:20:12

getting this invention to actually work and become a 09:20:16

shippable product was rigorous testing with many different kinds of devices and their associated device drivers. 09:20:21 09:20:24 09:20:31

BY MR. BRAUSA: 09:20:31

Q. Were any of the components that you used in this host controller new, or were these off-the-shelf components? 09:20:32 09:20:36 09:20:38

MR. JENSEN: Object to form. 09:20:40

THE DEPONENT: The -- for the first version of the device, which supported USB full speed, we used an off-the-shelf micro controller which had a USB host controller inside it, and that came from a company in Taiwan, I think. 09:20:41 09:20:46 09:20:54 09:20:58 09:21:03

For the second version, they actually constructed a custom chip for us that supported high-speed USB in a limited way, and so we had a second version of the product that supported high-speed USB. Other than that, everything else, to the best of my memory, was off the shelf. 09:21:04 09:21:06 09:21:10 09:21:14 09:21:18 09:21:21

BY MR. BRAUSA: 09:21:24

Q. Okay. And so the -- it sounds like in the first version, everything was off the shelf, including the micro controller, and then in the second version, everything was off the shelf, except for a custom micro-controller chip that you had them build for you? 09:21:24 09:21:28 09:21:31 09:21:33 09:21:38

A. Yeah, thinking back more than 20 years, that is the -- that's the best of my memory right now. 09:21:40 09:21:43

Q. Okay. And did the fact that you were using only off-the-shelf components in the first version of it mean that it wasn't an invention, from your perspective? 09:21:45 09:21:47 09:21:52

A. Not in the least. 09:21:55

Q. Why not? 09:21:56

A. What made this an invention was very sophisticated firmware that ran on this micro controller and very specialized and sophisticated host software, both for Mac OS 10, and for Windows, which interoperated in extremely subtle and sophisticated ways with the -- the host operating systems. Nobody had done that before. We know that because we met with engineers both at Microsoft and Apple, and we talked about doing this and we got various sorts of feedback from them. For example, from Microsoft they said, okay, you guys have right idea about this. Other people have tried to do this in such-and-such a way and that didn't work out so well, but, you know, I think you have a better chance with this. 09:21:57 09:22:01 09:22:05 09:22:10 09:22:15 09:22:21 09:22:26 09:22:29 09:22:33 09:22:37 09:22:42 09:22:44 09:22:47 09:22:48

There were a lot of details about that, which -- which required a lot of engineering problem solving, and we came up with a bunch of -- of unique things. The key in projects like this is you want compatibility between 09:22:50 09:22:52 09:22:56 09:23:03

an application or a custom device driver on the one end, and especially when it was custom at the other end. You had a product that was associated with that device driver, and you wanted those things to be able to interoperate and communicate with each other without having to know that we had taken away and completely replaced the interconnecting geometry. 09:23:06 09:23:10 09:23:13 09:23:15 09:23:17 09:23:19 09:23:23

Q. Okay. 09:23:26

A. So there was no question that was innovative and patentable. 09:23:26 09:23:29

Q. Okay. And just to be clear, it was innovative and patentable because of the way that you configured the off-the-shelf components using your firmware, I believe you said, and the software as well? 09:23:29 09:23:33 09:23:37 09:23:42

A. I wouldn't limit it quite in that way. The -- the hardware design as well, even though we were using standard components, was also creative and innovative. So it was a combination of those off-the-shelf components, but I would list host software, firmware, and hardware design as well. 09:23:43 09:23:56 09:24:00 09:24:03 09:24:06 09:24:11

Q. Okay. And so you would agree with me, then, that the hardware design of something using off-the-shelf components can nonetheless be patentable if it's creative and innovative, right? 09:24:12 09:24:14 09:24:17 09:24:22

MR. JENSEN: Object to form. 09:24:24

THE DEPONENT: Well, okay. It isn't automatically patentable. 09:24:25 09:24:31

MR. BRAUSA: Sure. 09:24:33

THE DEPONENT: But I would say in this example and others I can think of, it's possible to create something innovative enough, including a hardware design using standard components, that it could be compatible, yes. 09:24:34 09:24:35 09:24:39 09:24:42 09:24:45

MR. BRAUSA: Okay. Let me mark as an Exhibit 2019. And I will just go in sequence in the proceeding. 09:24:46 09:24:50 09:24:53

(Exhibit No. 2019 marked for identification.) 09:24:54

MR. BRAUSA: This is a copy of US patent publication number 2009/0024746. 09:24:55 09:24:58

BY MR. BRAUSA: 09:24:58

Q. And Mr. Welch, you can take a moment to look over this. But is this the patent application that we were just talking about? 09:25:41 09:25:43 09:25:45

A. Well, I will start by saying it has my name on it. I'm laughing because I haven't seen this in decades. 09:25:51 09:25:54 09:25:57

Q. Sure. 09:25:57

A. Okay. On the face of it, it does -- it does look like my original patent. Wow. Okay. And... 09:26:01 09:26:03

Q. And I'm just going to have a couple questions 09:26:41

about the claims. You can, of course, take as much time as you need to familiarize yourself with the document. 09:26:43 09:26:45

A. I note that there are 80 claims in this. 09:27:24

Q. I'm just going to ask you about claims 1 and maybe 2, to cut down on the reading. 09:27:34 09:27:37

A. Okay. Ask your questions. 09:28:45

Q. Okay. So if we go to claim 1, it refers to a stand-alone host controller, right? 09:28:46 09:28:49

A. That's what's written here. 09:28:51

Q. Okay. And it includes several components, right? 09:28:53 09:28:56

A. It does. 09:28:56

Q. The first one is listed as a network interface -- 09:28:59 09:29:03

A. That's correct. 09:29:05

Q. -- right? 09:29:06

And certainly, that's an off-the-shelf component you can purchase, right? 09:29:07 09:29:09

MR. JENSEN: Object to form. 09:29:12

THE DEPONENT: In the -- in the context of the original plans for this, yes, that's true. 09:29:12 09:29:23

BY MR. BRAUSA: 09:29:25

Q. Okay. And then the second component is a bus. 09:29:25

Do you see that? 09:29:28

A. Mm-hmm. 09:29:30

Q. And buses were also off-the-shelf components you could purchase? 09:29:30 09:29:33

MR. JENSEN: Object to form. 09:29:34

THE DEPONENT: That's true. Yes. 09:29:34

BY MR. BRAUSA: 09:29:38

Q. And it says: 09:29:38

"And at least one external port coupled to the bus." 09:29:39 09:29:42

Right? 09:29:42

A. That's right, yes. 09:29:42

Q. And ports were obviously external -- or I'm sorry. 09:29:51 09:29:51

External ports were off-the-shelf components you could purchase too, right? 09:29:55 09:29:59

A. That's correct. 09:29:59

Q. And then the last item listed as part of the stand-alone host controller is a processor coupled to the bus and the network interface. 09:30:01 09:30:04 09:30:07

Do you see that? 09:30:11

MR. JENSEN: I object to form. 09:30:11

THE DEPONENT: I do. 09:30:13

BY MR. BRAUSA: 09:30:13

Q. And processors could also be purchased off the shelf, as you did in the first version of your product, right? 09:30:13 09:30:16 09:30:18

A. That's correct. 09:30:18

Q. And then the processor would be configured to process communications passed between the network interface and the bus, right? 09:30:19 09:30:21 09:30:25

A. That's correct. 09:30:26

Q. In claim 2, it specifies that the external port is a USB port and the bus is a universal serial bus, or USB, right? 09:30:26 09:30:33 09:30:40

A. That's what claim 2 is, that's correct. 09:30:41

Q. Okay. And certainly USB and USB ports were also off-the-shelf components available for purchase, right? 09:30:44 09:30:48

MR. JENSEN: Object to form. 09:30:52

THE DEPONENT: The hardware for those things was off the shelf, certainly. 09:30:53 09:31:03

BY MR. BRAUSA: 09:31:04

Q. Okay. And notwithstanding the fact that all of these components listed in claim 1 and claim 2 are off-the-shelf components, you thought you had come up with something creative and innovative, as set forth in this patent, right? 09:31:04 09:31:08 09:31:11 09:31:17 09:31:20

MR. JENSEN: Object to form. 09:31:21

THE DEPONENT: Yes, with one important proviso. 09:31:27

Before the firm was done with this patent, even though I was the listed inventor, other people besides me did work on -- did -- worked -- worked on the patent 09:31:32 09:31:34 09:31:37

document and responded to office actions from the -- 09:31:47
from the patent office. For complicated business 09:31:52
reasons, I myself was not as involved in those things as 09:31:55
I had been in the original invention. So there may be 09:32:00
things in here -- I can't say without analyzing it -- 09:32:05
which -- which varied from the original filing. 09:32:08
BY MR. BRAUSA: 09:32:11
Q. Okay. But -- 09:32:11
A. Other than that, ye -- what -- I mean, yes, 09:32:13
what's listed in patents 1 and 2 can be constructed from 09:32:17
off-the-shelf hardware, that's true. But made to 09:32:24
operate and to -- to perform their function with -- with 09:32:27
software and firmware which was definitely off the 09:32:33
shelf. 09:32:36
Q. Okay. But sitting here today, the controller 09:32:36
set forth in claims 1 and 2 of Exhibit 2019 is something 09:32:40
you considered to be an invention that you made, right? 09:32:46
MR. JENSEN: Object to form. 09:32:48
THE DEPONENT: If by controller you mean the 09:32:49
language we adopted here, which was that this was a 09:32:56
different kind of USB host controller, yes. 09:32:59
BY MR. BRAUSA: 09:33:01
Q. Okay. You alluded to complicated reasons -- 09:33:03
complicated reasons surrounding your involvement in the 09:33:11
prosecution of this project? 09:33:14

A. Yes. 09:33:16

Q. What did you mean by that? 09:33:16

A. Boy. There was some complicated interpersonal issues in the company at that time. We'd -- we were three partners originally, and another partner had joined as president and there was some amount of disagreement about how things should be managed. The upshot of that was that the fellow who was the new president really wanted me to spend 100 percent of my time on engineering, and he himself took on the job, which I reluctantly agreed with, of dealing with the patent office about this patent. 09:33:27 09:33:32 09:33:35 09:33:37 09:33:43 09:33:48 09:33:51 09:33:55 09:34:00 09:34:03

Q. Why were you reluctant to agree to that? 09:34:07

A. Well, he wasn't the inventor. I was. He was a technical person, bought not in the way that I was. In retrospect, I frankly regret doing that. I -- I don't think it was in the best interest of -- of getting the patent. And as you may know, it was never issued. That was for other reasons. 09:34:09 09:34:11 09:34:15 09:34:21 09:34:23 09:34:26

A couple years after this, that company, InnoSys, sold the Keyspan division and all of its assets, of which this was one. So the ownership of this patent went to somebody else at that point, and I wasn't involved with it anymore. 09:34:28 09:34:32 09:34:36 09:34:39 09:34:42

Q. Was there any other disagreement about how 09:34:42

things would be run, beyond whether you'd be enrolled -- you'd be involved in patent prosecution or not going forward? 09:34:45 09:34:49 09:34:51

A. No. That was the main one. 09:34:52

Q. Okay. Did that have anything to do with why you left InnoSys or Keyspan? 09:34:53 09:34:56

A. No, no, not at all. 09:34:59

Q. Why did you leave -- is it Keyspan or InnoSys? Sorry. 09:35:00 09:35:05

A. InnoSys is a corporate entity founded in 1976. 09:35:05

Q. Mm-hmm. 09:35:09

A. It still exists to this day. I'm still a part owner to this day. I left -- okay. InnoSys was a product company, and I was, frankly, tired of doing that and having to fund receivables and inventory and all these different kinds of things, and I really wanted my own consulting practice. I was a partner in this, vice president, you know, one of many voices. In my present firm, I'm the main guy. And I was more interested in -- in doing consulting. It's a longer story than that, but that's the -- that's the summary. 09:35:09 09:35:13 09:35:16 09:35:18 09:35:21 09:35:25 09:35:28 09:35:31 09:35:35 09:35:38

Q. Okay. And when did you set up Bramson Wilson -- Welch & Associates? 09:35:39 09:35:42

A. We started operating in 2007 as an LLC and we switched to a subchapter S in 2008. 09:35:44 09:35:48

Q. During your time at InnoSys, did you have occasion to develop any adapters for Apple products? 09:35:50 09:35:57

A. I certainly developed adapters for Apple products, yes. It was while I was at -- at Keyspan. And, frankly, the -- sorry. The -- while I was at InnoSys, the Keyspan division was set up for that purpose. The InnoSys corporation had done a whole bunch of other things leading up to -- or starting to be involved with adapter products. We set up Keyspan for the purpose of creating a retail brand, and, yes, we created serial adapters and infrared remotes and other things, initially as plug-in cards, and after that -- well, there's a whole long story about how we were one of the first serial adapters that worked with the iPad, which shipped in 1998, and that was a huge business for us. It was an extremely successful product, the first working Keyspan serial adapter. And the -- the sort of amazing irony there is that particular product is still shipping today, even though the business has been -- you know, it's been purchased several different times. It's now owned by a completely different company. But I -- they contract with me to maintain the technology. 09:36:01 09:36:08 09:36:11 09:36:16 09:36:19 09:36:23 09:36:30 09:36:33 09:36:36 09:36:43 09:36:47 09:36:49 09:36:54 09:36:59 09:37:06 09:37:10 09:37:14 09:37:17 09:37:19 09:37:23

So an interesting way in which I was involved in the beginning and 25 years later I'm still involved. But the answer to your question is, yes, at 09:37:27 09:37:30 09:37:33

InnoSys/Keyspan, we developed lots of different kinds of adapters. 09:37:35 09:37:38

Q. Let me ask you a few follow-up questions about this first serial adapter for the iPad that was released in 1998. Can you explain to me what the purpose behind that was, why it was developed? 09:37:38 09:37:43 09:37:46 09:37:50

A. Well, okay. The sequence of events as a sort of high-affect memory to me is that Steve Jobs had come back to Apple, and he was shaking things up. Everybody knew that. And he was planning for a new line of products to be released. This was about 1996. Now, we knew people at Apple at that point because of the work we had been doing, and they came and met with us and they said, look, we really think you guys ought to pay attention to this USB thing. I knew what it was, but as far as I knew, it wasn't a sort of widely used technology at that point. But they really encouraged us, and at the developers conference where the iPhone -- no, I'm sorry, where the iMac was announced in, I think August of 1998, the thing that surprised everybody was here was a computer that had these USB ports on it, but it had nothing else. All of these other ports where you plugged in keyboards, printers, modems, the mice, all those kinds of ports were gone and all of a sudden it was USB. The first version of the iMac only supported a 09:37:51 09:38:01 09:38:06 09:38:09 09:38:14 09:38:18 09:38:21 09:38:24 09:38:27 09:38:29 09:38:33 09:38:38 09:38:44 09:38:49 09:38:52 09:38:56 09:38:58 09:39:03 09:39:06

USB mouse and keyboard. The second version was designed to support other things. 09:39:08 09:39:13

And I went to a session at the developers conference where people realized that especially the serial port was gone, and they were incredibly angry. And a friend of mine who worked at Apple and who had come to us suggesting we get involved in this actually answered that question by saying, well, we think that Keyspan ought to answer this problem. It was one of those incredible moments. I stood up in the back of this packed session, and I said, my name is Eric Welch. I work for Keyspan. Look for an announcement. It was one of those moments. 09:39:15 09:39:18 09:39:20 09:39:23 09:39:27 09:39:31 09:39:34 09:39:37 09:39:39 09:39:42 09:39:46

Q. Sure. And so in that context, it sounded -- you said people were angry? 09:39:48 09:39:51

A. Yeah, they were. 09:39:52

Q. So eliminating or changing the available ports on a device can -- can cause problems, right? 09:39:53 09:39:55

A. In particular at that time, a good quality raster printer with color was just -- had just become available for under $1,000, is my memory. And this was a very popular product to plug into a Macintosh, and these all had serial ports on them. They weren't network printers. They weren't all kinds of different things. They had old-fashioned serial ports. And all 09:39:59 09:40:03 09:40:07 09:40:10 09:40:14 09:40:17 09:40:19

of a sudden, here was this computer everybody wanted to buy because it looked good, it had all these great specs, but you couldn't plug that in. And our product was designed to solve that problem. The first version actually had two serial ports using the exact connector that Apple had removed, not -- not the connector that later versions of the serial adapter had, but this funny DIN 8 connector that Apple had pioneered some years earlier, and its special wiring and capabilities and various other kinds of things. We made it possible for those printers to be supported with our -- with our product. 09:40:22 09:40:25 09:40:29 09:40:31 09:40:34 09:40:37 09:40:40 09:40:44 09:40:48 09:40:51 09:40:54 09:40:57

It was a huge hit. You know, the day we started shipping, every campus bookstore in the country ordered two, as far as we could tell, and the next day they ordered two more and two more. Two or three of my engineers had to go work in shipping for about a month just to get the product out the door. 09:40:57 09:41:01 09:41:04 09:41:07 09:41:10 09:41:12

Q. Sure. 09:41:14

A. Anyway. 09:41:15

Q. Yeah. And so prior to the solution that you came up with at Keyspan, Apple 's decision to change and modify the ports on its new computer, that caused problems for the industry, right? 09:41:15 09:41:19 09:41:22 09:41:26

MR. JENSEN: Object to form. 09:41:27

BY MR. BRAUSA: 09:41:28

Q. It was a problem you needed to solve? 09:41:29

A. It -- it did. It was -- it was a problem we were encouraged to solve. And in the moment, I thought, okay, this is an opportunity. We go, you know, we should commit to this. A bit rash perhaps, but that's what we did. 09:41:30 09:41:33 09:41:37 09:41:39 09:41:43

Q. Okay. 09:41:44

A. It was hard work. But anyway, that's -- that's that story. 09:41:44 09:41:47

Q. Okay. Do you think the adapter you came up with was an invention? 09:41:47 09:41:50

A. It was. 09:41:51

Q. Okay. What was inventive about it? 09:41:52

MR. JENSEN: Object to form. 09:41:53

THE DEPONENT: Well, like the host controller, it was built of off-the-shelf components, but it was -- the particular hardware design, it was the details of the firmware that ran on the -- on the micro controller in the adapter, and in particular, a very special purpose host software initially just for Macintosh, but then we went on to support most other platforms, Windows certainly, but also Linux and other things. It was the combination of all of those things that made it patentable. But at the time, you know, I wasn't really 09:41:54 09:41:57 09:42:01 09:42:05 09:42:07 09:42:12 09:42:16 09:42:20 09:42:22 09:42:28

thinking about that. It didn't -- it didn't -- it didn't occur to me to do that. I wish I had, but it didn't occur to me. 09:42:32 09:42:34 09:42:37

BY MR. BRAUSA: 09:42:37

Q. Okay. And you said it's still being sold today, the -- 09:42:38 09:42:42

A. Still being sold today. 09:42:42

Q. Okay. And so that's -- theres' still a use case for an adapter -- 09:42:43 09:42:46

A. Mm-hmm. 09:42:48

Q. -- for legacy ports on devices -- 09:42:48

A. Mm-hmm. Mm-hmm. 09:42:51

Q. -- notwithstanding the industry has advanced and modernized? 09:42:51 09:42:55

A. It's been 25 years, yes, that's right. 09:42:55

Q. Okay. If I can direct you back to Exhibit 2019, your patent application ending in No. '746. We were looking at claim 1, and I wanted to direct your attention to the top of the same page. It's page 12, and it's just above what's marked paragraph 231, the sentence that starts, "The invention may also be implemented." It's line 2 of the left-hand column on page 12. 09:42:58 09:43:02 09:43:06 09:43:10 09:43:14 09:43:19 09:43:21 09:43:29

A. Mm-hmm. 09:43:31

Q. Do you see that? 09:43:32

A. I do. 09:43:33
Q. And it says that it can be implemented by the 09:43:33
preparation of application-specific integrated circuits, 09:43:36
correct? 09:43:39
MR. JENSEN: Object to form. 09:43:40
THE DEPONENT: Right. Or by the interconnecting 09:43:40
of appropriate network of conventional components as 09:43:44
will be readily apparent to those skilled in the art, 09:43:48
blah, blah, blah. 09:43:48
Yes. 09:43:53
BY MR. BRAUSA: 09:43:53
Q. Right. 09:43:53
A. I see that. 09:43:53
Q. And so I'll confess, my background is in 09:43:55
chemical engineering. 09:43:55
A. Mm-hmm. 09:43:55
Q. So I just wanted to understand, how would you 09:43:58
define an integrated circuit? 09:44:00
MR. JENSEN: Object to form. 09:44:02
THE DEPONENT: Well, in the context of this 09:44:03
document, that sentence refers to what often goes by the 09:44:06
acronym of ASIC, where for a specific purpose the -- the 09:44:12
economies of scale make it financially justifiable to 09:44:18
spend a lot of money to produce the ASIC in exchange for 09:44:24
being able to sell a part which costs much less than the 09:44:27

components separately. So that's one kind of integrated circuit. The term obviously goes back many decades before this. There are many integrated circuits which I -- I wouldn't describe as application specific, but they are more general purpose. 09:44:33 09:44:37 09:44:42 09:44:46 09:44:49

You know, Texas Instruments published a very important catalog of all of their then, you know, latest and greatest integrated circuits in about 1969 or '70, and my memory of that was high affect because at that time I was 13, 14 years old and I was really interested in this computer and electronics stuff and I was fascinated by the idea that you could buy these components that did all of these interesting things. So that's my own personal story. 09:44:53 09:45:00 09:45:05 09:45:10 09:45:14 09:45:17 09:45:19 09:45:22 09:45:25

But -- but the point is that I think a POSITA would understand integrated circuit to include a lot of different kinds of things, the ASIC mentioned in this sentence, standard off-the-shelf things like TI was shipping in the early '70s, and a whole bunch of other things as well. 09:45:28 09:45:32 09:45:35 09:45:37 09:45:40 09:45:43

BY MR. BRAUSA: 09:45:43

Q. Okay. But you referred to a POSITA. That is a person of ordinary skill in the art? 09:45:44 09:45:46

A. Ordinary skill in the art. 09:45:48

Q. And this POSITA would know what an integrated 09:45:49

circuit is, right? 09:45:49

A. That's right. 09:45:52

MR. JENSEN: Object to form. 09:45:52

BY MR. BRAUSA: 09:45:53

Q. In 2013? 09:45:53

A. I agree. 09:45:54

Q. And -- and they'd know that an integrated 09:45:56

circuit is composed of circuit components or structures, 09:45:58

right? 09:46:01

MR. JENSEN: Object to form. 09:46:01

THE DEPONENT: I'm hesitating. A POSITA would 09:46:02

know what an integrated circuit did functionally from 09:46:15

the outside. They may have some -- they may have a 09:46:17

limited idea of what goes on inside. I'll leave it at 09:46:20

that, yeah. 09:46:32

BY MR. BRAUSA: 09:46:33

Q. I'm not sure that answered my question. I was 09:46:33

just trying to understand. 09:46:35

A POSITA would understand that an integrated 09:46:36

circuit is made up of circuit components or structures, 09:46:39

right? 09:46:42

MR. JENSEN: Object to form. 09:46:42

Are you talking about a POSITA in the document 09:46:43

you are asking about or a POSITA in the Aptiv patents. 09:46:46

MR. BRAUSA: I'm just using his own language. 09:46:51

He referred to a POSITA. 09:46:53

MR. JENSEN: Well, okay. 09:46:55

THE DEPONENT: All right. I will restrict 09:47:02

myself to what I -- what I meant when I said POSITA was 09:47:05

POSITA in the context of these things that the present 09:47:07

proceeding is about. That's different than a POSITA 09:47:10

with respect to this patent, which is a slightly 09:47:13

different area. It's -- it's a slightly different 09:47:20

timeframe. 09:47:22

So I would say that a POSITA with respect to 09:47:23

these IPRs and PGRs and so on would understand that an 09:47:26

integrated circuit included functional components put 09:47:31

together to perform some function. 09:47:37

BY MR. BRAUSA: 09:47:38

Q. Okay. And what do you mean when you say 09:47:38

functional components? 09:47:40

A. Well, okay. I'm drawing a distinction between 09:47:41

understanding an integrated circuit functionally, which 09:47:46

I think a POSITA would do, and understanding the details 09:47:50

of how you create an integrated circuit. So there's 09:48:01

some fine points there which I wasn't actually asked 09:48:09

to -- to opine on for this case, and so I'm not going to 09:48:13

spend a lot of time on that. 09:48:16

In terms of general understanding, the answer to 09:48:19

your question is -- is yes. Generally speaking, a 09:48:22

POSITA would understand what an integrated circuit does. That is to say an integrated circuit in their particular area. And so, you know, it's -- it's to do with the subject matter of these patents, USB and other things. Whether that extends to knowing how to actually create a -- an integrated circuit, I don't actually have an opinion about that. 09:48:25 09:48:28 09:48:32 09:48:35 09:48:44 09:48:47 09:48:50

Q. Okay. And we'll get to that in a moment because I think one of your errata changes that you provided before the deposition touches on that. But I want to make sure I understand your opinion. 09:48:51 09:48:57 09:48:59 09:49:02

If we can find confine it to the POSITA you were referring to, which is the POSITA with respect to the Aptiv patents in 2013 -- 09:49:04 09:49:09 09:49:11

A. Mm-hmm. 09:49:15

Q. -- your testimony is that a POSITA would generally know what an integrated circuit is, right? 09:49:15 09:49:19

A. Generally, that's right. 09:49:22

Q. And they would know that it's composed of circuit components to perform a certain function, right? 09:49:23 09:49:25

A. At a high level, a POSITA would know that an integrated circuit included circuit elements, yes. 09:49:27 09:49:33

Q. Okay. And a circuit element is something like a resistor, transceiver, those types of things? 09:49:36 09:49:38

MR. JENSEN: Object to form. 09:49:40

THE DEPONENT: Certainly a POSITA would know that an integrated circuit is composed of transistors because that's widely published. The extent to which integrated circuits include other things is, in my opinion, less widely published, so I -- I wouldn't go so far as to say a POSITA would understand the bestiary of stuff that goes on and goes into an integrated circuit in more detail than that. 09:49:47 09:49:52 09:49:57 09:49:59 09:50:02 09:50:07 09:50:12 09:50:16

BY MR. BRAUSA: 09:50:18

Q. Okay. But it sounds like we can agree that a POSITA would know that there are transistors as structures in an integrated circuit, right? 09:50:18 09:50:21 09:50:24

A. A POSITA would know that there are transistors in an integrated circuit. 09:50:27 09:50:30

Q. Okay. Are there any other structures that a POSITA would know are part of a circuit or could be part of a circuit? 09:50:32 09:50:35 09:50:38

MR. JENSEN: Object to form. 09:50:38

THE DEPONENT: I'm not going to speculate about that. I don't -- I don't have an opinion about whether a POSITA would understand the inner workings of an integrated circuit at that level of detail. 09:50:39 09:50:48 09:50:51 09:50:54

BY MR. BRAUSA: 09:50:56

Q. So respectfully, I'm not asking about the inner workings of any integrated circuit. My question is just 09:50:56 09:50:59

whether a POSITA would know there are other structures that could be included in an integrated circuit in addition to transistors. 09:51:02 09:51:05 09:51:09

A. I haven't actually studied that. I haven't studied that question. I can't rule out that a POSITA would only have the knowledge I indicated before and still be a POSITA with respect to this material. 09:51:10 09:51:16 09:51:19 09:51:23

Q. Okay. So sitting here today as a -- as an expert -- 09:51:26 09:51:32

A. Mm-hmm. 09:51:32

Q. -- with, I think your CV says 49 years of experience -- 09:51:33 09:51:35

A. Mm-hmm. Mm-hmm. 09:51:36

Q. Beyond transistors, there is no other circuit component you can identify that can be part of an integrated circuit? 09:51:37 09:51:41 09:51:44

A. I wasn't, for this matter, asked to opine on or do an analysis of what appears inside an integrated circuit. If asked, I could have an opinion about that, but I don't just sitting here. 09:51:45 09:51:54 09:51:58 09:52:01

Q. Okay. Well, I'm asking you now. Do you not have an opinion? 09:52:03 09:52:05

A. I don't have an opinion on that. I could study it and have an opinion, but I don't have an opinion right at this moment. 09:52:05 09:52:08 09:52:11

Q. Okay. So you would need to study what in order to tell me what other structures are included in an integrated circuit beyond transistors? 09:52:12 09:52:15 09:52:18

A. Well, I have to think about it for a few minutes first, and then I would gather together some material that I'm not prepared to name at the moment. Then I would study that, and I would consider the other contexts to a fully formed question of the four, Mr. Welch, will you please look at this matter as of this date, you know, considering these sorts of issues, and all the other related context. I would study that, and I could give an opinion about the appropriate POSITA, and in particular to your question about what would a POSITA understand goes into an integrated circuit. 09:52:20 09:52:22 09:52:25 09:52:28 09:52:30 09:52:35 09:52:38 09:52:42 09:52:45 09:52:51 09:52:54 09:52:58

Q. Okay. Do you have an opinion on whether a pull-down resistor could be a structure included in an integrated circuit as of 2013? 09:52:59 09:53:02 09:53:06

A. I don't have an opinion about that. 09:53:07

Q. What about a pull-up resistor? 09:53:09

A. I don't have an opinion about that. 09:53:11

Q. Okay. And when you say you don't have an opinion about that, you just don't know? 09:53:12 09:53:14

A. I didn't say that. I said I don't have an opinion about that. 09:53:16 09:53:18

Q. Okay. Well, help me understand. What's the difference between saying you don't have an opinion about it and you just don't know? 09:53:18 09:53:21 09:53:23

A. Well, the kinds of work that I have been asked to do as an expert which results in an opinion is always about an extremely well-formulated question where the context, the background, the subject matter, you know, patents and all these other kinds of things, are given to begin with. Then as a technical expert, I take all that material and, as we discussed earlier, I look at the claims and I look at the other language and I consider, well, okay, given my background and what I know and all these other sorts of things, what other information do I need. We have a lot of exhibits in here, various technical stuff that I pulled into the opinion in order to support the -- the final opinion that I have rendered here. That's what I would do if asked to have an opinion about, you know, any particular thing. 09:53:29 09:53:31 09:53:35 09:53:38 09:53:43 09:53:46 09:53:50 09:53:53 09:53:55 09:53:58 09:54:01 09:54:05 09:54:11 09:54:15 09:54:19 09:54:22

Q. And so it sounds like you weren't asked as part of your retention in this case to offer an opinion on whether a circuit includes any structural components? 09:54:22 09:54:26 09:54:30

MR. JENSEN: Object to form. 09:54:34

THE DEPONENT: I wouldn't say it that way. I was asked to consider what constitutes a POSITA in 09:54:35 09:54:43

respect of the material presented here, the background, the technical issues, the things outlined as the technical challenges, and as part of that, I recognize that there are a number of things here which could -- which a POSITA would know could be implemented using an integrated circuit or not using an integrated circuit. And when I did a sort of preliminary analysis of those two cases, I found that the obviousness questions that I was asked to look into didn't come out any differently whether -- whether you considered using off-the-shelf integrated circuits or creating custom integrated circuits or using discrete components. And because of that, I did not add to my definition of a POSITA the kinds of things that you are asking about; and, therefore, in context of this particular case, those things are not part of what I considered. 09:54:48 09:54:55 09:54:59 09:55:03 09:55:07 09:55:10 09:55:14 09:55:17 09:55:22 09:55:25 09:55:28 09:55:34 09:55:36 09:55:43 09:55:47 09:55:50

BY MR. BRAUSA: 09:55:54

Q. Okay. And so I just want to make sure I understand. I'm not so much interested in the definition of a POSITA at this point, but I just want to understand what you were asked to do. Okay? 09:55:54 09:55:58 09:56:00 09:56:03

MR. JENSEN: Object to form. 09:56:06

THE DEPONENT: Is that a question? Are you asking me? 09:56:07 09:56:08

/// 09:56:08

BY MR. BRAUSA: 09:56:08

Q. I'm just wanting to clarify. Is that okay? 09:56:09

A. Of course. 09:56:11

MR. JENSEN: Object to form. 09:56:12

THE DEPONENT: Ask your question. 09:56:13

BY MR. BRAUSA: 09:56:14

Q. Were you asked to consider whether a POSITA, applying your definition, considers a circuit to have structure? 09:56:15 09:56:19 09:56:23

MR. JENSEN: Object to form. 09:56:25

THE DEPONENT: I was not asked -- I was not asked that specific question, no. 09:56:26 09:56:28

BY MR. BRAUSA: 09:56:30

Q. Okay. And so you haven't offered an opinion in these matters on that specific question, correct? 09:56:30 09:56:33

MR. JENSEN: Object to form. 09:56:35

THE DEPONENT: Okay. I -- I may have misheard part of what you're talking about. 09:56:40 09:56:44

Up to now, you've been making a distinction between circuit elements that might be stand-alone and circuit elements that might be inside an integrated circuit. With respect to that distinction and what form these might take inside an integrated circuit, I was not asked to consider that. On the other hand, it's definitely within the context of these patents that a 09:56:46 09:56:48 09:56:51 09:56:54 09:56:59 09:57:02 09:57:06

POSITA would have some circuit knowledge because it's necessary to -- to assemble various components and circuit elements to implement some of the art or prior art or -- or whatever it is. And it is certainly the case that some of the prior art has to do with custom circuits, Chang 2, for example. It's true that some of the claims talk about things being done inside an integrated circuit. In the context of all of those things, that's certainly the realm of the POSITA. 09:57:10 09:57:13 09:57:19 09:57:22 09:57:27 09:57:32 09:57:37 09:57:41 09:57:44

But -- but to your specific question, I wasn't asked to consider or opine about, well, Mr. Welch, you know, how would it have been different if this claim were in -- were implemented in an integrated circuit versus if this wasn't. But nevertheless, because I'm a curious guy, I thought about both of those cases. It's just that -- and this is the important part -- as I considered those cases, they did not render the analysis of obviousness any different. And so I stopped at that point. Okay? I don't really care if this is done with an integrated circuit or not, except for the claims that talk about integrated circuits; and, therefore, I don't have to consider the precise details of how much a POSITA knows what goes on inside an integrated circuit, because -- because, again, it doesn't -- it doesn't make any difference to the analysis. 09:57:48 09:57:52 09:58:02 09:58:03 09:58:09 09:58:13 09:58:16 09:58:19 09:58:22 09:58:26 09:58:29 09:58:32 09:58:36 09:58:40 09:58:44 09:58:47

BY MR. BRAUSA: 09:58:48

Q. Okay. I think you just testified that you would agree that the POSITA would have some circuit knowledge because it's necessary to assemble various components and circuit elements to implement some of the art or prior art or whatever it is. 09:58:49 09:58:55 09:58:59 09:59:02 09:59:05

A. I did say that. 09:59:07

Q. Okay. What did you mean when you said various components and circuit elements? 09:59:08 09:59:10

A. Well, some of the things you mentioned, transistors, pull-up resistors, pull-down resistors, other things that we could -- we could name. 09:59:12 09:59:16 09:59:19

Q. Okay. What are some other circuit elements that you can name besides transistors, resistors? 09:59:21 09:59:25

A. Switches, multiplexors, cross/bar switches, devices that -- that detect digital or analog signals, logic elements which may be built up together to perform some logic function between and amongst signals which are logic-level voltages, things like that. 09:59:27 09:59:33 09:59:42 09:59:45 09:59:52

Q. Okay. And these are all circuit structures that a POSITA would have known about as of 2013, correct? 09:59:54 09:59:57

A. To the -- if I've listed things beyond what's -- what's in here, then not necessarily. But generally, yes, those things are all representative of the kind of technology involved here, and, therefore, a POSITA would 10:00:00 10:00:10 10:00:13 10:00:16

know about them. 10:00:18

Q. Okay. I've been remiss. You have several, I 10:00:18

think six, handsome bound volumes of what I believe are 10:00:25

your reports in this case. 10:00:30

A. They are. 10:00:31

Q. Can I just confirm that you have the following 10:00:32

at least five reports in front of you? 10:00:36

A. Yeah. Yeah. I -- well, okay. I have -- I have 10:00:38

five of the major reports. I also have five that are 10:00:42

short of the -- of this thing, which is the 10:00:45

supplementary declaration. 10:00:50

Q. All right. 10:00:52

A. I have one of these for each of these as well. 10:00:53

Q. Understood. So let's focus on, just to make 10:00:56

sure we're on the same page -- 10:00:59

A. Please. 10:01:00

Q. -- the five you have in front of you. 10:01:01

A. Yeah. 10:01:03

(Referencing Exhibit 1013.) 10:01:03

BY MR. BRAUSA: 10:01:04

Q. Somewhat confusingly, they're all marked 10:01:04

Exhibit 1013 in their respective proceedings. 10:01:07

A. Yes. 10:01:10

Q. But I have one declaration of Eric Welch from 10:01:10

case number IPR 2024-00228 -- 10:01:13

A. Yes, I have that one. 10:01:17

Q. -- regarding US Patent No. 9,619,420? 10:01:18

A. Yep. 10:01:22

Q. I have another one, also Exhibit 1013, from proceeding IPR 2024-00229, relating to US Patent No. 9,645,962? 10:01:23 10:01:27 10:01:35

A. Yep, I have that one. 10:01:37

Q. The third is an Exhibit 1013 in proceeding IPR 2024-00230 relating to US Patent No. 11,176,072. 10:01:38 10:01:44

A. That's correct. 10:01:54

Q. Number 4 is Exhibit 1013 from PGR2024-0011 relating to US Patent No. 11,681,643. 10:01:54 10:02:06

A. I have that one. 10:02:12

Q. And then the last one, also Exhibit 1013, from proceeding IPR 2024-00495, also relating to US Patent No. 9,619,420. 10:02:13 10:02:17 10:02:23

A. I have -- I have all those. 10:02:25

Q. Okay. And as -- as you state in your report, there are several sections of these reports that are effectively the same across the five proceedings, correct? 10:02:27 10:02:34 10:02:36 10:02:36

A. Mm-hmm. That's correct. 10:02:39

Q. And I think that's up to Section -- Section 1 through 12 are largely the same across the different -- 10:02:40 10:02:44

A. That's close. Sections 1 through 12 are 10:02:48

essentially the same in four out of five of these. I think 12 in one of these, I couldn't tell you exactly which, I think 12 is different in one of them. 10:02:51 10:02:54 10:02:57

Q. Okay. Got it. For the most part, I can tell you I'm going to spend our time, for efficiency purposes, on Exhibit 1013 from the 228 proceeding. 10:02:59 10:03:02 10:03:05

A. Okay. 10:03:10

Q. And that's with respect to the '420 patent. 10:03:10

A. Mm-hmm. 10:03:13

Q. But as I'm asking questions, if it's ever unclear what declaration I'm referring to or which specific patent or claim -- 10:03:13 10:03:17 10:03:20

A. Mm-hmm. 10:03:21

Q. -- please don't hesitate to clarify. 10:03:22

A. I won't hesitate. 10:03:24

Q. I want to make sure it's clear for the record. 10:03:25

A. I won't hesitate. Right. 10:03:27

Q. And if the answers to any questions, in your mind, differs based on the proceeding, if you can let me know that as well, I'd appreciate it. 10:03:28 10:03:31 10:03:34

MR. JENSEN: Object to form. 10:03:35

BY MR. BRAUSA: 10:03:38

Q. I see in the copies that you have in front of you, there are various sticky -- sticky notes on the side. 10:03:41 10:03:45 10:03:48

A. Mm-hmm. Do you want to see? 10:03:48

Q. Sure. Why don't I take a look. 10:03:49

A. You won't be able to read my chicken scratch, 10:03:54

but for what it's worth, there it is. 10:03:57

Q. Okay. Beyond the -- 10:03:58

A. Yeah, there's nothing written -- 10:04:07

Q. -- Post-it Notes, is there any margin -- 10:04:08

A. No, no, no. 10:04:11

Q. And what do the Post-It Notes referring to? 10:04:12

A. They are -- they are just an adjunct to the 10:04:14

state -- the table of context to remind me how to find 10:04:17

certain things. 10:04:20

Q. Okay. 10:04:21

A. So only one of these has -- has sticky notes on 10:04:21

the first 12. 10:04:24

Q. Okay. 10:04:24

A. And the rest of them begin with sort of ground 10:04:25

1, claim 1. 10:04:28

Q. Okay. 10:04:28

A. And probably have a sticky note that has those 10:04:29

letters on it. 10:04:31

Q. Okay. So I'm looking at your copy of 10:04:32

Exhibit 1013 from the 229 proceedings relating to the 10:04:36

'962 patent. There are yellow sticky notes that appear 10:04:40

to refer to the sections. For instance, there's one 10:04:43

that says "prior art," "legal standards," et cetera. 10:04:47
A. Mm-hmm. 10:04:49
Q. There are also pink sticky notes. One says 10:04:50
"priority date." One says "hub." One says "initiate," 10:04:55
"enumerate." What are the pink sticky notes for? 10:05:00
A. I ran out of yellow. 10:05:04
Q. Okay. 10:05:06
A. I was just going -- it was a different day I was 10:05:06
going back and reviewing certain things that were not 10:05:09
sort of structural in nature. Anyway, that's -- that's 10:05:12
what they are. 10:05:14
Q. Okay. And how did you decide to put additional 10:05:15
sticky notes that don't correspond to a heading there? 10:05:18
A. There's no hard and fast rule. But for some of 10:05:21
these things -- well, okay. For all of this stuff, I 10:05:32
had to go back over a lot of months. I wrote all these 10:05:37
things, finalized them -- wrote them last year and 10:05:39
finalized them in December, so that's ten months ago. 10:05:42
So I had to go back and sort of remind myself. 10:05:45
There's a -- there's a -- I don't want to 10:06:05
belabor this point, but there's a thing that goes on in 10:06:09
all technology patents -- USB is no different -- where 10:06:12
the inventors make use of -- of certain terminology, 10:06:15
which -- which may or may not be in the original spec. 10:06:20
And so let's focus on terminology and patents that have 10:06:25

to do with USB, terms that do not appear in the -- in the original specification. One example of that is the term "master slave." Now, when terms like that appear in one of these patents, I have to ask myself, two questions. Number 1, apart from what's written in here, would a POSITA understand what this means? And then the second question is, if they don't understand it, what definition is given to that term in the patent itself? Because, of course, that's -- that's the point. The patent is attempting to teach something that's allegedly special; and, therefore, the specifications, details, drawings and so on are meant to put together an idea, and that sometimes may involve using the terms a little differently. In some cases, in some contexts, I would even consider those uses of terminology to be potentially misleading. 10:06:29 10:06:35 10:06:37 10:06:42 10:06:46 10:06:50 10:06:53 10:06:57 10:07:01 10:07:03 10:07:07 10:07:11 10:07:16 10:07:18 10:07:25 10:07:29

For that reason, I have marked a couple of these things where my memory said, oh, yeah, remember that this one is a little special, remember in the sense of when I first wrote this. 10:07:31 10:07:34 10:07:37 10:07:40

Now, what I tried to do about that, as much as possible, is to capture those things specifically in the background section. So I talk about master slave, what do I think a POSITA means by that. It isn't in the spec. It's well enough understood in my opinion, at 10:07:42 10:07:45 10:07:48 10:07:52 10:07:55

large, that I don't have to worry about a POSITA reading that and then having to shuffle through the documents to sort of figure out what's meant. In other words, it's sort of self-defining. 10:08:05 10:08:07 10:08:09 10:08:13

There are other terms used about USB processes that don't have -- and we will probably come to these, that don't have that quality. They are used in a particular way here. Even if they -- even if they map to something in the -- in the specification, there's a different emphasis or a different connotation perhaps. And, again, because patents are about their own words, you know, I try and single those out, and I have rendered my opinion about that. I have rendered my opinion about this, not about USB. I wasn't asked to do that. Of course, I bring tremendous knowledge of USB. That's why I was hired. But it's really, my opinion is really about these things. 10:08:14 10:08:17 10:08:21 10:08:23 10:08:25 10:08:26 10:08:31 10:08:33 10:08:36 10:08:38 10:08:42 10:08:45 10:08:48

Q. Okay. When you say you weren't -- you weren't asked to render your opinion about USB, what do you mean by that? 10:08:49 10:08:52 10:08:55

A. I wasn't asked, Mr. Welch, how would you compare the performance and cost tradeoffs between USB high speed and USB full speed? I wasn't asked to do that. If I was asked, I could render an opinion about that. I certainly have the background and knowledge. I wouldn't 10:08:56 10:09:03 10:09:06 10:09:12 10:09:15

do it off the cuff, but I could. What I meant to say 10:09:17
was, I wasn't asked to render an opinion about USB as it 10:09:21
exists completely separate from this stuff. I was asked 10:09:24
to, you know, opine about these things in the context, 10:09:27
the critical context, that all this stuff is it -- is in 10:09:30
the world of -- of USB. 10:09:34
So there -- there are many, many points about 10:09:36
these patents which have to be considered specifically 10:09:39
from that viewpoint, and I'd read them very carefully, 10:09:42
you know, is this patent offering up an alternative to 10:09:46
some fundamental function in USB. And no, I didn't find 10:09:49
anything like that. And what that means is, okay, the 10:09:53
people that wrote this are assuming that USB is kind of 10:09:56
a given. Okay? Well, it 's my job to know what that is 10:10:00
because I do. I understand how USB works. And the 10:10:03
POSITA in this case understands how USB works. And so 10:10:05
these things, it is appropriate to read them in that 10:10:08
context. That's all I meant. 10:10:11
Q. Okay. And I -- you may have just answered my 10:10:13
next question. But just to clarify, earlier you said 10:10:16
sometimes patents can use terms in misleading ways or 10:10:19
supply their own definition? 10:10:23
A. Mm-hmm. 10:10:24
Q. I think you just testified, but I want to 10:10:26
confirm, that the patents you were asked to consider, 10:10:28

the Aptiv patents, don't include any terms that you view as misleading or having a special definition. 10:10:31 10:10:35

MR. JENSEN: Object to form. 10:10:38

BY MR. BRAUSA: 10:10:40

Q. Is that fair? 10:10:41

A. Not that I can recall. I can't rule out that as we read through a particular thing I might say, oh, I'm sorry, Adam, here's one of those things I said there weren't any of. 10:10:42 10:10:45 10:10:49 10:10:52

Q. Okay. But sitting here today -- 10:10:53

A. Sitting here today, I don't remember. I don't remember. I wouldn't say it was egregious misuse. 10:10:55 10:10:57

Q. Okay. So when you were hired in May of 2023, what -- what was the task you were given? 10:10:59 10:11:03

A. I was asked to work on a series of IPRs. I think we had eight at that point that we were going to do, maybe, maybe more. And so I was given the original patents, you know, please look at these and give us your -- give us your opinion about the -- you know, whether there's prior art and there's an obviousness point and so on. At the same time, I was given quite detailed legal standards. It's true that I have done this enough times that I know what a lot of -- I mean, I know what obviousness is, but always in these cases I ask the lawyers to provide -- you know, assume I know 10:11:05 10:11:11 10:11:14 10:11:17 10:11:27 10:11:29 10:11:32 10:11:37 10:11:40 10:11:43 10:11:47

nothing about the law, because I'm not a lawyer. So it's appropriate. You know, give me all of the legal requirements and legal standards as if I didn't know anything, and then I use that as -- as it is. I don't evaluate it. I don't say, oh, that's different than the last time, or at least I try not to. So that -- briefly put, I was asked to look at these patents. One final thing that I was given at that point was some prospective prior art. 10:11:51 10:11:53 10:11:56 10:11:58 10:12:00 10:12:03 10:12:09 10:12:17 10:12:19

Q. Okay. 10:12:20

A. You know, Mr. Welch, would you evaluate these patents in the light of this prospective prior art that somebody or other has -- has located. 10:12:20 10:12:23 10:12:27

Q. Okay. And you're putting the emphasis on prospective in prospective prior art. Why is that? 10:12:29 10:12:32

A. Well, in respective constructing an opinion, it isn't really prior art until I -- okay. In my opinion, it's only prior art once I've done the analysis, once I say it is. You know, if someone else says, oh, this is -- this is of -- this is prior art, we want you to write up why, no, no, that's not how it works. This is prospective prior art. We think this is relevant here, or it might be relevant, or whatever. I mean, my job as I see it is to render an opinion about the patents -- they are what they are -- and to consider prior art if 10:12:36 10:12:41 10:12:43 10:12:47 10:12:49 10:12:53 10:12:55 10:12:58 10:13:02 10:13:06

there is some supplied, to go and look for prior art -- I always do that -- and then to try and put together, you know, the entire picture. You know, as you know, obviousness is all about the prior art and the POSITA view. So that's -- in some ways, my main job here is to hold up the POSITA view. 10:13:10 10:13:12 10:13:18 10:13:21 10:13:25 10:13:29

Q. So when you were hired by Microchip in May of 2023, it sounds like you were provided with the task of looking at the Aptiv patents, including the four we're talking about today -- 10:13:34 10:13:39 10:13:44 10:13:47

A. Mm-hmm. 10:13:48

Q. -- and then some others, and you were also provided with prospective prior art, as you've characterized it. 10:13:49 10:13:51 10:13:54

Correct? 10:13:55

A. That's right. 10:13:56

Q. Were there any other materials that you were provided initially by Microchip counsel? 10:13:56 10:13:58

A. I don't remember about initially, but one example of something that was provided eventually was to do with the -- the issue of secondary considerations. I was given the interrogatory response -- I was told this was the interrogatory response from Aptiv about certain things, you know, and would you -- would you consider these comments in the light of -- of these -- of these 10:14:01 10:14:08 10:14:12 10:14:18 10:14:24 10:14:26 10:14:30

legal points of potential secondary art. So there's a section in here where I render an opinion about that. The input to that is those two things. It's the material that I was given, described as coming from Aptiv in an interrogatory response. I noted, for example, it wasn't about specific claims or patents, but just sort of more generally. And then the legal standard for what these things are. And I -- I looked at that in that way. So that was something else I was given. 10:14:34 10:14:40 10:14:43 10:14:47 10:14:50 10:14:52 10:14:55 10:14:57 10:15:01 10:15:03

(Reference Exhibit 1014.) 10:15:03

BY MR. BRAUSA: 10:15:03

Q. Okay. Do you recall whether one of the pieces of prospective prior art you were given was Exhibit 1014 in these proceedings, what we call the Chang reference? 10:15:03 10:15:09 10:15:14

A. I was certainly given the Chang reference. I don't remember what its number was. Let me just pull up the -- 10:15:17 10:15:22 10:15:24

Q. Okay. I can represent for the record that it's Exhibit 1014. 10:15:25 10:15:27

A. Okay. I will take your word for it. 10:15:27

Q. Okay. So the Chang reference that is the primary reference in each of your opinions on obviousness was provided to you by counsel, correct? 10:15:29 10:15:32 10:15:36

A. Among other things, yeah, that's right. 10:15:38

(Referencing Exhibit 1015.) 10:15:38

BY MR. BRAUSA: 10:15:38

Q. Okay. And I -- my next question, and it's good you have the exhibit listing in front of you because I'm going to ask what those other things that were provided to you by counsel were. 10:15:43 10:15:46 10:15:48 10:15:51

Turning to Exhibit 1015 is the Chang 2 reference. Was that provided to you by counsel? 10:15:52 10:15:55

A. It was. 10:15:57

(Referencing Exhibit 1016.) 10:15:57

BY MR. BRAUSA: 10:15:58

Q. Okay. What about Exhibit 1016, the Overtoom reference. Was that provided to you by counsel? 10:15:58 10:16:03

A. Okay. Actually, I don't remember. 10:16:05

Q. Okay. 10:16:07

A. There are several here that I found. 10:16:07

Q. Okay. 10:16:11

A. There are several I found, some which we used, some which we didn't use. I don't remember which the -- and that's true about Hesse too. Anyway, yeah, the primary two that you asked about, yes, those I was given as prospective. 10:16:11 10:16:14 10:16:18 10:16:21 10:16:26

Q. Okay. Prior to your retention in this case in May of 2023, do you ever recall having seen the Chang reference, Exhibit 1014 -- 10:16:27 10:16:29 10:16:34

A. No. 10:16:36

Q. -- or the Chang 2 reference, Exhibit -- 10:16:36

A. I don't -- I don't remember seeing either of those. 10:16:40 10:16:42

Q. Okay. And then I think with respect to Exhibit 1016, Overtoom, you weren't sure whether that was something you found or counsel provided you? 10:16:42 10:16:45 10:16:48

A. And equally, I don't remember if I had -- if I had provided, because I had seen it elsewhere. I just don't remember. 10:16:50 10:16:53 10:16:56

Q. Okay. 10:16:56

A. Yeah. 10:16:56

(Referencing Exhibit 1017.) 10:16:56

BY MR. BRAUSA: 10:16:56

Q. With respect to Exhibit 1017 to Hesse, is that one that you provided, counsel provided, or you don't remember? 10:16:56 10:17:00 10:17:04

A. I don't remember. 10:17:04

Q. Okay. 10:17:04

A. Yeah, same. 10:17:05

(Referencing Exhibit 1025.) 10:17:05

BY MR. BRAUSA: 10:17:06

Q. What about Exhibit 1025 to Castelbury, do you remember how that was located? 10:17:06 10:17:10

A. I don't remember. No. 10:17:11

(Referencing Exhibit 1029.) 10:17:11

BY MR. BRAUSA: 10:17:13

Q. What about Exhibit 1029 to Chutorash, do you remember whether that was something you located or counsel for Microchip provided? 10:17:13 10:17:19 10:17:21

A. Well, that was provided to me, but I will admit a sense of deja vu looking at certain drawings in there. So I can't swear I hadn't seen it before. 10:17:23 10:17:27 10:17:32

(Referencing Exhibit 1033.) 10:17:32

BY MR. BRAUSA: 10:17:35

Q. Okay. So Exhibit 1033 is a patent to an individual with the surname of Bohm. 10:17:35 10:17:38

A. Mm-hmm. 10:17:40

Q. Do you see that? 10:17:40

A. Mm-hmm. 10:17:41

Q. Do you know who that person is? 10:17:42

A. Not offhand, no. 10:17:43

Q. Do you know who they work for? 10:17:45

A. I don't know that, either. Well, I -- notwithstanding it might be in the record, but I -- offhand, I don't know. 10:17:46 10:17:48 10:17:52

Q. Okay. So you never talked to a Mr. or Ms. Bohm as part of your analysis in this case? 10:17:53 10:17:56

A. Not to the best of my memory, no. 10:17:58

Q. Okay. So you don't have any ideas as to whether 10:18:00

that person works for Microchip, Aptiv, or some other company? 10:18:02 10:18:06

A. Not offhand, no. 10:18:06

Q. Are there any other references that you can remember that were provided to you as prospective prior art by counsel in May of 2023 in addition to Exhibit 1014 and Exhibit 1015, the Chang 1 and 2 references? 10:18:11 10:18:15 10:18:18 10:18:24 10:18:27

A. Well, all of these other things fall into the same category. Somebody provided them as prospective prior art, possibly amongst other things we ultimately didn't pick. So that includes 1016, 17, 29, 30, 32, 33, 34 -- what's that -- 38, 39, 40, 41, 42 -- wow, there's a lot here -- 47, 52, 53, just jogging my memory from looking at this list here, 66 and 7. It looks like -- well, okay. There are other -- okay. Those are prospective prior art patents. 10:18:28 10:18:31 10:18:34 10:18:37 10:18:44 10:18:55 10:19:02 10:19:10 10:19:18

Now, in the fullness of the analysis, all of the USB specifications were considered as prior art as well, sometimes cited directly. Personally, because of the way these things work, if I have two potential references for some point about USB, for example, if I can cite to a patent, I prefer that because it's easier for the PTAB people to find it. But frequently, the same thing appears in a -- in a USB standard. In 10:19:21 10:19:26 10:19:29 10:19:38 10:19:42 10:19:47 10:19:50 10:19:54

addition to its being easier to locate by -- by somebody reading the declaration, there are cases when I -- I cite to either a patent or I have some other publications in here that are books about USB or -- or other sort of related material, and I cite to those when I think it's sort of easier. 10:19:59 10:20:05 10:20:08 10:20:11 10:20:16 10:20:20

But pretty much without exception, just on this one issue, issues about USB, what is it, how does it work, and so on, those are all fundamentally answered by the -- by the standards and they are the final word, so they're in here for that reason. If I don't cite them in all cases, it's not because the information is there. No, it is there. It's just it's there, you know, and it's every single word about a particular topic. And to get a certain reference, you know, it's easier to cite to a summary which I read and consider to be accurate. If I read it and it's not accurate, then, of course, I don't use it. Anyway, that's -- so. 10:20:21 10:20:24 10:20:28 10:20:32 10:20:33 10:20:37 10:20:39 10:20:43 10:20:47 10:20:51 10:20:55 10:20:57

Q. Okay. 10:21:00

A. There's a lot of UBS specs in here. They're all potential and/or actual prior art. Or if they're not literally prior art, they certainly inform the knowledge of the POSITA. You know, a POSITA in my definition of a POSITA, they know about these specs, and so it's appropriate for that reason to cite them. 10:21:00 10:21:04 10:21:10 10:21:14 10:21:18 10:21:21

Q. Okay. Putting the USB specifications to one side, looking at the exhibits, are there any exhibits that you see that you can recall that you specifically located? 10:21:22 10:21:25 10:21:29 10:21:32

A. Oh, sure. 10:21:32

Q. And if you can just name those for me. 10:21:35

A. Okay. But you don't want me to include USB? 10:21:37

Q. Correct. We'll put the specifications to one side. 10:21:41 10:21:43

A. Okay. Okay. 1031, I don't remember. This is an off-the-shelf USB bridge packaged as something. I don't remember who supplied this. I have used a couple of USB bridges in my engineering work. This might have been one of them. I don't remember. And I might have provided that document. 10:21:43 10:21:57 10:22:03 10:22:05 10:22:09 10:22:11

Q. So just in the interest of time, I can -- I can grant you that if you don't know, we don't -- we don't need to list it. 10:22:12 10:22:15 10:22:19

A. Okay. 10:22:19

Q. We'll put that in the I don't know bucket. I'm just interested in ones that you can conclusively say -- 10:22:19 10:22:21

A. All right. 10:22:21

Q. -- I provided this or located this myself. 10:22:25

A. I think we cite to -- okay. Okay. 1060, we cite to a specific Fairchild USB switch. I provided 10:22:44 10:22:49

that because I happened to actually have used that switch on another project. 10:22:53 10:22:55

Q. Okay. 10:22:57

A. Oh, wait. Sorry. It's not -- okay. Here it is. It's 1068. 10:22:58 10:23:04

Q. Okay. 10:23:08

A. Yeah, 1068. 10:23:08

(Referencing Exhibit 1068.) 10:23:08

BY MR. BRAUSA: 10:23:09

Q. 1068, is a reference you provided? 10:23:09

A. 1068, I provided. 10:23:11

Q. Any others? 10:23:11

A. 1069, Horowitz and Hill. 10:23:12

(Referencing Exhibit 1069.) 10:23:12

BY MR. BRAUSA: 10:23:15

Q. Exhibit 1069 was located by you, too? 10:23:15

A. That's right, 1069. 10:23:18

Q. Okay. 10:23:19

A. 1073 and 1074. 10:23:20

Q. Okay. So just to confirm, Exhibits 1073 and 1074 were located by you? 10:23:25 10:23:30

A. Right. 10:23:31

(Referencing Exhibits 1073 and 1074.) 10:23:31

BY MR. BRAUSA: 10:23:31

Q. Any others? 10:23:31

A. No. 10:23:32

Q. Okay. 10:23:32

A. Except for the I don't remember category. 10:23:35

Q. Okay. And so the exhibits we just mentioned, those were located by you, the patents that you considered, and Chang 1 and 2 those were provided by counsel? 10:23:37 10:23:39 10:23:43 10:23:47

A. Mm-hmm. 10:23:47

Q. Correct? 10:23:47

A. Mm-hmm. 10:23:48

Q. And most of the other exhibits, it sounds, fall into the I don't -- I don't remember bucket? 10:23:48 10:23:50

A. Well, okay. Counsel provided the prosecution history -- 10:23:52 10:23:55

Q. Sure. 10:23:56

A. -- for the subject patents, yeah. 10:23:56

Q. Sure. Okay. So the patents -- the file histories for the subject patents and Chang 1 and 2 were provided to you by counsel. The exhibits you just mentioned were located by you? 10:23:59 10:24:02 10:24:06 10:24:09

A. Mm-hmm. 10:24:10

Q. And the balance of the exhibits, you just don't remember whether you provided them -- 10:24:10 10:24:14

A. Yeah. 10:24:15

Q. -- or counsel provided them? 10:24:15

A. That's correct. 10:24:17

Q. Okay. About how much time have you spent to 10:24:17

date collectively on the IPRs and PGRs you were hired by 10:24:19

Microchip for? 10:24:26

A. Somewhere between 250 and 275 hours. 10:24:26

Q. Okay. And remind me what your hourly consulting 10:24:30

rate is? 10:24:32

A. 395. 10:24:33

Q. Okay. And have you invoiced Microchip for all 10:24:33

that time? 10:24:38

A. I have invoiced everything through the 30th of 10:24:38

September, yes. 10:24:42

Q. Okay. Were you aware there -- outside of the 10:24:43

PTAB proceedings that we're here today dealing with and 10:24:48

the other PTAB proceedings that you've been a consultant 10:24:51

with, that Aptiv and Microchip have been involved in 10:24:55

litigation with one another in district court? 10:24:58

A. I have -- I've heard that said, yes. 10:25:00

Q. Okay. And have you talked with any experts that 10:25:02

Microchip has used in those proceedings? 10:25:04

A. I have not. 10:25:06

Q. Okay. Do you know why Microchip isn't using any 10:25:07

of those experts in these proceedings? 10:25:10

A. I don't. 10:25:12

MR. JENSEN: Object to form. 10:25:12

THE DEPONENT: I don't know. 10:25:13

BY MR. BRAUSA: 10:25:14

Q. Okay. 10:25:14

A. I don't know that. 10:25:15

Q. We've been going a little over an hour. Do you want to take -- 10:25:16 10:25:18

THE REPORTER: I want to take a break. 10:25:19

THE DEPONENT: Okay. That's fine. 10:25:21

THE VIDEOGRAPHER: I'll switch media. 10:25:23

This marks the end of Media No. 1 in the deposition of Eric Welch. The time is 10:25 a.m. We are off the record. 10:25:24 10:25:26 10:25:29

(A recess transpires.) 10:25:30

THE VIDEOGRAPHER: This marks the beginning of media No. 2 in the deposition of Eric Welch. The time is 10:45 a.m. We are on the record. 10:45:35 10:45:39 10:45:44

BY MR. BRAUSA: 10:45:44

Q. Welcome back, Mr. Welch. During the break, did you talk with counsel at all? 10:45:47 10:45:49

A. Only to the extent of his reminding me of something he has told me before, which is to not speak too quickly. 10:45:50 10:45:54 10:45:57

Q. I see. 10:45:57

A. It's a habit. 10:45:59

Q. Understood. 10:46:00

Did you discuss the substance of your testimony at all? 10:46:01 10:46:03

A. Not at all. 10:46:03

Q. When we broke, we were talking about the materials that you were provided by counsel -- 10:46:04 10:46:09

A. Mm-hmm. 10:46:11

Q. -- in the May 2023 timeframe when you were retained in these five proceedings as well as the additional IPR proceedings. 10:46:12 10:46:15 10:46:19

A. Let me just interject. That's not quite accurate. 10:46:20 10:46:24

Q. Okay. 10:46:24

A. I was provided some of this stuff in May, but some of this stuff was developed. 10:46:25 10:46:27

Q. Okay. 10:46:28

A. You know, they found things, I found things, and it happened over time. 10:46:29 10:46:32

Q. Okay. Got it. In May, you were provided with the four patents that we're dealing with today, right? 10:46:33 10:46:35

A. Yep. Mm-hmm. 10:46:37

Q. And in May, were you provided with copies of Chang and Chang 2 -- 10:46:38 10:46:40

A. To the best of my memory, yes. 10:46:42

Q. Okay. And so it sounds like in your ordinary approach when you get an assignment like this, you start 10:46:44 10:46:46

with the patent and you start with the claims, and then you look to the prospective prior art. Correct? 10:46:48 10:46:51

A. That's right. And then beyond that too, whatever appropriate background there is. 10:46:53 10:46:57

Q. Okay. And you employed that general approach in these five proceedings, correct? 10:46:59 10:47:02

A. That's correct. 10:47:04

Q. Okay. And so after looking at the claims of the four patents we're dealing with, you then looked at the Chang 1 and Chang 2 references -- 10:47:04 10:47:12 10:47:15

A. Mm-hmm. 10:47:15

Q. -- that you've been provided? 10:47:17

A. Mm-hmm. 10:47:18

Q. And your task was to look at their disclosures and see whether they taught or made obvious what was in the claims? 10:47:18 10:47:21 10:47:25

A. That's right. That's right. 10:47:25

Q. And, ultimately, you concluded in all of these proceedings, all five of these proceedings, that the Chang references in combination with one another, the knowledge of a POSITA? 10:47:27 10:47:30 10:47:33 10:47:38

A. Mm-hmm. 10:47:39

Q. And in some instances, another reference -- 10:47:39

A. Mm-hmm. 10:47:43

Q. -- was sufficient to render the challenge claims 10:47:43

obvious in your view, correct? 10:47:47

A. That's correct. Right. 10:47:49

Q. Okay. 10:47:51

A. I mean, different ones have different grounds. 10:47:51

Q. Sure. 10:47:53

A. So, yeah, put the things together in different ways, but that's right. 10:47:54 10:47:57

Q. Sure. But just to be clear in, though, that original combination of Chang 1 and Chang 2 was provided to you by counsel at the outset; that wasn't something -- 10:47:58 10:48:00 10:48:03 10:48:05

A. That's right. 10:48:05

Q. -- you went out an found? 10:48:06

A. That's right. 10:48:06

Q. Okay. In forming your opinions or during your work, beyond the legal standards that I understand were provided to you by counsel, were you asked to make any assumptions by counsel? 10:48:07 10:48:12 10:48:17 10:48:19

A. Not that I can recall, no. 10:48:26

Q. Okay. And in formulating your opinions, beyond the documents provided to you by counsel, some of which we've discussed, were there any other facts or data that were provided to you by counsel that you relied on in forming your opinions? 10:48:27 10:48:31 10:48:38 10:48:41 10:48:44

A. Well, I mentioned the interrogatory -- 10:48:46

interrogatory response before. 10:48:48

Q. Sure. 10:48:50

A. No, not that I can recall. 10:48:51

Q. Okay. And we're dealing with five primary declarations here. You were retained in May of 2023, and I believe you testified, to date you have spent about 250 to 275 hours total in your work with Microchip? 10:49:01 10:49:07 10:49:12 10:49:14 10:49:17

A. That's roughly. 10:49:18

Q. How much of that time would you estimate was spent preparing these five declarations that were filed in December of 2023? 10:49:18 10:49:22 10:49:27

A. It's a little hard to say. I mean, we did eight in all. I don't remember the exact filing. I think four were filed in December and maybe four more in January. As you know, there's -- in many of these, patents there's a common specification, and much of the analysis of prior art sort of applies to all of them. There was at least one that has some other material to do with power delivery, and of course that was separate. Boy, at a -- at a very rough guess, I'd say three-quarters of the time was spent on these four because, you know, the primary analysis, which was then adapted for the next four, there was a lot of common stuff there. So that's just a very crude guess. 10:49:28 10:49:43 10:49:50 10:49:53 10:50:02 10:50:07 10:50:15 10:50:18 10:50:26 10:50:29 10:50:32 10:50:36 10:50:41

Q. Okay. And when you say these four, you're referring to -- 10:50:44 10:50:47

A. Sorry, these four patents. 10:50:47

Q. -- these four patents, these five declarations? 10:50:49

A. That's right. 10:50:50

Q. Okay. Got it. 10:50:51

And you anticipated my next question, which was: Were these five declarations written in parallel? Were they written in sequence? Something in between? 10:50:52 10:50:55 10:51:00

MR. JENSEN: Object to form. 10:51:03

THE DEPONENT: I did a lot of analysis sort of separate -- okay. Before we decided exactly how the documents would be structured, before I decided how these would be structured, I did a lot of analysis sort of stand alone, because of the commonality, and eventually came up with this idea, I asked counsel if it would be okay, could we, guys, could we have common sections in all of these things and say so, you know, is that -- is the board going to object to that or whatever. And they said, no, that's not a bad idea. 10:51:11 10:51:17 10:51:22 10:51:24 10:51:27 10:51:31 10:51:36 10:51:39 10:51:45 10:51:46

And so there's a lot of analysis done before -- before each separate document was produced. Okay? Then the job was, okay, here's this common analysis that has to do with the specifications, Figure 4 particularly, and related things in the specifications. Again, PD 10:51:48 10:51:54 10:51:58 10:52:01 10:52:05

came later. 10:52:12

(Reporter clarification.) 10:52:12

THE DEPONENT: I'm sorry. PD. It's short for 10:52:13
power delivery. That came later. 10:52:14

Okay. So after a lot of analysis had been done, 10:52:19
then I went back to each -- each patent by itself and 10:52:21
reread the claims, which of course are different between 10:52:29
each patent. That's the whole point. And then at that 10:52:32
point, I wrote the final version of the analysis based 10:52:35
on this sort of common work that had been done. And as 10:52:40
I started doing that, I then reduced the common work 10:52:43
into, okay, what should we have in the background, what 10:52:46
should we have in these other sections, which really 10:52:50
could be the same in all of them. In other words, I had 10:52:52
to sort of start working on writing the individual 10:52:56
analyses to see what would work as the common section. 10:52:58

So this is sort of a crude version of the 10:53:01
process that I use, but that's -- that's basically how 10:53:04
this stuff came together. Obviously, for each 10:53:08
individual patent, the key is, what are the words in the 10:53:11
claims themselves. And so the final analysis of each 10:53:14
claim builds on the initial analysis, which says, okay, 10:53:18
generally this is what's going on here, and generally, 10:53:22
the prior art applies in this way. I have to go back 10:53:24
and redo that, rethink it, reword it for each different 10:53:27

claim. 10:53:32

Now, some of the claims were common too, and 10:53:33

there were sections where claims were repeated with so 10:53:36

much commonality that I did a different thing. I said, 10:53:39

well, this one is so much like that, let me put the 10:53:42

words down here and different words down over here, and 10:53:45

maybe even color them to show where they're common. And 10:53:47

then I'd say, this -- this is really like this other 10:53:50

claim in the same patent; and, therefore, my analysis is 10:53:53

substantively the same in this case as it was in that 10:53:56

other case, or not. You know, well, okay, this one 10:53:59

has -- this one has slightly fewer words; and, 10:54:03

therefore, it's got one less limitation; therefore, it's 10:54:06

more general; and, therefore, you have to think about it 10:54:08

in that sense. And there were a few of those which 10:54:12

required more words because of, you know, some nuance or 10:54:14

whatever. Anyway, that's -- that's generally how this 10:54:17

worked. 10:54:19

BY MR. BRAUSA: 10:54:19

Q. Okay. So it -- let me see if I can summarize. 10:54:20

I think I understand what you're -- you're saying. 10:54:23

You started with the claims of the patent, then 10:54:26

you went to the prior art, you did a general analysis, 10:54:28

you put together that general analysis, and then you 10:54:33

essentially made that general analysis more specific in 10:54:40

view of the specific language in the claims. Is that fair? 10:54:42 10:54:46

MR. JENSEN: Object to form. 10:54:47

THE DEPONENT: I would say it very slightly differently. 10:54:50 10:54:52

I certainly started with the -- each patent on its own, the claims, but also all the specifications, drawing and everything else, and then I went from there to do an analysis. And because the specifications are so similar, I chose at that point to really focus on that. In other words, the work felt like it divided up a little bit that way, but -- but then the latter part of what you said is substantially accurate. The final analysis was -- was done specifically for the claims in each patent. 10:54:53 10:54:55 10:54:57 10:55:02 10:55:04 10:55:09 10:55:12 10:55:15 10:55:20 10:55:22

BY MR. BRAUSA: 10:55:22

Q. Okay. Are you aware that the declarations that you authored were themselves filed as exhibits to something called an IPR petition or in one instance a PGR petition? 10:55:26 10:55:30 10:55:35 10:55:39

A. I am certainly aware of that. I couldn't off the top tell me the difference between those two things. 10:55:40 10:55:42

Q. Okay. 10:55:45

A. But I'm aware these were filed as part of an IPR, or IPR like. 10:55:45 10:55:51

Q. Okay. And in the context of your preparation of these reports, all of which have been marked as Exhibit 1013 in the respective proceedings, did you ever review the petition that was submitted by Microchip alongside your report? 10:55:53 10:55:56 10:55:59 10:56:02 10:56:05

A. I did not. 10:56:06

Q. Okay. And that's true for all five of the proceedings we're dealing with? 10:56:07 10:56:10

A. It is. 10:56:11

Q. Okay. And do you have an understanding that Aptiv filed what are called preliminary -- or I'm sorry, patent owner preliminary responses -- 10:56:11 10:56:15 10:56:19

A. I'm aware of that, yes. 10:56:21

Q. -- in response to the petition? 10:56:22

A. Right. 10:56:23

Q. Okay. Have you reviewed those? 10:56:24

A. No. What I reviewed was the -- the PTAB ruling. 10:56:25

Q. Okay. 10:56:29

A. I reviewed those in some detail and, of course, they reference both of these things. 10:56:30 10:56:33

Q. Okay. And the PTAB ruling you're referring to is called the institution decision? 10:56:35 10:56:38

A. That's right. 10:56:39

Q. Okay. And so you have reviewed the institution decisions in all of these proceedings? 10:56:40 10:56:42

A. To be -- these five, yes. 10:56:44
Q. Okay. 10:56:46
A. There are some others. I haven't actually 10:56:47
looked at those. 10:56:48
Q. Okay. Are you aware that in some of the others, 10:56:49
the PTAB has denied institution? 10:56:51
A. I understand that. But I haven't read those. 10:56:54
Q. Okay. So you don't have an understanding as to 10:56:56
why the PTAB -- 10:56:58
A. I don't. 10:56:59
Q. -- denied institution? 10:56:59
A. No. 10:57:00
Q. And you don't know whether the PTAB critiqued 10:57:01
your opinions at all in those opinions? 10:57:04
A. I don't. 10:57:06
Q. After the declarations were submitted in 10:57:07
December of 2023, it sounds like you -- you reviewed the 10:57:16
PTAB's institution decisions? 10:57:21
A. When it came, yes. 10:57:23
Q. Sure. 10:57:24
A. Was June, I think, yeah. 10:57:25
Q. Okay. For your deposition here today, or for 10:57:26
your work on behalf of Microchip, beyond the PTAB's 10:57:29
institution decisions, are there any other documents you 10:57:33
reviewed after submitting your declaration that you had 10:57:36

not reviewed at the time you submitted your declarations? 10:57:41 10:57:43

A. Not to the best of my memory, no. 10:57:43

Q. Okay. So the -- the -- the universe of additional documents that you reviewed after submitting your declarations are limited to the PTAB's institution decisions? 10:57:45 10:57:50 10:57:52 10:57:56

A. Mm-hmm. 10:57:56

Q. Okay. 10:57:57

A. That's correct. 10:57:57

Q. And I take it you spent some time preparing for your deposition today as well? 10:57:57 10:58:03

A. I did. 10:58:04

Q. How long did you spend preparing for your deposition? 10:58:04 10:58:06

A. A couple days. 10:58:06

Q. Okay. Can you tell me -- I don't want to get into the substance of any communications with counsel. But what did you do to prepare for your deposition? 10:58:07 10:58:08 10:58:11

A. I wrote on the Blackboard 900 times, "Don't talk too fast." I mean, I've done a number of these things and, you know, I have high -- high-affect memories of the question would come and I would just start talking immediately. And the person sitting next to me, they needed to make a comment, and I didn't -- I was talking 10:58:13 10:58:17 10:58:21 10:58:24 10:58:27 10:58:31

over him. It's just a habit. So talking fast and talking over them. So I had to -- I had to really practice about that. 10:58:33 10:58:36 10:58:38

Otherwise, since it had been ten months, the other thing I did was I just reviewed the documents carefully, reminding myself of everything, rereading the prior art, rereading the patents, occasionally rereading other things, but mostly limited to -- to the specific matter here, that is, the -- the patents and the -- the prior art. I didn't feel it necessary to go back to the USB specs and say, okay, let me remind myself of how that works or -- or whatever. In general, that's what the preparation was. 10:58:40 10:58:45 10:58:47 10:58:51 10:58:57 10:59:02 10:59:06 10:59:12 10:59:15 10:59:17

Q. Okay. To prepare for your deposition, did you meet with anyone? 10:59:18 10:59:20

A. I met with Mr. Jensen and the other attorney, Mr. Lane. 10:59:21 10:59:24

Q. Okay. And how long did you meet with them? 10:59:25

A. It was a couple of hours over a couple of days. I don't remember exactly. 10:59:30 10:59:33

Q. Okay. In total, do you recall how long you met with counsel for Microchip? 10:59:33 10:59:36

A. Let's say two full days. 10:59:38

Q. Okay. And then was there additional prep that you did beyond those two full days? 10:59:40 10:59:43

A. No, just this -- just this self-talk reminder. 10:59:45

Q. Okay. Got it. 10:59:49

In -- in all of your declarations, there are obviousness grounds based on Chang 1 and Chang 2? 10:59:52 10:59:57

A. Mm-hmm. 11:00:01

Q. And then there's also a reference to including the knowledge of the POSITA -- 11:00:01 11:00:03

A. Mm-hmm. 11:00:05

Q. -- correct? 11:00:06

How did you determine whether to rely just on the knowledge of the POSITA or to add an explicit reference like you did with Chutorash or -- well, we can use Chutorash as an example? 11:00:07 11:00:10 11:00:15 11:00:18

MR. JENSEN: Object to form. 11:00:21

THE DEPONENT: Okay. Chutorash is a good example because that reference, to the best of my memory, at the risk of mistaking one name for another, is about USB in automobiles and the fact that USB in automobiles usually involves devices that a POSITA would see were hubs, even though they're not actually described that way. The value of that is it provides context for somebody reading this thing and try to understand, and it just felt better to me, when possible, to start by saying, well, a POSITA would understand that you could use USB in a car. Okay. 11:00:22 11:00:32 11:00:36 11:00:39 11:00:44 11:00:49 11:00:52 11:00:56 11:00:59 11:01:04 11:01:07

That's nice and that's my say-so, but it's a slightly better statement, it occurs to me, if you have a reference for it. In some ways, fundamentally what I had to learn to do in order to be an expert witness is, yes, I'm an expert, but it's usually better if I can say you know, it is the case that X, Y, and Z, and, oh, by the way, here are these high-quality references. 11:01:10 11:01:13 11:01:15 11:01:20 11:01:24 11:01:28 11:01:30

And so, you know, another example of that is, you know, I have Horowitz and Hill in here, spectacularly high-quality electronics textbook, you know, probably 1500 pages, you know, and it's in here for the purpose of talking about voltage dividers and, you know, a couple of other really simple circuit elements. Did I need that reference for my own knowledge? No, of course not. But it's better, I have learned, in these declarations to be able to cite something. So that's the -- that's the -- sort of the primary thinking. You know, I start off with USB in -- in cars makes sense. But we have several of the other references, like the article about, you know, the car is like a PC on Wheels. I like that very much because it's easy to read and it makes the point. 11:01:32 11:01:34 11:01:37 11:01:43 11:01:45 11:01:50 11:01:53 11:01:57 11:02:00 11:02:05 11:02:08 11:02:10 11:02:13 11:02:16 11:02:20

Chutorash is spectacular and it sort of has a different view of the same thing. It likes to show some -- some rather busy drawings showing a lot of 11:02:24 11:02:27 11:02:29

different sort of interconnected pieces. That's useful, too. 11:02:34 11:02:38

BY MR. BRAUSA: 11:02:38

Q. Okay. So do you have an understanding of what I say when you -- if I say that you included Chutorash as part of the grounds explicitly? 11:02:39 11:02:43 11:02:46

Does that make sense? 11:02:48

A. I understand that, yes. 11:02:49

Q. Okay. And you're aware that you did not include, for instance, Hill and Horowitz or Horowitz and hill as part of any grounds explicitly? 11:02:50 11:02:53 11:02:56

A. I am aware of that. 11:02:59

Q. Okay. And so understanding your opinion that it's better to have a reference supporting your opinions -- 11:03:00 11:03:02 11:03:05

A. Mm-hmm. 11:03:05

Q. -- how did you go about deciding whether a given reference that you think a POSITA would have been aware of should be part of the grounds or just part of the background knowledge of a POSITA? 11:03:06 11:03:09 11:03:13 11:03:16

MR. JENSEN: Object to form. 11:03:17

THE DEPONENT: Using the Horowitz and Hill example, there's a way that reference is almost gratuitous. I mean, everybody understands about voltage dividers. Any possible definition of a POSITA that you 11:03:20 11:03:25 11:03:33 11:03:35

might consider here, and I'm aware that PTAB considered ours and yours as being different, you know, that would be -- that would be obvious. That would be known to a POSITA. But the idea there is that that reference is about explaining what voltage dividers are and putting it in context as, you know, it appears in the H&H chapter called Fundamentals, you know, there's a bunch of stuff in there about, you know, what a -- what an engineering student in the sort of first course or a second course, you know, might be asked to work through this to remind them or to learn anew about all of these different sorts of things. It's a fundamental aspect of electrical engineering. And so, you know, that -- that just makes it clear that I haven't just invented this or that I'm misusing the term or whatever, but once we have it in the declaration, that's good enough. 11:03:38 11:03:40 11:03:43 11:03:47 11:03:53 11:03:57 11:04:02 11:04:04 11:04:08 11:04:11 11:04:14 11:04:17 11:04:21 11:04:23 11:04:26 11:04:30

Horowitz and Hill is not really part of the argument about -- argument -- it's not really about the analysis that's -- that comprises one of these grounds. Or let me say it a different way. Voltage dividers are in here as an example of one possible detection scheme that might be used in a case where you have an incident device which, you know, you analyze it and, you know, you think that it may have a pull-up or a pull-down resistor. Well, the explanation there, the analysis is 11:04:32 11:04:34 11:04:40 11:04:43 11:04:47 11:04:50 11:04:54 11:04:57 11:04:59

that a POSITA would understand that you would -- amongst other things, you could use a voltage divider in that case to figure out what it is; is there a resistor present, what's the value, is the resistor not there, all of these different kinds of things. But Horowitz and Hill aren't part of that analysis. They're just part of saying that voltage dividers were well known. So that's why, just to take that to a possible extreme in that particular case, H&H is part of background for the -- the overview background section and talking about different well-known detection schemes and not part of the grounds. 11:05:02 11:05:06 11:05:08 11:05:11 11:05:14 11:05:17 11:05:19 11:05:23 11:05:26 11:05:32 11:05:37 11:05:41

BY MR. BRAUSA: 11:05:41

Q. Okay. But I guess my confusion is, Chutorash, you rely on to show that USB was used in vehicles, correct? 11:05:41 11:05:45 11:05:45

A. We don't -- we don't rely on it as if without Chutorash we couldn't say that. I just think it makes it clearer. I think it makes it more complete. Same with the PC on Wheels reference. Just makes the -- just makes the -- makes the explanation a little more clear. 11:05:50 11:05:54 11:05:56 11:06:00 11:06:06

Q. Okay. Well, the PC on Wheels article isn't part of any grounds, is it? 11:06:11 11:06:13

A. No, but -- I'm sorry. I'm answering your question by going back and forth between the sort of 11:06:16 11:06:18

background analysis and -- and the grounds themselves. 11:06:21
I -- I take your point that there's a difference between 11:06:23
those -- those things. I think -- I think Chutorash fit 11:06:28
as part of the grounds because language in the patents 11:06:33
suggested that USB and automobiles was a point that 11:06:41
needed to be addressed specifically and not -- if we 11:06:44
could, not just with the POSITA knowledge. 11:06:48
Q. Okay. 11:06:49
A. And Chutorash respect for that. 11:06:50
Q. Was it your decision as to which specific 11:06:52
reverences to explicitly call out in the grounds, versus 11:06:56
relying on the POSITA's general knowledge? 11:06:58
A. Well, yes. I put together the analysis and, 11:07:01
therefore, I put together these grounds using the prior 11:07:10
art that had been supplied. And in these details, yes, 11:07:14
I had to decide which references were just part of the 11:07:22
background and which references might useful and become 11:07:25
part of the grounds in regards to the example I gave. 11:07:29
Q. Okay. Do you know whether you -- there's a 11:07:31
difference in terms of what you have to show for a 11:07:35
motivation of combined that turns on whether a reference 11:07:38
is in the grounds or not? 11:07:42
A. Well, I'm not a lawyer. So my understanding is 11:07:43
there's a legal standard that obviousness requires, I 11:07:51
think the term is preponderance of -- of evidence that 11:07:58

it's more likely than not that given these different references and the knowledge of the POSITA, the -- the claim language in question would have been obvious. That's my layman's understanding of that. 11:08:00 11:08:06 11:08:11 11:08:16

Q. Okay. And do you have a layman's understanding of what a motivation to combine is referring to, or a motivation to modify? 11:08:18 11:08:20 11:08:24

A. Yes. My -- my idea about that is, again, given by the definition of obviousness. You don't have to have a single reference. It's -- obviousness can be shown, I've been given to understand, by finding several things, such that if you consider them together with the knowledge of the POSITA, that consideration would have rendered the -- the claim language in question obvious. That's -- that's my understanding. 11:08:25 11:08:27 11:08:30 11:08:34 11:08:38 11:08:41 11:08:43 11:08:46

Well, okay. Sorry. That doesn't quite answer your question motivation combine -- to combine has to do with, it's not enough -- certainly it's not enough in hindsight to say, oh, we've got these things, therefore, we'll find this prior art. No. What you have to show, and I think I have shown here, is that these things existed, they would have been known and could have been known to a POSITA, they had their own knowledge, and it would have made sense to combine them. 11:08:49 11:08:51 11:08:55 11:08:58 11:09:01 11:09:05 11:09:07 11:09:09 11:09:14

Well, what's the motivation? The motivation is 11:09:15

that we have a problem to be solved, which is the need for dual-role ports, plural, and having them in an automobile or other kinds of contexts where having fewer ports is better than more ports. That gives you the idea of multiple dual-role ports could be beneficial. 11:09:18 11:09:22 11:09:26 11:09:32 11:09:35

And these two reference give you, each of them, a part of that. Chang 1 has a hub where one of the ports has a host interface by virtue of a bridge. Chang 2 has what it has, which is essentially a single port, but which is dual role, not multiple ports. So if you -- if you consider those two things, the motivation, I think, is -- is this: 11:09:41 11:09:44 11:09:48 11:09:53 11:09:56 11:10:00 11:10:04

A POSITA in this area has experience doing development with USB systems. Fundamental components in that development, as you have -- you have hosted, you have hubs, you have devices, you have a couple of other things. Hubs are a fundamental part of the process. The USB hub did not somehow come on later as a -- an improvement on the process. The USB hub was there at the very beginning because it is the fundamental and sole mechanism for a single host to be able to communicate with more than one device, and the people that designed USB understood that that was -- that was important. Now, there's a lot of other details about why the 1-1 spec and its version of a hub had -- had 11:10:06 11:10:10 11:10:13 11:10:16 11:10:21 11:10:26 11:10:31 11:10:34 11:10:36 11:10:40 11:10:42 11:10:46 11:10:48

fairly simple functionality, and that -- some of that has to do with the economics of building those things. But in the relevant timeframe, a POSITA with, as I suggest, knowledge about how to put these USB systems together, a fundamental building block, they would have a toolbox of things, and one of the fundamental tools in that toolbox is the hub. 11:10:54 11:10:57 11:11:00 11:11:02 11:11:05 11:11:08 11:11:11

You know, you're putting these things together. Hubs were off-the-shelf components. There were -- there were integrated circuits with two, four and seven ports available prior to the data of these things, and those of us that design these things use those naturally. You know, at Keyspan, we had a compound device. Compound is a term of art from the USB spec that refers to two devices in an enclosure that are brought together with an embedded hub. That's very important. The specification has a lot of detail about the hub can actually explain to the host that a given device is connected with a captive connection rather than being plugged or unplugged. That's a -- that's a detail that's not important here. I'm just making the point that the USB specification is all about making this possible, making it well known, how to do it, and what would work. 11:11:13 11:11:16 11:11:20 11:11:23 11:11:27 11:11:32 11:11:36 11:11:39 11:11:44 11:11:48 11:11:50 11:11:53 11:11:56 11:11:59 11:12:02 11:12:06 11:12:09

So okay. So given that, looking at Chang and 11:12:11

Chang 2, it would be obvious to a POSITA, okay, there's a hub over here and there's this one thing, but we can improve that one thing with the teachings. We don't have to take the details and the precise implementation of Chang 2. We can take those teachings and combine them here and expand what's being done with the hub, because the hub was so fundamental to this process that it would be obvious to a POSITA to do that, and therefore, the combination of those things, so says my analysis, renders the claims obvious. 11:12:14 11:12:17 11:12:19 11:12:23 11:12:25 11:12:29 11:12:33 11:12:37 11:12:39 11:12:44

Q. Okay. I think when you started that line of testimony, you mentioned that one of the -- or a motivation to combine references was the need for dual-role ports, plural. Correct? 11:12:46 11:12:51 11:12:55 11:12:58

A. That's correct. 11:13:00

Q. Okay. I just want to make sure I understand. 11:13:01

Chang 1, as we've been calling it, Exhibit 1014, has ports, plural? 11:13:05 11:13:09

A. Mm-hmm. 11:13:11

Q. None of them are dual role, right? 11:13:12

A. That's correct. 11:13:14

Q. Okay. Chang 2, Exhibit 1015, has a port, singular? 11:13:15 11:13:19

A. Mm-hmm. 11:13:20

Q. And it's dual role, correct? 11:13:20

A. Mm-hmm. Mm-hmm. 11:13:21

Q. So neither Chang 1 nor Chang 2 explicitly 11:13:22

disclose multiple dual-role ports, right? 11:13:27

A. That's correct. 11:13:29

Q. Okay. And it's your view that a POSITA, looking 11:13:31

at those two references, which were provided to you by 11:13:34

counsel, would conclude that it's obvious to make all 11:13:38

the ports in a hub dual-role ports? 11:13:42

A. Mm-hmm. That's right. The reason for that -- 11:13:46

Q. Respectfully, we'll get to the reason. I just 11:13:50

want to make sure I understand. 11:13:53

A. Okay. 11:13:54

Q. And I want to go back to -- 11:13:54

A. I wasn't sure if you asked a question or not. 11:13:56

Q. That's quite all right. My fault. 11:13:58

I want to go back to the question we were 11:14:00

talking about before that testimony, though. You can 11:14:01

turn to the table of contents in your report from the 11:14:03

'228 proceedings. 11:14:08

A. Mm-hmm. Mm-hmm. 11:14:09

Q. Exhibit 1013. 11:14:10

And there is a Section 9 that is modify -- 11:14:13

Motivation To Modify Chang In View Of Chang 2 and the 11:14:16

Knowledge of a POSITA. 11:14:18

A. Mm-hmm. 11:14:19

Q. There's a Section 10 that is Motivation To Modify Chang In View Of Chang 2, Chutorash and the Knowledge of a POSITA. 11:14:19 11:14:22 11:14:26

A. Mm-hmm. 11:14:26

Q. And then there's a section 11 that is Motivation to Modify Chang in View of Chang 2, AN96527 and the Knowledge of the POSITA, correct? 11:14:26 11:14:29 11:14:36

A. I see those three here, yes. 11:14:37

Q. Okay. And your report in this proceeding, all right, the Exhibit 1013 we're looking, at doesn't have any other sections about motivation to modify Chang, correct? 11:14:38 11:14:41 11:14:44 11:14:48

A. That's correct. 11:14:48

Q. Okay. And so there's not a section in your report, for example, about the motivation to modify Chang in view of Overtoom? 11:14:49 11:14:51 11:14:55

A. No. That's correct. 11:14:58

Q. And there's not a section in your report about any motivation to modify Chang in view of the Hesse reference, Exhibit 1017? 11:14:59 11:15:02 11:15:06

A. No. 11:15:11

Q. And there is not a section in your report about any motivation to modify Chang in view of the Castelbury reference, Exhibit 1025? 11:15:11 11:15:14 11:15:17

A. That's correct. 11:15:19

Q. Okay. And so why did you not include any sections about motivation to modify Chang in view of, for example, the Castelbury reference, Exhibit 1025? 11:15:20 11:15:24 11:15:28

MR. JENSEN: Object to form. 11:15:32

THE DEPONENT: Okay. The simple answer to that is that those other references, and I would have took look at them carefully to get the details, but in general, those are the references, bring us components. In one case, the -- well, I think there are several examples of cross/bar switches. Earlier in the analysis and in background, I make the point that a POSITA would understand what a cross bar switch is and what it's used for, and that, therefore, it was justified to use that in the toolbox, just like a voltage divider. 11:15:34 11:15:40 11:15:42 11:15:46 11:15:50 11:15:54 11:15:58 11:16:02 11:16:05 11:16:08

In -- in Reference No. 9, this other thing that's added here, the AN96527, may not itself apply to the this patent, but it's here for completeness. And that is -- that has to do with power delivery, again another tool in the toolbox. And there's one other. I forget offhand. The point is that those things give us components, they give us pieces. And all of those pieces were known to a POSITA. So there's not sort of motivational issues that come up there. Rather, these things populate the toolbox, just like with the voltage divider, whereas in the Chutorash case, it's possibly a 11:16:10 11:16:15 11:16:20 11:16:22 11:16:25 11:16:29 11:16:33 11:16:36 11:16:41 11:16:44 11:16:48

fine line here, but I felt that its references to USB in automobiles spoke to the language of the claims in ways that were useful, whereas these other things, it was different. They spoke to the details about components that were used to solve a problem. 11:16:54 11:16:59 11:17:05 11:17:07 11:17:10

Okay. I won't try and anticipate your questions. But there are other questions that we might get to later where some of the details of that, you know, we could come back to and -- and flesh out a bit. 11:17:17 11:17:18 11:17:21 11:17:26

BY MR. BRAUSA: 11:17:26

Q. Okay. And so if I understood you to -- your testimony, it was that if a reference is just describing a component in a toolbox -- 11:17:27 11:17:30 11:17:34

A. Mm-hmm. 11:17:36

Q. -- you haven't provided any motivation to combine that particular tool with Chang or Chang 2 in your report explicitly? 11:17:38 11:17:40 11:17:45

MR. JENSEN: Object to form. 11:17:46

THE DEPONENT: Those things show up in addition, possibly, to other ways. Those things show up in the motivation as part of the knowledge of the POSITA. 11:17:46 11:18:04 11:18:06

Another way to think about all this stuff is that I've given it as my opinion that a POSITA would know about certain things, voltage dividers, switches, multiplexors and so on, and each of these motivation 11:18:10 11:18:14 11:18:17 11:18:20

sections has the knowledge of the POSITA. The purpose in the background section to bring in some of those other references is to provide a reference for some of these points about knowledge of the POSITA, the USB 2 spec for USB things, the Horowitz and Hill for a couple of electrical details. Hesse or Overtoom, I forget which one it is, because they have a very nice cross/bar and a cross/bar which is used in the context of USB. We have a lot of other things like that, too. We have data sheets from -- from Fairchild and -- and micro analog devices, I think is another one, showing sort of off-the-shelf components. 11:18:25 11:18:28 11:18:32 11:18:36 11:18:40 11:18:44 11:18:49 11:18:52 11:18:55 11:18:58 11:19:03 11:19:06

So I think the answer to your question is that those things, in a way, all show up in the motivation to combine, but they're packaged as part of the POSITA knowledge; it's just in the background. I wanted to clarify and provide background about, you know, why a POSITA would know these things if they're working in USB. That's the first point, a POSITA is somebody who works here in USB and knows about the fundamental USB pieces. 11:19:08 11:19:11 11:19:15 11:19:19 11:19:21 11:19:28 11:19:30 11:19:33 11:19:37

Given these various references, it's my opinion that they would know about those things as well, not only for those, the purpose of those references, there might be other references. But the point is that those 11:19:38 11:19:42 11:19:44 11:19:46

things become part of the toolbox, therefore, part of the knowledge of the POSITA; therefore, they -- they are part of the motivation to combine. 11:19:50 11:19:52 11:19:56

BY MR. BRAUSA: 11:19:56

Q. Okay. So is it your testimony that Chang 1, for instance, is not part of the toolbox or knowledge of the POSITA? 11:19:58 11:20:04 11:20:06

A. There is a process in -- in engineering which makes it a little difficult to answer that question. As engineers, we are asked to solve problems, and if we're good engineers, we start out by really trying to understand the problem rather than doing a common thing, which is somebody says, you know, do you know about X or could you solve Y, and you think, oh, yeah, I worked on Z and that's sort of like that, and so you say yes and you go down a bad path. No. What's best in engineering is trying to understand the problem. You have the toolbox as a sort of starting point for all of those kinds of things, but it's not uncommon that you get presented with a problem which is not obviously or immediately solved by the things in your toolbox. 11:20:07 11:20:28 11:20:31 11:20:36 11:20:39 11:20:41 11:20:45 11:20:48 11:20:52 11:20:54 11:20:58 11:21:02 11:21:05 11:21:10

So what do you do? Well, you know, you go back to what you know and you see if you have worked on anything in the past which is like this, and what did you do or you see -- you go back to the past and you 11:21:12 11:21:15 11:21:23 11:21:25

say, well, I had a similar problem and I looked up a bunch of different possible references. You know, did I come across anything there which wasn't useful then but which could be useful now? 11:21:29 11:21:32 11:21:34 11:21:38

My point is that beyond the toolbox, engineers are called on to be creative, to find other things, to go out into the world and look for stuff. This happens all the time. Now, if we're good engineers, the experience of doing that means that your toolbox is expanding all the time. I've been doing this for 50 years and I have a pretty big toolbox. 11:21:39 11:21:42 11:21:46 11:21:51 11:21:54 11:21:58 11:22:01

So I'm not saying that a POSITA here would have had Chang in their toolbox a priori. I am saying that a POSITA is the kind of person that has the toolbox, has the various understandings as what I've described, and the ability to go out and look for things. 11:22:03 11:22:06 11:22:11 11:22:14 11:22:17

Q. Okay. Well, just to confirm, as of 2023 in May, when you were retained, neither Chang or Chang 2 were in your personal toolbox, right? 11:22:19 11:22:23 11:22:26

MR. JENSEN: Object to form. 11:22:28

THE DEPONENT: Not as such. I may have known more -- no, never mind that. Yes, they were not in my toolbox. 11:22:28 11:22:39 11:22:45

BY MR. BRAUSA: 11:22:45

Q. Okay. And it sounds like you agreed with me. I 11:22:46

think you testified that there are problems that come up that are not obviously or immediately solved by the things in your toolbox. Right? 11:22:50 11:22:52 11:22:55

A. That's correct. 11:22:57

Q. And for those types of problems, you have to be creative, you have to be innovative to solve the problem, right? 11:22:57 11:23:01 11:23:03

A. That's correct. 11:23:03

Q. All right. Have you, in preparing your opinions in this case, talked with anyone about Microchip about what approaches they use to solve the problem of integrating CarPlay in an automobile? 11:23:04 11:23:09 11:23:13 11:23:17

A. I have not talked to anybody about that. No. 11:23:19

Q. Okay. Have you reviewed any materials from the district court litigations between Microchip and Aptiv about what Microchip was saying about the problem of integrating CarPlay into automotive devices? 11:23:22 11:23:25 11:23:32 11:23:36

A. The only information which even mentions CarPlay at large is the interrogatory response. I have nothing else. 11:23:40 11:23:46 11:23:49

Q. Okay. So you hadn't done any investigation of any vexing problems that were related to CarPlay and automotive manufacturers? 11:23:49 11:23:52 11:23:58

A. Well, two things. Number 1, I don't necessarily agree that there is a vexing problem there. Number 2, I 11:24:01 11:24:05

have not looked at any -- at anything related to the CarPlay problem other than to determine that the specifications for CarPlay are proprietary information of Apple computer. 11:24:08 11:24:14 11:24:21 11:24:26

Q. Okay. And so just to confirm, you didn't talk with anyone by the name of Mitch Obolsky from Microchip? 11:24:27 11:24:30

A. I have not talked to Mitch Obolsky. 11:24:36

Q. Okay. And you didn't talk with Mark Bohm from Microchip about -- 11:24:38 11:24:42

A. I haven't talked to Mark Bohm. 11:24:43

Q. Okay. And you haven't reviewed any of their trial testimony that they provided about Aptiv's solution to a problem involving CarPlay? 11:24:44 11:24:47 11:24:50

A. I haven't talked to them about anything. 11:24:52

Q. Okay. And you -- 11:24:54

A. Or reviewed their testimony about anything. 11:24:55

Q. Okay. Have you reviewed any testimony from microchip's damages expert in the litigation? 11:24:57 11:25:02

A. No. I haven't reviewed any damages testimony related to Microchip, no. 11:25:05 11:25:10

Q. Okay. And so you weren't aware that Microchip alleged that they had lost almost 45 million units of sales due to Aptiv's product design? 11:25:11 11:25:16 11:25:20

MR. JENSEN: Object to form. 11:25:23

THE DEPONENT: I wasn't aware of that, no. 11:25:24

BY MR. BRAUSA: 11:25:24

Q. Okay. And so you don't have any opinion and you don't have any information about why Aptiv was able to capture that share of the market? 11:25:25 11:25:27 11:25:32

A. I have -- 11:25:34

MR. JENSEN: Object to form. 11:25:34

THE DEPONENT: I have no opinion about that. 11:25:34

BY MR. BRAUSA: 11:25:34

Q. Okay. In preparing for your deposition today, did you review any of your prior declarations from different cases? 11:25:36 11:25:49 11:25:53

A. Full disclosure. During the months of August and September, I did have another expert case that I worked on, and I provided declarations for two -- two IPRs in another case that has nothing to do with the subject matter here and nothing to do with any of the parties here. 11:25:54 11:26:06 11:26:09 11:26:18 11:26:22 11:26:24

Q. Okay. 11:26:26

A. But not otherwise. 11:26:26

Q. So -- so you reviewed those for that work? 11:26:27

A. Yeah, for -- 11:26:29

Q. You didn't review those in preparation for your work here today? 11:26:30 11:26:33

A. Not for this, no. 11:26:34

Q. Fair point. 11:26:35

You were an expert for a patent owner known by the name of Martin Coaster? 11:26:36 11:26:39

A. Mm-hmm. 11:26:40

Q. And that was in an IPR against Western Digital Corporation and SanDisk, correct? 11:26:40 11:26:43

A. That's correct. 11:26:46

Q. Okay. And you provided an expert declaration in that case on behalf of the patent owner? 11:26:46 11:26:49

A. That's correct. 11:26:52

Q. Okay. 11:26:53

A. Yes. 11:26:54

Q. Okay. And do you know what ultimately happened in that proceeding? 11:26:55 11:26:57

A. I think, to the best of my memory, when I went back, you know, a year later or something, and looked at the -- at the PTAB database and briefly skimmed the -- the final decision, it appeared that Coaster had lost some of his claims and -- and retained some as well. 11:26:58 11:27:08 11:27:11 11:27:18 11:27:25

Q. Okay. Were you deposed in that case? 11:27:30

A. Yes. 11:27:32

MR. BRAUSA: I'm going to mark as an Exhibit 2020, the declaration of Eric Welch, Exhibit 2050, from the IPR 2020-01391. 11:27:35 11:27:38 11:27:45

(Exhibit No. 2020 marked for identification.) 11:27:50

MR. BRAUSA: So this is marked as Exhibit 2020. 11:27:51

1	And please take a moment to review that. I can direct	11:28:19
2	you to the last page. It's dated May 24th, 2021, and I	11:28:21
3	believe that's your DocuSign signature.	11:28:25
4	THE DEPONENT: I -- I can see my DocuSign	11:28:40
5	signature on here from May 24th, 2021.	11:28:42
6	BY MR. BRAUSA:	11:28:42
7	Q. Okay. And does this look to be a copy of the	11:28:47
8	expert declaration you submitted on behalf of patent	11:28:49
9	owner Martin Coaster?	11:28:52
10	A. On the face of it, yes. It would take me a	11:28:56
11	while to really validate it.	11:28:59
12	Q. Okay.	11:29:01
13	A. There's a lot of moving parts here.	11:29:01
14	Q. If I can direct your attention to paragraph 11.	11:29:03
15	It's in the legal standards section under Obviousness.	11:29:18
16	A. Mm-hmm.	11:29:29
17	Q. And this states forth your understanding that	11:29:32
18	prior art in combination of prior art references may not	11:29:41
19	be based on hindsight, reconstruction, or ex-post	11:29:46
20	reasoning, right?	11:29:49
21	A. Give me a second here.	11:29:51
22	Q. Okay. I've read that paragraph. Ask your	11:30:07
23	question.	11:30:10
24	A. Okay.	11:30:10
25	Q. And you understand that at least in the context	11:30:11

of this proceeding, your prior art references should not be combined based on hindsight, reconstruction, or ex-post reasoning, right? 11:30:15 11:30:20 11:30:24

A. You said the key phrase there, "this proceeding." You know, so for each of these things, I'm given the appropriate legal standard. I'm not a lawyer. If you were to ask me the differences between this one and the one that I provided here, you know, I don't -- I would have to -- I would have to analyze that. It's certainly the case that for each of these things I'm given various legal standards, including things like this, and I perform my analysis based on that -- based on that standard or, you know, that -- that information that's provided. If you were going to ask me did I apply the language here to this, no, I didn't, because that isn't how it works. 11:30:26 11:30:27 11:30:31 11:30:35 11:30:38 11:30:43 11:30:45 11:30:47 11:30:50 11:31:01 11:31:04 11:31:10 11:31:13

Q. Okay. 11:31:15

A. I -- I am given the appropriate -- maybe the law has changed or, you know, maybe the lawyers have a different view of it. Okay? That's their job. My job is to take the -- the legal standards as provided and apply them to the best of my understanding. 11:31:16 11:31:19 11:31:21 11:31:24 11:31:30

Q. Understood. If we can go to the background section of this declaration. It starts on page 8 at paragraph 17 and 18. Again, this is Exhibit 2020. 11:31:33 11:31:36 11:31:39

These two paragraphs provide a very brief background on the USB standard, agree? 11:31:51 11:31:55

A. Give me a sec. 11:32:00

Q. Sure. 11:32:01

A. Okay. I've read those. Ask your question. 11:32:42

Q. Sure. In paragraph 18, you say that the standard therefore sets forth requirements as needed. 11:32:44 11:32:49

A. Mm-hmm. 11:32:52

Q. You are reviewing -- referring to the USB standard there, right? 11:32:53 11:32:55

A. Yes, that's what that says this is about. 11:32:56

Q. Okay. And it says that the USB standard sets forth requirements as needed, but leaves as much to -- let me start over. 11:33:02 11:33:10 11:33:13

The sentence says: 11:33:15

"The USB standard, therefore, sets forth requirements as needed, but leaves as much as possible to suppliers, which could include promoter companies as well as their competitors, to decide on the actual implementation through innovation." 11:33:16 11:33:19 11:33:21 11:33:24 11:33:27

A. Mm-hmm. 11:33:30

Q. Is that a -- still your view of the USB standards sitting here today? 11:33:31 11:33:34

A. It is. 11:33:35

Q. Okay. The next sentence says: 11:33:35

"The form and content of the USB standards, the practices of the USB IF organization" and the market self itself -- "or the marketplace itself promotes innovation in the UBS product space, including connectors, cables, and devices, both class and vendor specific." 11:33:45 11:33:48 11:33:52 11:33:55 11:33:58 11:34:03

Do you see that? 11:34:03

A. Mm-hmm. 11:34:04

Q. Is that an accurate characterization of your opinion today? 11:34:05 11:34:09

A. I have a slightly complicated answer. 11:34:22

In general, yes. But when I do these declarations, a background section is appropriate. What do I say? Well, I know a lot about USB. I could write a thousand pages. I could write 10,000 pages. And that's inappropriate. I pick the parts of the background that seem most relevant, A, to the sort of matter at hand, but B, also to the nature and structure of the balance of the declaration. 11:34:24 11:34:30 11:34:34 11:34:37 11:34:40 11:34:43 11:34:47 11:34:50

So the answer to your question generally is yes. But you have to take it in context with -- with what this section is about and -- and its purpose in the entire document. I'm not saying I have a different opinion about this stuff now, but, you know, I choose -- if you were to ask me, you know, well, in this one you 11:35:02 11:35:03 11:35:07 11:35:09 11:35:12 11:35:15

said X, but in this one you said Y, well, again, it's because, you know, I could say thousands of things and frequently do, but I just -- I have to reduce it down to what seems appropriate to the patents and to the -- the matter at hand. So for example, at the end of the last sentence here, I go to some lengths to say the -- the standard does not specify how to construct the USB 2 and 3 contacts within a plug. Well why did I do that? Well, it's because that's what this case was about. It was all about the -- those contacts and a plug. That's a major portion, if not the primary portion, of the invention in question here. And so it -- it seemed appropriate to me to point out at this level, okay, everybody should understand that this -- that the specification, it does say a lot of things about these signals, but this is something it doesn't say. You know, that's -- that was just my judgment at the time, that it was appropriate to put that in. I didn't put that in here because it didn't seem appropriate. 11:35:17 11:35:21 11:35:23 11:35:27 11:35:31 11:35:35 11:35:39 11:35:46 11:35:48 11:35:50 11:35:54 11:35:57 11:36:01 11:36:05 11:36:08 11:36:10 11:36:15 11:36:17 11:36:19

Q. Okay. 11:36:21

A. Anyway, that's... 11:36:22

Q. But you would agree with me that on subject matter in which the standards are silent, the USB standards are silent, those are areas where the USB standard-setting organization has left it for industry 11:36:23 11:36:25 11:36:28 11:36:30

to innovate, as you've said here? 11:36:33

A. That's true generally. One always has to 11:36:36

remember that that innovation is meant -- is meant to 11:36:45

fit in with the USB standard. It's not -- you know, 11:36:48

there may be a zillion thou shalt not do X, Y, and Z 11:36:51

kind of things that you could say and they don't, even 11:36:56

though those are implied by the specification. If you 11:36:59

were to scour the spec and you didn't find some 11:37:02

particular thing that's prohibited, a POSITA might 11:37:05

nevertheless understand, no, you can't actually do that 11:37:07

for these reasons here in the standard. 11:37:10

These standards are very complicated and 11:37:12

sophisticated, and they're of unusually high quality, in 11:37:15

my opinion. They tell you a lot about what it is and 11:37:17

how it works and how it's supposed to work and how 11:37:20

interoperation is governed, all these different things, 11:37:23

but they're not perfect. So a blanket statement that 11:37:26

anything left out is open to innovation has to be 11:37:31

tempered with the understanding that, okay, the USB 11:37:36

world has these rules and you have to follow those rules 11:37:39

in order to play nice. 11:37:42

Q. If we go to paragraph 36 on page 17 of 11:37:44

Exhibit 2020, this is an under -- under a heading titled 11:37:50

"A POSITA Would Not Have Been Motivated To Combine Hay 11:37:54

With Chang." 11:37:58

Do you see that? 11:37:58

A. I'm sorry. What paragraph? 11:38:05

Q. Paragraph 36 on page 17. 11:38:06

A. Oh, I was looking, of course, at page 36. I see that. 11:38:08 11:38:43

Q. Okay. And so your -- obviously, it's a different patent, different parties. But in this case, you were arguing against a motivation to combine in saying, I disagree that a POSITA would have combined these two references, the Hay and the Chang reference, in this proceeding, correct? 11:38:43 11:38:46 11:38:51 11:38:53 11:38:55 11:38:58

A. I do see that, for reasons that are developed elsewhere in this document and which have everything to do with the details of this. Again, this statement shouldn't be taken out of context. 11:38:59 11:39:05 11:39:08 11:39:12

Q. Sure. Under -- understood. And I wanted to direct you to just a -- one statement in paragraph 36 where you say: 11:39:13 11:39:15 11:39:20

"A POSITA would not have been motivated to combine Hay with Chang for the simple fact that Chang's teachings are contrary to a primary goal of Mr. Coaster's claimed invention." 11:39:21 11:39:23 11:39:26 11:39:29

And then it goes on explaining what that goal is, correct? 11:39:31 11:39:34

A. I can see the sentence, yeah. 11:39:34

Q. Okay. And so you would agree with me -- I understand that the specifics matter, but in general, one reason that there might not be a motivation to combine two references is if one of the reference's teachings are contrary to a primary goal of the invention, right? 11:39:49 11:39:51 11:39:54 11:39:58 11:40:03 11:40:06

A. I don't know that I would generalize this in that way. I can't -- I can't say that it's impossible, but I can't rule out that -- that this -- the statements in here are intentionally oversimplified, because of other matter here. In other words, for me to agree with you might be taking this sentence out of context. In general, there might be reasons that you -- one could argue that a POSITA would not have been motivated to combine something with something else, but -- but this sentence about the claimed goals, that's -- that's highly dependent upon the context that this -- of this matter, and I -- I'm not going to generalize on that. 11:40:07 11:40:16 11:40:20 11:40:24 11:40:30 11:40:35 11:40:38 11:40:44 11:40:46 11:40:50 11:40:55 11:40:58

Q. Okay. What are some reasons, as you mentioned, that a POSITA would not have been motivated to combine references, at a high level? 11:41:00 11:41:03 11:41:06

A. I'm not going to speculate about that. I mean, there's just -- I wasn't -- I wasn't asked to consider the universe of non-combination, so I -- I can't really answer that. 11:41:08 11:41:10 11:41:14 11:41:18

Q. Okay. Well, as it says here, at least one 11:41:19
possible reason you wouldn't combine two references is 11:41:22
if the reference's goals are contrary to the stated goal 11:41:25
of the invention, right? 11:41:28
A. Sort of. My point about this document and that 11:41:29
sentence is, yes, as developed in the previous 35 11:41:37
paragraphs, there are a bunch of issues here that are 11:41:40
summarized by talking about the -- this in a -- in a 11:41:43
shorthand form, the primary goal of Coaster's claimed 11:41:47
invention, but I wouldn't -- pulling this sentence out 11:41:54
by itself, I wouldn't say, okay, therefore, if you look 11:41:57
at some other art someplace and some other patents 11:42:00
someplace and you -- you find something that you think 11:42:04
is the primary goal, that this logic would apply. 11:42:07
This -- this statement is developed as part of the whole 11:42:10
analysis. 11:42:13
So I would agree with you only to the extent of 11:42:14
once you have the complete picture, once you have all of 11:42:21
the issues surrounding this issue, what the primary 11:42:23
goals are or aren't, and, you know, any number of other 11:42:26
things. And I -- it's been, you know, five years since 11:42:30
I wrote this, or four years or something, and I don't -- 11:42:33
although pictures are nice, I don't really remember 11:42:37
all -- what all the issues were. 11:42:39
Q. Sure. So it's your testimony, if I understand 11:42:41

it, that there are potentially instances where the prior art can be contrary to the primary goal of the invention, but nonetheless, you'd believe there's a motivation to combine? 11:42:43 11:42:47 11:42:50 11:42:53

A. I don't know that I would say it quite that way. Let -- let's leave it that I -- I agree in a given circumstance there may be good reasons why a POSITA would not have been motivated to combine teachings. I'm not -- I'm not willing to generalize on this point of primary goals. I think that's too context dependent. 11:43:00 11:43:01 11:43:05 11:43:09 11:43:13 11:43:16

Q. Okay. Why don't we go to paragraph 40 on page 19 of Exhibit 2020. And, again, this is under a section in which you're opining that a POSITA would not have been motivated to further combine certain references. 11:43:23 11:43:27 11:43:40 11:43:44 11:43:46

A. Mm-hmm. 11:43:47

Q. And this adds a reference called Hiller to Hay and Chang, right? 11:43:47 11:43:50

A. Mm-hmm. I see that phrase, yeah. 11:43:51

Q. Okay. And in the second sentence, you say: 11:43:57

"Hiller nowhere indicates that its memory-related teachings may be incorporated into a USB flash drive." 11:44:01 11:44:04 11:44:06

Right? 11:44:07

A. That's what's written here. 11:44:08

Q. Okay. And then you go on to say: 11:44:08

"There's no reason that a POSITA would have consulted a reference that did not concern USB flash drives when considering how to construct a USB flash drive." 11:44:11 11:44:13 11:44:16 11:44:19

Correct? 11:44:20

A. Yep. 11:44:20

Q. Okay. And so if a piece of prior art doesn't relate to the specific subject matter of an invention, that's a reason that you wouldn't combine it with other prior art? 11:44:22 11:44:27 11:44:30 11:44:34

MR. JENSEN: Object to -- 11:44:35

BY MR. BRAUSA: 11:44:35

Q. That's what you're saying here, right? 11:44:36

A. Well -- 11:44:37

MR. JENSEN: Object -- let me get my objection in. 11:44:38 11:44:40

THE DEPONENT: I figured. 11:44:40

MR. JENSEN: Object to form, and I'll object to this as beyond the scope. This is a separate declaration. He's got five declarations in this actual case that you're welcome to ask him questions about, but I think this is beyond the scope of what we're -- we're here to do and discuss. And it seems like a tremendous waste of time. You've asked him more about this 11:44:41 11:44:43 11:44:45 11:44:48 11:44:52 11:44:54 11:44:58

declaration, I think, almost than the ones that he wrote for this proceeding. So I'll just make that as a standing objection to this line of questions. 11:45:03 11:45:05 11:45:08

MR. BRAUSA: That's fine. 11:45:10

THE DEPONENT: Well, okay. I will just summarize by saying I'm -- I'm not going to generalize, I'm not going to speculate. I don't remember enough about this thing here to know exactly why this was written and what it's meaning is in the context of the entire document. So, you know, there was an internal sort of logic to this which I stand by, because I signed it, but I can't and won't generalize this to anything else because that's inappropriate. 11:45:11 11:45:19 11:45:21 11:45:25 11:45:28 11:45:31 11:45:36 11:45:40 11:45:43

BY MR. BRAUSA: 11:45:43

Q. Okay. When you were preparing your declarations in this case, did you have any understanding as to whether it was appropriate to combine references that didn't mention the specific subject matter of the claims? 11:45:45 11:45:47 11:45:53 11:45:59 11:46:03

MR. JENSEN: Object to form. 11:46:04

THE DEPONENT: This matter, we have the overwhelming background context of USB, and a POSITA has knowledge of that, which I have detailed in my declaration. And as a sort of shorthand way of talking about that, I have mentioned this concept of toolbox. 11:46:09 11:46:20 11:46:24 11:46:28 11:46:33

The USB toolbox is very broad, and there are a lot of -- there are a lot of ways in which you could innovate. I'd say as I've defined a POSITA with his tool or her toolbox, that the prior art references here are perfectly appropriate. And, in fact, I looked at dozens of other ones that were about USB things, you know, sort of related to this or whatever. It's just that in the end, I thought that these were the best. These are about USB and they do have to do with the matter at hand. They have to do with plugging in a host device in -- into a place where in the previous, you know, use of USB, you would have only plugged a device. Now, it turns out that the bridge that makes that possible is -- was a well-known thing. I used it myself in the -- in the timeframe of 2003 or '4 in a project that I detailed somewhere in here. 11:46:35 11:46:44 11:46:47 11:46:54 11:46:58 11:47:04 11:47:07 11:47:13 11:47:15 11:47:21 11:47:25 11:47:30 11:47:35 11:47:38 11:47:42 11:47:48

So in this case, I think that the context is entirely appropriate for these prior art references to be considered and, as I say, we considered a lot of others too, for the simple reason that they have to do with USB. 11:47:48 11:47:53 11:47:56 11:47:59 11:48:01

BY MR. BRAUSA: 11:48:01

Q. Okay. So in your analysis here, any reference touching on USB would be potentially relevant to your analysis? 11:48:03 11:48:07 11:48:11

A. They are only relevant -- okay. A USB reference, of which there are hundreds of thousands probably, they only approach relevance if they start to get into this area of dual-role ports or devices and -- and hosts being able to be plugged into the same place, and various other variations on that. That would be -- that would be the kind of context that I would look for. 11:48:13 11:48:22 11:48:25 11:48:29 11:48:35 11:48:37 11:48:41

Q. Okay. So just to go back to Chang, Exhibit 1014, I think we talked about the fact already, it doesn't describe any dual-role ports, right? 11:48:44 11:48:51 11:48:54

A. Not to the best of my memory, no. 11:48:57

Q. It doesn't describe any switching mechanisms or switch components? 11:49:03 11:49:06

A. I think that's right. 11:49:06

Q. And it doesn't mention any automotive applications for USB, right? 11:49:07 11:49:09

A. That's -- well, I don't remember. But I don't -- not as far as I remember, no. 11:49:11 11:49:17

Q. Okay. If we turn to Chang 2, Exhibit 1015, it doesn't mention USB in automotive applications either, does it? 11:49:18 11:49:23 11:49:29

A. No. That's right. 11:49:29

Q. And it has -- I think we talked about just one downstream dual-role port, not multiple downstream dual-role ports, correct? 11:49:30 11:49:34 11:49:37

A. Mm-hmm. Mm-hmm. 11:49:39

Q. And it has a switch, but it's more like a MUX, not a cross/bar switch, right? 11:49:39 11:49:41

A. Mm-hmm. 11:49:43

Q. Because there's only one port? 11:49:44

A. There is only one port. 11:49:45

Q. Chutorash, Exhibit 1029 that we've been talking about, it doesn't have any dual-role ports, right? 11:49:46 11:49:51

A. I don't remember. 11:49:56

Q. Okay. Maybe we'll look at that. 11:49:57

Do you remember whether Chutorash described any bridge or head-to-head -- or I'm sorry, host-to-host communication? 11:49:58 11:50:01 11:50:04

A. I don't remember that, either. My primary memory and the way in which Chutorash is used primarily is to talk about the general context of USB being used in cars, and the POSITA's view of that is that the underlying technology for USB is low voltage and has a very high degree of safety and, you know, positive end user experience. In some ways, it's an ideal application to move into an automobile. The PC on Wheels article is just one example of that. I think in the POSITA view, using -- using USB in an -- in an automobile makes a lot of sense. 11:50:04 11:50:08 11:50:11 11:50:15 11:50:24 11:50:32 11:50:37 11:50:39 11:50:46 11:50:48 11:50:53

I'm not sure where I was going with that. Never 11:51:01

mind. Ask your next question. 11:51:03

Q. Okay. So you don't remember whether Chutorash, 11:51:05

Exhibit 1029, discloses any dual-role ports? 11:51:08

A. I don't remember, no. 11:51:11

Q. And do you know whether it describes any 11:51:12

host-to-host communication? 11:51:16

A. I don't remember that, either. 11:51:16

Q. If I say the phrase a "persistent downstream" or 11:51:17

a "persistent downstream device port," do you know what 11:51:22

that means? 11:51:25

MR. JENSEN: Object to form. 11:51:26

THE DEPONENT: I have several ideas about that. 11:51:27

If you want to talk about that phrase in detail, I would 11:51:34

ask you -- I would ask you to mention a patent and a 11:51:36

claim -- 11:51:38

MR. BRAUSA: Okay. 11:51:38

THE DEPONENT: -- where it shows up. 11:51:40

BY MR. BRAUSA: 11:51:40

Q. How about claim 2 of the '420 patent? 11:51:41

A. Fine. Let's look at that. 11:51:43

Q. And I can give you a copy of the patent if that 11:51:45

would be helpful. 11:51:47

A. Well, I'll start with my documents. 11:51:48

Okay. Claim 2. Okay. It's going to be in this 11:51:55

one. 11:51:58

It's my hand. Okay. Claim 2. 11:51:58

THE REPORTER: What's the exhibit we're referencing? 11:52:02 11:52:03

MR. BRAUSA: So the exhibit we're referencing is 1013 from the '228 proceeding. 11:52:04 11:52:06

BY MR. BRAUSA: 11:52:06

Q. And if you want, I can direct you. The text of the claim appears at page 141, paragraph 249 of Exhibit 1030 -- 1013, excuse me. 11:52:34 11:52:36 11:52:40

A. Mm-hmm. Okay. Yeah, I remember this one. My analysis of this one is lengthy, and I think necessarily so. 11:52:43 11:53:08 11:53:11

Okay. So I have the -- I have the general area. Now, let me know what your question is, and then I'll review the analysis on that point. 11:53:13 11:53:17 11:53:22

Q. Okay. My question was just, do you know what I'm referring to elsewhere -- actually, you know what, maybe I can provide a little better context and then we'll come back to your analysis of claim 2. Let's go to paragraph three -- let me give you the right cite -- 307 in the same document. 11:53:24 11:53:29 11:53:33 11:53:35 11:53:38 11:53:49

A. Okay. 11:53:52

Q. And it's in a subheading called "Commercial Success." And my question is just about this phrase that appears in the middle of this paragraph, 11:53:53 11:53:57 11:54:36

"Persistent USB." 11:54:38

Do you see that? 11:54:38

A. I see it, yeah. 11:54:44

Q. Okay. Sitting here today, do you -- do you have an understanding of what persistent USB means in the context of the claims you analyzed? 11:54:44 11:54:47 11:54:50

MR. JENSEN: Object to form. 11:54:53

THE DEPONENT: Hang on. Let me read the analysis here. 11:54:54 11:54:58

Okay. Yes, I see -- no. I'm sorry. Your question was, do I have an idea about what it means? 11:55:31 11:55:34

MR. BRAUSA: Yes. 11:55:38

THE DEPONENT: Okay. In the context referred to here, my best sense -- no. Let me preface that a different way. 11:55:38 11:55:41 11:55:49

This analysis suggests that a couple of the claims actually require the concept of persistent USB. To be -- to be completely thorough, we probably ought to look at those claims. But generally speaking, I -- I understand -- all right. Sorry for interrupting myself. 11:55:50 11:55:56 11:56:03 11:56:05 11:56:13

Now, I don't remember offhand if this is a term of art or if it appears in the spec, but my understanding about this generally, and what I mean by that is, I start with this idea, but if a given claim uses the term differently, then I have to use that 11:56:15 11:56:17 11:56:19 11:56:23 11:56:26

differentness in that claim to do the analysis in that claim. 11:56:29 11:56:32

But let me just say generally, as a bias or pre-standing notion, I think what this is talking about is the -- the idea that in a host and a series of things plugged into it, devices, although in the context here some of those things might be dual role or -- or those things might actually be USB hosts, the idea of persistence is that everything is running. If you unplug one of those things, obviously it stops working, but the system as a whole is persistent if everything else keeps working. 11:56:33 11:56:38 11:56:40 11:56:46 11:56:51 11:56:54 11:56:58 11:57:00 11:57:04 11:57:07

Similarly, everything is working. There's a free port. You plug something in there, and then the system recognizes it and does something with it, according to what it is, that doesn't disrupt everything else. That's my general understanding, to be modified by a specific claim if necessary. 11:57:08 11:57:10 11:57:13 11:57:18 11:57:21 11:57:26

BY MR. BRAUSA: 11:57:26

Q. Okay. And if we turn back to paragraph 249 in claim 2. 11:57:29 11:57:36

A. Paragraph 249. Yes. Right. 11:57:41

Q. It requires a switch configured to simultaneously connect two downstream ports to the upstream port, right? 11:57:48 11:57:53 11:57:55

A. Okay. Let's walk through it carefully. I don't want to oversimplify any of this. 11:57:57 11:58:09

"Second USB port to the first port, thereby providing bidirectional initiation of communication." 11:58:11 11:58:13

Okay. That language is used here to talk about the connection of two hosts through some appropriate mechanism. It's the bridge in this context. So by directional initiation of communication between the USB host and the consumer device when that device is a host. 11:58:16 11:58:21 11:58:25 11:58:35 11:58:38

Okay. So that's one part. And then simultaneously to connect another port through the hub, thereby only responding to communication initiated by the host. Again, that phrase is the convention used frequently here to talk about and to characterize communication between a host and a device. And my section on background talks about the convention of that term and discusses other views of this. But anyway, you know, a POSITA reading this would understand that phrase in context and that this second thing is about connecting a device simultaneously to a host. 11:58:41 11:58:43 11:58:54 11:58:57 11:59:02 11:59:06 11:59:09 11:59:15 11:59:20 11:59:22 11:59:27

Q. Okay. 11:59:31

A. That's what I read claim 2 as. 11:59:32

Q. Okay. So in generally speaking, claim 2 is referring to a scenario where you have one upstream host, one downstream host, and a simultaneous connection 11:59:34 11:59:41 11:59:44

with a downstream device, right? 11:59:46

A. That's recognize. 11:59:48

Q. Okay. And as you say in 250, the claim requires a downstream host and a downstream device that simultaneously communicate with the upstream host, correct? 11:59:48 11:59:52 11:59:55 11:59:55

A. That's correct. 12:00:00

Q. Okay. And so the scenario where you have a downstream device already plugged in and you plug in a downstream host, the USB communications would continue, right? 12:00:00 12:00:04 12:00:08 12:00:08

A. Mm-hmm. 12:00:15

Q. You have simultaneous communication? 12:00:15

A. That's what the claim says. 12:00:16

Q. Okay. And similarly, if you plug in a USB host and then unplug a device and you have other ports, it doesn't cut the communication from the other ports, right? 12:00:18 12:00:20 12:00:23 12:00:25

A. Mm-hmm. 12:00:26

Q. Okay. That's what the simultaneous communication in claim 2 is referring to, right? 12:00:26 12:00:29

MR. JENSEN: Object to form. 12:00:31

THE DEPONENT: Okay. You might be adding the persistence comment here, even though it isn't actually in the claim language. All -- all the claim language 12:00:38 12:00:44 12:00:48

says is that you can plug these two things in simultaneously, and that the communication works. It doesn't go on to say what happens if you unplug one of them. 12:00:50 12:00:53 12:00:56 12:00:59

BY MR. BRAUSA: 12:00:59

Q. Okay. But you would agree with me, as you wrote and opined in paragraph 250, that the claim 2 does require a downstream host and a downstream device that simultan -- simultaneously communicate with the upstream host, right? 12:00:59 12:01:01 12:01:05 12:01:10 12:01:12

A. It does say that. That is my opinion, yes. 12:01:12

Q. Okay. And that's your opinion sitting here today? 12:01:14 12:01:17

A. Yes. 12:01:17

MR. BRAUSA: Okay. Maybe we can take care of a little bookkeeping before the next break. 12:01:17 12:01:22

I'm going to mark as Exhibit 2021 an errata sheet that was handed to me this morning by your counsel. 12:01:24 12:01:30 12:01:32

(Exhibit No. 2021 marked for identification.) 12:01:34

BY MR. BRAUSA: 12:01:34

Q. And do you recognize this document, Mr. Welch? 12:01:52

A. I do. It has my signature. 12:01:54

Q. Right. And a signature of today's date, October 10th? 12:01:56 12:01:58

A. Today's date, yep, that's right. 12:01:59

Q. Okay. Who prepared this document? 12:02:01

A. I did. 12:02:02

Q. Okay. When did you prepare it? 12:02:03

A. I have been taking notes over the last couple of days of my own personal review and review with the lawyers, and when I talked about this, we agreed it would be a good idea to get this in writing. And so based on my notes, the lawyers had somebody write this up, and I read it, made sure it was right, and signed it this morning. 12:02:06 12:02:08 12:02:11 12:02:14 12:02:17 12:02:21 12:02:25

Q. Okay. Sounds good. And just so I understand the contents of this, this has three columns in it, the first column is the location. This refers to paragraphs in your reports or report? 12:02:25 12:02:27 12:02:31 12:02:33

A. Mm-hmm. 12:02:35

Q. And if there's no parenthetical, for instance, after paragraph 39, the first row -- 12:02:35 12:02:39

A. Mm-hmm. 12:02:42

Q. -- that means it's paragraph 39 of all five of your declarations, all of which are designated as Exhibit 10 -- 12:02:42 12:02:45 12:02:49

A. Yes. 12:02:49

Q. -- 13 in the respective proceedings? 12:02:49

A. I'm sorry about that. Yes, that's right. 12:02:52

Q. And then for the rows that follow, there's a parenthetical that refers to paragraphs, and those identify specific proceedings, so those are specific to those reports in those proceedings, right? 12:02:55 12:02:57 12:02:59 12:03:02

A. Mm-hmm. Mm-hmm. That's right. 12:03:04

Q. I want to talk to you -- and you said that -- let me back up. 12:03:05 12:03:09

You said that as you were taking notes you -- you came across these corrections that needed to be made? 12:03:10 12:03:15 12:03:17

A. Mm-hmm. 12:03:18

Q. When were you taking these notes? 12:03:18

A. Over the last couple of days, including preparation I did by myself and -- okay. I shouldn't say anything about what I did while talking because that's privileged. But let me just say generally, in the last couple of days' worth of my own review. Let's put it that way. 12:03:20 12:03:29 12:03:34 12:03:37 12:03:40 12:03:43

Q. Okay. Do you still have these notes in your possession? 12:03:45 12:03:47

A. Some of them were mental. Okay. The notes that I took were all, frankly, during conversations with counsel. I think they're, therefore, privileged. 12:03:48 12:04:01 12:04:04

Q. Okay. 12:04:07

A. Yeah, so I have them, but you can't have them. 12:04:08

Q. We may have a debate about that. But do you still have them -- 12:04:10 12:04:13

A. Yeah. 12:04:13

Q. -- is the initial question? 12:04:14

A. I do. 12:04:14

Q. Okay. Where are they? 12:04:15

A. There are some in a notebook in my pocket and there are some in a file on my computer, which is sort of general notes for this case. 12:04:17 12:04:19 12:04:25

Q. Okay. We may be coming back to that. But focusing on this document, one correction that you made, and I guess after you specified the location of the correction in column 1, you identify what the as-served or as-filed text was that's labeled current text, correct? 12:04:26 12:04:31 12:04:36 12:04:41 12:04:46 12:04:50

A. That's right. 12:04:50

Q. And then you identify a change. That's what you want to correct it to, right? 12:04:51 12:04:53

A. Right. 12:04:55

Q. Okay. So in paragraph 39 of all five of your reports, you stated your understand -- that, quote, I understand that lack of written description must be proven by clear and convincing evidence." 12:04:56 12:04:59 12:05:04 12:05:07

Do you see that? 12:05:08

A. Mm-hmm. Mm-hmm. 12:05:09

Q. And then you say that the change you want to make is just delete this paragraph entirely from all five of your reports, and you state that the correct legal standard is stated in paragraph 17? 12:05:09 12:05:11 12:05:14 12:05:18

A. That's exactly right. 12:05:20

Q. Okay. And your testimony is that you realized that paragraph 39 set forth the wrong legal standard? 12:05:23 12:05:25

A. Let me update that to say that there may or may not have been conversations about this that were privileged. 12:05:29 12:05:33 12:05:34

Q. Okay. Well, did counsel tell you that the legal standards set forth in 39 was not the applicable legal standard for this case? 12:05:35 12:05:40 12:05:42

MR. JENSEN: You can answer that question, Eric. I'll waive the privileges to this. 12:05:44 12:05:45

THE DEPONENT: Okay. All right. The exact thing that happened here was that I was rereading this and I thought, oh, wait, this looks like it's wrong. So I asked him and he said, oh, yeah, you're right, this should be taken out. That was it. 12:05:48 12:05:50 12:05:52 12:05:55 12:05:58

BY MR. BRAUSA: 12:05:58

Q. Who wrote paragraph 39 in all five of your reports? 12:06:00 12:06:03

A. This is part of the provided legal standards. So all of that stuff was provided by counsel. 12:06:03 12:06:05

Q. Okay. So your attorneys provided you with paragraph 39, which you identified as the wrong legal standard? 12:06:08 12:06:11 12:06:14

A. Well, it just -- coming across it, it didn't -- it seemed like it conflicted with something else and so I asked about it. I mean, you know, it doesn't hurt to ask, right? 12:06:15 12:06:19 12:06:22 12:06:24

Q. Okay. Do you know if there's a scenario where a written description must be proven by clear and convincing evidence? 12:06:25 12:06:27 12:06:30

A. I'm not a lawyer. So no, I can't answer that. 12:06:31

Q. You don't know? 12:06:33

A. No, I really don't know. I -- I understand about the -- okay. The -- the legal standards written in and included in my document guided what I did in the analysis. If you ask me to go back the other direction and say, where did you use this exact standard, I couldn't do that off the top of my head. I certainly used the standards in the way that I understand they're meant to be used, but since I'm not an expert in them, you know, as -- as a -- as a technical expert, you know, I can read stuff in here and I read a few words and I say, okay, I know exactly what that is, I know why that's there, I know where it comes from, I know everything. Since I'm not a lawyer, I can't -- I don't 12:06:35 12:06:41 12:06:46 12:06:54 12:07:00 12:07:04 12:07:07 12:07:09 12:07:15 12:07:18 12:07:22 12:07:24 12:07:26

have the same sort of presence of mind about this stuff. 12:07:28
I used it. I think I used it correctly in the sense of 12:07:30
starting from those things and letting that inform sort 12:07:32
of general processes about putting together the 12:07:36
analysis. But taking this apart and saying, well, 12:07:42
that's why it was used or, you know, under what 12:07:45
circumstances would you use something else, I can't 12:07:48
answer that kind of question. 12:07:50
Q. Okay. So I just want to make sure I'm 12:07:51
understanding. 12:07:54
The text about the lack of written description 12:07:55
must be proven by a clear and convincing evidence, you 12:07:58
testified that that -- you used that standard in forming 12:08:02
your opinions? 12:08:05
A. I think I actually used the correct one, which 12:08:05
is the preponderance of evidence, and I didn't notice 12:08:08
that this was here. That's why it seemed like it was 12:08:11
out of place. 12:08:13
Q. Okay. So the incorrect standard, the one that 12:08:14
was in all five of your reports, that was provided to 12:08:18
you by counsel? 12:08:21
A. Mm-hmm. 12:08:21
Q. How did you know which of the two standards, 12:08:22
between paragraph 17 and 39, was correct? Why did you 12:08:26
think 39 was wrong? 12:08:30

MR. JENSEN: Object to form. Asked and answered. 12:08:32 12:08:33

THE DEPONENT: Yeah, I think I've already answered. I don't think I can say anything else beyond what I've already said. 12:08:33 12:08:39 12:08:41

BY MR. BRAUSA: 12:08:41

Q. Okay. But you're the one who brought paragraph 39 to the attorneys' attention. 12:08:42 12:08:45

A. That's correct. 12:08:47

Q. Okay. When was that? 12:08:47

THE DEPONENT: Well, do you wave privilege? 12:08:54

MR. JENSEN: You can say -- yeah, you can answer that question. I'm sorry. Yes. 12:08:55 12:08:57

MR. BRAUSA: Probably not all of it, but -- 12:08:58

MR. JENSEN: As to this question, you can -- 12:09:00

THE DEPONENT: Yeah. 12:09:02

MR. JENSEN: -- if you remember when -- 12:09:02

THE DEPONENT: I think it was -- 12:09:03

MR. JENSEN: -- brought it up. 12:09:03

THE DEPONENT: -- two days ago. 12:09:04

I think this came up in a conversation -- what's today? Thursday. I think it came up Tuesday. 12:09:06 12:09:08

BY MR. BRAUSA: 12:09:08

Q. Okay. And so the legal standard section of your reports, was that all written and provided for you by 12:09:10 12:09:14

counsel? 12:09:19

A. That's correct. 12:09:19

Q. Okay. You didn't have any input into that. You just took that as the standard and did your best to apply it? 12:09:20 12:09:23 12:09:26

A. Not input, but I asked questions about it. I needed to make sure I understood it. 12:09:26 12:09:29

Q. Okay. 12:09:30

A. You know, as I said, in talking about some of these other things, I'm aware that sometimes there are differences or nuances or whatever, and none of that is my job, except to follow it. 12:09:31 12:09:33 12:09:36 12:09:39

Q. Right. But prior to two days ago, at no point between May of 2023 and October of 2024 did you ask, hey, what's the correct standard for legal -- or for written descriptions? 12:09:40 12:09:44 12:09:49 12:09:53

A. I don't remember. There were a number of conversations along the way at points that it seemed appropriate. 12:09:58 12:10:03 12:10:05

Okay. Let me -- let me answer this question a different way. 12:10:08 12:10:10

As I understand it, these -- these different standards, clear and convincing, preponderance, or whatever, those are sort of levels of -- of gradations and I -- i can't pretend to really understand that 12:10:11 12:10:13 12:10:17 12:10:22

stuff. In general, my goal is to -- is to be able to find and state things which would meet the highest legal standard, just because that's the easiest. Now, if in coming across a particular thing, you know, I had some question in review or in drafting about, you know, how would standards apply in this particular case, then we would -- then we would talk about them. 12:10:24 12:10:29 12:10:31 12:10:34 12:10:38 12:10:44 12:10:46

So, frankly, if changing one of these standards from a less restrictive one to a more restrictive one, that didn't change my analysis because, except in very specialized cases, I effectively made my analysis based on -- on the highest possible standard, just because that's what I'm inclined to do. 12:10:50 12:10:53 12:10:58 12:11:01 12:11:06 12:11:09

Q. Okay. Hopefully this will be brief. But in the second row, you refer to a paragraph 268 that's only in a change you want to make in PGR2024-0011, correct? 12:11:12 12:11:14 12:11:20

A. Mm-hmm. 12:11:25

Q. And it looks to me like the change that you are making is, instead of saying in grounds 6 through 8, you're saying in ground 6 through 7. Right? 12:11:25 12:11:28 12:11:33

A. Mm-hmm. 12:11:36

Q. There is no ground 8 in PGR2024-11, right? 12:11:36

A. Yeah, yeah, right. 12:11:41

Q. And then you cross out the reference to the limitation being not enabled, right? 12:11:42 12:11:44

A. Right. 12:11:47

Q. Okay. And you don't offer any enablement 12:11:47

opinions in PGR2024-11 either, right? 12:11:52

A. Right. 12:11:57

Q. Do you have any idea how that error made its way 12:11:57

into your report that you signed in -- and filed in 12:12:00

December of 2023? 12:12:04

A. I don't know. I can only guess. I mean -- 12:12:05

MR. JENSEN: I would -- I would instruct you not 12:12:07

to answer -- 12:12:08

THE DEPONENT: Fine. 12:12:09

MR. JENSEN: -- on the basis of privilege. 12:12:09

THE DEPONENT: Okay. Fine. Fine, fine, fine. 12:12:13

I won't guess. 12:12:15

MR. BRAUSA: I'll just be left to wonder. 12:12:16

BY MR. BRAUSA: 12:12:16

Q. Beyond the changes that are set forth in this 12:12:18

table, are there any other errors, changes, 12:12:20

modifications, et cetera, that you want to make to your 12:12:24

opinions and declarations sitting here today? 12:12:27

A. Not at this point, no. 12:12:30

Q. Okay. If there is anything that comes up as the 12:12:30

day goes on, could you please identify that for me? 12:12:33

A. Of course. Absolutely. Yes. 12:12:35

MR. BRAUSA: Okay. I'm going to shift gears, so 12:12:37

I don't know if we want to take a break now. 12:12:43

THE DEPONENT: What time is it? Oh, it's 12:13. 12:12:46

Yeah, we can break for lunch. 12:12:50

MR. JENSEN: How much longer do you think you 12:12:52

have? 12:12:54

MR. BRAUSA: I'm going to go into another topic, 12:12:54

so it will be a longer -- longer exam. 12:12:56

MR. JENSEN: It's up to you. 12:12:59

MR. BRAUSA: Why don't we go off the record 12:13:01

briefly. 12:13:02

THE VIDEOGRAPHER: This marks the end of Media 12:13:04

No. 2 in the deposition of Eric Welch. The time is 12:13:05

12:12 p.m. We are off the record. 12:13:08

(A recess transpires.) 12:13:09

THE VIDEOGRAPHER: This marks the beginning of 12:50:17

Media No. 3 in the deposition of Eric Welch. The time 12:50:22

is 12:50 p.m. We are on the record. 12:50:26

MR. BRAUSA: Welcome back, Mr. Welch. 12:50:33

THE DEPONENT: Thank you. 12:50:35

BY MR. BRAUSA: 12:50:35

Q. At the lunch hour, did you talk with counsel at 12:50:35

all? 12:50:37

A. No. 12:50:37

Q. Okay. Before we broke, you mentioned that you 12:50:37

had a notebook in your pocket of notes? 12:50:41

A. Mm-hmm. 12:50:43

Q. Did you refer to that at any point today after your deposition? 12:50:44 12:50:47

A. No, not at all. 12:50:47

Q. Okay. We had also been talking about the Chang reference, which is Exhibit 1014, and we have also referred to that as Chang 1. 12:50:48 12:50:53 12:50:59

A. Mm-hmm. Yes. 12:51:01

Q. We talked about the fact that it doesn't ex -- it doesn't describe or disclose any dual-role ports on its own, right? 12:51:04 12:51:08 12:51:12

A. That is correct. 12:51:13

Q. Okay. Now, dual-role ports were known at the time Chang was filed, correct? 12:51:13 12:51:19

A. I can't speculate about that. 12:51:20

Q. Okay. Dual-role ports were at least set forth in the first version of OTG, which published in 2001, right? 12:51:33 12:51:37 12:51:40

MR. JENSEN: Object to form. 12:51:48

THE DEPONENT: Yes, that's true. But as has been detailed at length, the kind of dual-role ports that you get from OTG are different from the kind we're talking about here and that you can get with a bridge. So, yeah, OTG might have come out before Chang. I don't remember. 12:51:49 12:51:51 12:51:53 12:51:56 12:51:59 12:52:03

BY MR. BRAUSA: 12:52:03

Q. Okay. How are the types of dual-role ports that you get from OTG different from the kind that we're talking about here? 12:52:03 12:52:05 12:52:10

A. OTG doesn't have a mechanism for a host to talk to a host. 12:52:11 12:52:14

Q. Okay. 12:52:17

A. Instead, OTG has a mechanism for a device to connect and identify what it is, and there are further mechanisms that OTG can use for the -- the sides to negotiate what they want to be; and, therefore, one or the other side can be the host, but necessarily the other side has to be the device. 12:52:18 12:52:22 12:52:27 12:52:29 12:52:35 12:52:37

Q. Okay. 12:52:40

A. That's how OTG works. 12:52:40

Q. Okay. And so OTG, as a result of the negotiation protocol, you might flip which port is asking as the host, but there's never a scenario where they're acting as a host at the same time? 12:52:41 12:52:44 12:52:48 12:52:52

A. That's right, although the details of and then they flip can be somewhat complicated, yes. 12:52:54 12:52:57

Q. Right. Right. And if you had a dual-role OTG port, wanted to be OTG compliant, you'd have to have all this additional OTG circuitry and -- and logic, this complication, as you said? 12:52:59 12:53:02 12:53:07 12:53:13

MR. JENSEN: Object to form. 12:53:14

THE DEPONENT: Well, that -- not to belabor it, 12:53:15
but that's a little complicated too. More than most USB 12:53:17
specs, the OTG spec devolved into a -- into additional 12:53:22
items in the toolbox. It is not uncommon for people to 12:53:28
take different parts of the OTG spec and use them for 12:53:33
different purposes. They're not necessarily 12:53:36
incompatible, but, for example, the OTG spec says an OTG 12:53:39
device has exactly one port on it, it's a micro AB 12:53:43
connector. There are no other cases. That's the 1.2, I 12:53:48
believe. Anyway, the fact is the OTG mechanisms are 12:53:53
used in a lot of other places that aren't exactly that 12:53:57
and people feel free to pick and choose different OTG 12:54:01
things to put them together in different ways. It's 12:54:04
just -- it's the way the thing has ended up being used. 12:54:07
So saying what is exactly -- what exactly is OTG 12:54:11
compliant or not, that's in the -- in the art, that's a 12:54:15
little complicated. 12:54:17

BY MR. BRAUSA: 12:54:18

Q. Okay. So when we're talking about the dual-role 12:54:19
ports that you refer to in -- or I'm sorry, dual-role 12:54:23
ports that you refer to in your reports, are you 12:54:28
referring to OTG ports or a different type of dual-role 12:54:30
port or both? 12:54:35

A. In some ways, and I will be specific about this, 12:54:38

a dual-role port is something that will accept -- in the general case, will accept the connection of a host, a traditional host, a traditional device, and in some cases another dual-role port. In the details of how all of that works, what I suggested in the report is that there are mechanisms for detecting what something is, and some of those mechanisms are taken from or borrowed from OTG, for example, the ID pin that you see in the mini AB, micro AB, and certain other connectors. In other words, you can use mechanisms from OTG to do something which is not exactly anticipated in OTG, like host to host. 12:54:45 12:54:48 12:54:52 12:54:54 12:54:59 12:55:01 12:55:03 12:55:08 12:55:12 12:55:17 12:55:20 12:55:23

Q. Okay. Let me hand you what's already been marked Exhibit 1014 that we've been talking about for a little bit now. This is the Chang reference. And this particular copy of it comes from PDR2024-11, but as with your declaration, I believe it's Exhibit 1014 across all five proceedings. 12:55:24 12:55:35 12:55:38 12:55:46 12:55:51 12:55:55

A. Okay. So I see this. 12:56:06

Q. So this, on its face, refers to a filing date of August 16th, 2005? 12:56:07 12:56:10

A. Yes. 12:56:12

Q. And do you know whether dual-role ports of the type you were talking about that can allow for host-to-host communication would be known to a POSITA as 12:56:17 12:56:20 12:56:22

of August 16th, 2005? 12:56:25

MR. JENSEN: Object to form. 12:56:27

THE DEPONENT: I have no specific evidence one way or the other. 12:56:29 12:56:34

Wait a minute. Wait a minute. Let me go back. I almost said the wrong thing. 12:56:42 12:56:44

Yes, dual-role -- okay. Host-to-host connections were certainly known because the first USB bridges were around at the time of this patent and, in fact, are used in this patent. 12:56:46 12:56:48 12:56:56 12:56:58

MR. BRAUSA: Sure. 12:57:02

THE DEPONENT: So we certainly had that capability. I don't -- so -- but beyond that, I don't know whether somebody had implemented a dual-role port before this. It wouldn't surprise me, but I don't have any specific evidence. 12:57:03 12:57:04 12:57:12 12:57:14 12:57:16

BY MR. BRAUSA: 12:57:17

Q. Okay. And as part of your analysis in this case, you didn't do any investigation of whether a POSITA would have known about dual-role ports as of the filing date of the Chang reference, August 16th, 2005? 12:57:17 12:57:20 12:57:24 12:57:28

A. No. I used the -- I used the reference dates of the subject patents, the 2013 date. 12:57:31 12:57:35

Q. Okay. Now, the primary figure that you rely on, or one of the primary figures that you rely upon, Chang, 12:57:47 12:57:50

as a starting point for your opinions is set forth in Figure 3, correct? 12:57:54 12:57:57

A. That's correct. 12:57:59

Q. Okay. Now, Figure 3 has three dedicated downstream ports. Those are labeled as 44, right? 12:57:59 12:58:07

A. That's right. 12:58:09

Q. A dedicated -- and those are all device ports? 12:58:10

A. Mm-hmm. 12:58:12

Q. A dedicated host port downstream, which is 50? 12:58:13

A. Mm-hmm. 12:58:16

Q. And then a dedicated host port upstream, which is 42, correct? 12:58:16 12:58:21

A. Mm-hmm. That's right. 12:58:22

Q. And in the Chang disclosure, it identifies the hub as essentially the entire box labeled 40 in Figure 3, correct? 12:58:23 12:58:26 12:58:31

A. I would have to read it to be sure, but I think that's right. 12:58:33 12:58:35

Q. Okay. And within the hub, there is something called a hub control unit, right? 12:58:36 12:58:38

A. I -- that's certainly in this drawing, yeah. 12:58:41

Q. Okay. And that's labeled 46, right? 12:58:43

A. Mm-hmm. 12:58:45

Q. Hub -- or I'm sorry. 12:58:45

Chang never refers to the hub control unit 12:58:47

labeled 46 as a hub in and of itself, does it? 12:58:51

A. I would have to reread it to be sure. Let me 12:58:55

take a look at 46. Hold on a sec. Let me just take a 12:59:09

look at what he says about that. 12:59:12

Okay. When I first read this, I considered that 12:59:29

point, but the fact is that in paragraph 19 he describes 12:59:31

the function of this box 46 between ports 42 and 12:59:36

ports -- port 42 and ports 44 in such a way that a 12:59:44

POSITA would trivially know that's a -- that's the 12:59:51

function of a USB hub. And so, okay, I got that sense 12:59:53

of this, you know, within -- within minutes of reading 13:00:01

this. It seems to me to just leap out of -- as being 13:00:04

clear that that's what this is, even if he doesn't use 13:00:08

those exact words. 13:00:13

Q. Now, this is complicated in the larger sense 13:00:14

because we have the word "hub" and "USB hub" used in 13:00:17

different places, sometimes to mean slightly different 13:00:22

things. Offhand, I would say USB hub more often is 13:00:24

intended to mean and would certainly convey to a POSITA 13:00:31

the function of a USB hub as given by the USB standards, 13:00:36

but not necessarily always. In other words, this is one 13:00:43

of those things which sometimes refers to a functional 13:00:47

entity from the USB spec and other times looks more to a 13:00:52

POSITA like a local construct. And I have tried to 13:00:57

conduct my analysis throughout to be sort of agnostic on 13:01:01

that term. 13:01:07

So, for example, if you look at this figure, 13:01:07

Figure 53, yes, we certainly use this as a starting 13:01:09

point. And I came up with several drawings for which 13:01:12

the attorneys provided a good graphics person to provide 13:01:14

colors and things. 13:01:18

THE REPORTER: You're hitting the mic with your 13:01:21

paper. 13:01:23

THE DEPONENT: Oh, sorry. Sorry. 13:01:23

So Figure 3 of Chang was certainly our starting 13:01:25

point, and what we did with this was a couple of 13:01:27

different things, adding the teaching of Chang 2 and we 13:01:30

add a box or cross/bar and various things you may ask me 13:01:33

questions about. But in some cases, we wanted to 13:01:36

consider the analysis two ways. That is to say, in 13:01:40

relation to the sort of local content of a given claim, 13:01:47

we may wanted to clarify that it's 46 that's the hub, in 13:01:50

other cases we may wanted to have clarified that it's 40 13:01:54

that's the hub, or in other ways we did the analysis 13:01:57

both ways. There's lots of places in my report where I 13:02:01

say, well, if you consider the hub to be the whole 13:02:05

thing, and therefore, you know, you don't modify this in 13:02:07

the modifications that I talked about before, are 13:02:11

displayed outside, that's one case. Or if you consider 13:02:13

46 to be the hub, then you can do those modifications 13:02:16

inside, in line with what's in this drawing. The purpose of all that is -- is to show through those different analysis that the -- the application of Chang plus Chang 2, plus the knowledge of the POSITA, provides obviousness either way you read on this point. So that was a long answer to your question. 13:02:22 13:02:25 13:02:27 13:02:34 13:02:39 13:02:42

BY MR. BRAUSA: 13:02:46

Q. Right. Just to get back to what the question was, Chang never refers to item 46, the hub control unit, as a hub, right? That's your interpretation of what it functionally does, but Chang never actually says hub unit or hub control unit 46 -- 13:02:46 13:02:48 13:02:54 13:02:59 13:03:02

A. It's not just -- 13:03:05

(Simultaneous speakers.) 13:03:10

THE DEPONENT: It's not just my interpretation. It's my opinion that a POSITA would -- would understand what 46 is functionally, both from this drawing and from what I think was paragraph 19. 13:03:10 13:03:12 13:03:15 13:03:18

BY MR. BRAUSA: 13:03:20

Q. Okay. And you're basing that exclusively on what's written in paragraph 19 about the hub control unit for establishing several transmission paths between the up link port and downlink port. That's the portion of paragraph 19? 13:03:21 13:03:26 13:03:29 13:03:33 13:03:39

A. That's right, paragraph 19. There may be 13:03:39

discussion elsewhere in the patent. I don't remember. 13:03:41
But it's 19 plus this drawing. Well, and perhaps -- 13:03:43
perhaps -- hold on. Let me just see if it appears 13:03:46
anywhere else. Not there. 13:03:49
Q. We're lucky it's only 26 paragraphs long. 13:03:57
A. Yeah, right. 13:04:00
No. In Figure 2 prior art, he called this 16. 13:04:02
Okay. Yes. 13:04:06
But the answer is, yes, because of these 13:04:07
drawings, plural, and because of paragraph 19, possibly 13:04:10
in addition to other things, and the POSITA's knowledge, 13:04:14
I think a POSITA would see this as a functional hub, not 13:04:18
precisely a physical one, but a functional hub as 13:04:23
outlined in the USB. 13:04:27
Q. Understood your opinion that that's how a POSITA 13:04:29
would interpret those words. 13:04:31
A. Mm-hmm. 13:04:32
Q. I just want to make sure we're clear on the fact 13:04:32
that Chang doesn't actually call 46 a hub by name 13:04:35
anywhere in the Chang reference. Right? It's always 13:04:42
referred to as a hub control unit? 13:04:45
A. I couldn't swear to that without rereading every 13:04:49
word, but okay, yeah. 13:04:51
Q. Okay. So it's your opinion that a POSITA would 13:04:52
read Chang and conclude that looking at Figure 3, there 13:04:57

are two hubs shown, one labeled 40, one labeled 46? 13:05:01
A. Not exactly. I mentioned that not because of 13:05:07
Chang or what a POSITA would make of this picture, no. 13:05:11
I think a POSITA would make of this picture what I said 13:05:16
first. 46 is a -- I'm sorry. 40 is a construct of this 13:05:19
patent, you know, so it's -- it's the thing that Chang 13:05:25
said, hub with host-to-host transmission function. 13:05:28
That's what that is. That's obvious. It's clear. It's 13:05:31
titled. It's described. In that, a POSITA would 13:05:35
understand that 46 is the USB IF function that's part of 13:05:37
that thing in Chang's invention. My other comments had 13:05:42
to do not with Chang by itself, but with these things. 13:05:45
You know, we talk about hubs in these things many, many 13:05:48
times, many different contexts, lots of words. Lots of 13:05:51
combinations, lots of different things. 13:05:55
Q. Right. 13:05:57
A. And -- 13:05:58
Q. So let's turn to some of those lots of different 13:05:59
words at paragraph 65 of Exhibit 1013 in the '420, where 13:06:01
you talk about USB hubs. 13:06:10
A. Yep. 65. 13:06:23
Q. And there you set forth the USB definition of a 13:06:24
hub as a USB device that provides additional connections 13:06:27
to the USB, right? 13:06:29
A. Yes. 13:06:32

Q. And you then go on, on page 31, to say the hub's attachment points are called ports, right? 13:06:32 13:06:35

A. That's right. 13:06:37

Q. Okay. The hub control unit, 46 in Chang, does not have ports. Those are separate from the hub control unit, right? 13:06:40 13:06:44 13:06:47

MR. JENSEN: Object to form. 13:06:48

THE DEPONENT: That's -- that's a subtlety. The answer to your question is no. And the reason it's no is that as used in the USB IF standards, ports in this sense are functional. Elsewhere in this standard, they talk about connectors and their role, and in many ways that they strive to make clear, even though they spend 100 pages doing it, they try and make it clear that connectors are used to implement ports. But in the bigger picture, port in the sense of Figure 4-5 is not the same as a connector. You know, these things could be pins on an IC. They could be non-USB internal connectors inside a box. They could be lots of different things. 13:06:50 13:06:54 13:06:56 13:07:05 13:07:08 13:07:12 13:07:16 13:07:18 13:07:21 13:07:27 13:07:30 13:07:36 13:07:39

BY MR. BRAUSA: 13:07:39

Q. Okay. So is it your testimony that hub control 46 shown in Chang has attach ment points called ports? 13:07:41 13:07:45

A. Called ports in respect of the way the Figure 4-3 is. I -- I'm -- I'm sort of anticipating some of 13:07:52 13:07:55

the problem here by acknowledging that port -- it gets reused throughout this stuff in ways that are not always obvious. 13:08:01 13:08:04 13:08:08

So I'm to be clear here. A POSITA's view of a hub, which ultimately comes from the USB IF definition, is a functional item. The physicality of that depends on the implementation. It could be verilog inside of a larger FPGA. It could be a chip. It could be, you know, a box with a plastic around it. It could be a plugin board, all kinds of different things, and the ports on that hub, as referred to in -- in the USB IF, just talking about hub functionality, can be a lot of different things physically, wires, connectors, captive cables, all kinds of stuff. 13:08:10 13:08:12 13:08:16 13:08:20 13:08:24 13:08:27 13:08:33 13:08:37 13:08:42 13:08:45 13:08:50

Q. So it's your testimony that a POSITA would understand the word "hub" to be a functional term and not corresponding to any specific structure? 13:08:51 13:08:55 13:09:01

A. Well, slightly beyond -- no. More than that. The POSITA's view here has a tolerance for ambiguity where the word "hub" gets used lots of different ways. And I think taken in context with the individual specifications and claims, a POSITA would know what's being talked about. I'm not saying that this particular view of a hub, which I'm talking about a POSITA having about looking at Chang Figure 3, is the exact view they 13:09:06 13:09:09 13:09:14 13:09:17 13:09:20 13:09:22 13:09:25 13:09:28

would have looking at everything else. No. There's a lot of different views. That's my point. There's a lot of different ways that the word "hub" is used. But as part of that universe of the way hubs are used, it is the case that the USB IF specification for hub is a functional one, not necessarily a physical one. 13:09:31 13:09:33 13:09:36 13:09:39 13:09:45 13:09:48

Q. Okay. Anywhere in your report, paragraph 65 through 68, which is your background discussion of USB hubs, do you state what you just stated here, that you think the USB specification of the term -- or definition of the term "hub" is a functional one? 13:09:52 13:10:01 13:10:05 13:10:09 13:10:13

A. No, I don't. I don't have a discussion of that here. 13:10:15 13:10:49

Q. Okay. Turning back to Figure 3 of Chang, Exhibit 1014, the -- the bridge is shown as item 52, right? 13:10:49 13:10:55 13:11:02

A. That's right. 13:11:02

Q. Okay. And it's only connected to one of the downstream ports shown, the host port 50, right? 13:11:03 13:11:07

A. In this picture, that's correct. 13:11:09

Q. And so in Chang, there is no discussion of switching between -- the bridge between different ports or routing the signal coming from port 50 to a different path depending on the device connected to port 50, right? 13:11:11 13:11:17 13:11:20 13:11:25 13:11:29

A. I would agree with that. 13:11:29

Q. Okay. And Chang also doesn't explicitly 13:11:30

disclose any simultaneous communication with upstream 13:11:36

port 42 by downstream ports 44 and 50, right? 13:11:42

A. I would say in Chang that's implied. 13:11:46

Q. Okay. 13:11:53

A. Yeah. It doesn't have to be said. Like many 13:11:54

other things here, all this stuff is backstopped by the 13:11:57

USB specification, which is very clear about the 13:12:00

simultaneity of traffic on downstream ports and hubs 13:12:07

known to a POSITA clear in the original spec and implied 13:12:11

here. 13:12:13

Q. Okay. When you say implied, my question was 13:12:14

that Chang doesn't explicitly say that ports 44 and 50, 13:12:17

the device and host ports are simultaneously 13:12:23

communicating with upstream port 42, correct? 13:12:29

A. Not that I remember. 13:12:31

Q. Okay. You think that's implied, correct? 13:12:31

A. It is my opinion that that's implied, yes. 13:12:34

Q. Okay. Is there anything in Chang that supports 13:12:37

that implication, or is it just based on the POSITA's 13:12:40

knowledge of the USB spec, in your view? 13:12:44

A. Chang could have invented lots of different 13:12:50

things and put this bridge in something that doesn't 13:12:53

have anything to do with USB. The choice to put this 13:12:55

into USB brings with it, necessarily, a lot of stuff, and that stuff was known to Chang and it's known to people that read this. It's known to the POSITA and so on. So, yeah, that -- that comes along by -- by relating this to the USB spec. 13:12:58 13:13:02 13:13:05 13:13:07 13:13:14

Q. Okay. But just again to confirm, Chang doesn't explicitly say that anywhere, right? 13:13:15 13:13:19

A. That's right. 13:13:21

MR. BRAUSA: Let me hand you what's already been marked as Exhibit 1015, which is the Chang 2 reference. And this copy is also from PGR2024-0011. 13:13:30 13:13:32 13:13:47

THE REPORTER: It's here if you need it, sir. 13:14:06

THE DEPONENT: I do. Thank you. 13:14:08

BY MR. BRAUSA: 13:14:19

Q. And this is the second Chang reference that you were provided by counsel as part of your analysis in this case, right? 13:14:19 13:14:22 13:14:24

A. That's correct. 13:14:25

Q. And I think you say this in your report somewhere. But just to be clear, even though we're calling these Chang 1 and Chang 2, that individuals named Chang are different people, different -- different inventors, right? 13:14:26 13:14:28 13:14:31 13:14:34 13:14:39

A. That's my understanding. 13:14:41

Q. Okay. In Chang 2, we see one diagram of the 13:14:41

device that's described that's referenced in your report shown in Figure 1, right? 13:14:56 13:14:59

A. That's correct. 13:15:00

Q. Okay. And the upstream port is essentially the first connection interface 11, right? 13:15:01 13:15:07

A. That's correct. 13:15:09

Q. And that connects to a first host device? 13:15:10

A. Right. 13:15:13

Q. And then the downstream port is the section -- second connection interface that -- that can connect to a second host or a slave device or a device mode? 13:15:13 13:15:17 13:15:21

A. That's right. 13:15:26

Q. Okay. And what's shown in between them is what Chang refers to -- Chang 2 refers to as a bridge, right? 13:15:26 13:15:32

A. Well, in Figure 1, it's a control chip, and it's No. 13. And then in Figure 2, we see an expanded schematic or where 13 is a chip called U1. 13:15:35 13:15:45 13:15:49

Q. Okay. Just to confirm, in Figure 1, the big box labeled 1 is titled "Data Transmission Bridge Device," right? 13:15:57 13:16:00 13:16:04

A. Yes, that's right. 13:16:04

Q. Okay. And within that bridge device, there's a control chip 13, right? 13:16:06 13:16:09

A. Right. 13:16:10

Q. And then with Figure 5 shows a blown-up 13:16:11

schematic of that control chip located in the bridge, correct? 13:16:23 13:16:25

A. That's correct. Yes. 13:16:46

Q. Okay. And within the control chip 13 shown in Figure 5 of Chang 2, that's where the switching mechanism, switching circuitry, resides, correct, to toggle between the host or device at the second connection interface? 13:16:46 13:16:51 13:16:57 13:17:00 13:17:05

A. Yes, that's correct. 13:17:06

Q. Okay. And what functional blocks or what structures shown in Figure 5 correspond to the switch used to toggle between host mode and device mode at the downstream port? 13:17:07 13:17:10 13:17:15 13:17:22

MR. JENSEN: Object to form. 13:17:22

THE DEPONENT: Give me a minute here. 13:17:23

Okay. I always have to remind me that the use of the word "bridge" here has slightly different meaning than it does in some other places. But to your question, I think -- I think Figure 5 -- okay. You were asking about Figure 5, and your question, I think, was where -- where is the switch? 13:19:14 13:19:17 13:19:21 13:19:23 13:19:29 13:19:32

MR. BRAUSA: That's correct. 13:19:37

THE DEPONENT: Okay. My understanding is the switch is physically in this bypass circuit unit, 133. 13:19:40 13:19:42

MR. BRAUSA: Mm-hmm. Okay. 13:19:47

BY MR. BRAUSA: 13:19:52

Q. Anywhere else or just in the bypass circuit unit? 13:19:53 13:19:56

A. I'm taking your question to mean the circuit element that is set one way or another way, and taking that definition of switch, and I hesitate because sometimes people talk about sort of abstract switching units by including what caused the decision to be switched this way or that way. So obviously, we have -- we have other things going on here that bear on that. 13:19:59 13:20:02 13:20:05 13:20:10 13:20:15 13:20:17 13:20:20

Q. Okay. Well, I'm talking about the routing switch that's referenced in claim 2 of the '420 patent. Is there a routing switch in Figure 5? 13:20:22 13:20:25 13:20:29

A. Yes. 133 is a routing switch. 13:20:35

Q. Okay. And that's located within the control chip? 13:20:36 13:20:39

A. Right. 13:20:39

Q. And that control chip is located within the bridge, right? 13:20:40 13:20:42

A. Right. 13:20:43

Q. So the routing switch in Chang 2 is part of the bridge, right? 13:20:43 13:20:46

A. It's part of what -- 13:20:47

MR. JENSEN: Object to form. 13:20:52

THE DEPONENT: -- Chang calls a bridge, yes. 13:20:53

This could get tricky if you look at Figure 4. There's a thing in Figure 4 in '420 which is also called bridge, and it apparently has some decision logic in it about detection, and there's a switch control circuit. So bearing in mind that these different people have used bridge in different ways, yes, this is the -- this is the analog of the routing switch in Chang 2.

BY MR. BRAUSA:

Q. Okay. Chang 2 in Figures 1 and Figures 5, it never characterizes any of this circuitry or any of these components as a hub, right?

A. Not that I can remember, no.

Q. Okay. And then just to round it out, Figure 3 in Chang 2, that's a physical embodiment of the overall bridge, right?

A. Yes, it looks like it.

Q. Okay. And we see the control chip located at 13. It's a little box inside the plug, right?

A. Box, yep, yep.

Q. And what's 121 in Figure 3 of Chang 2?

A. Okay. Hold on one second. Okay. Fortunately, it's short.

Okay. The key language seems to be in paragraph 29, in the middle, where Chang 2 goes on to say:

"Additionally, if the second connection

interface, 12, needs to connect to a slave device, 4," 13:23:30
which I specify means a USB device, which he says in 13:23:36
parentheses, "normally has a B-type female connector of 13:23:43
the USB specification, then an adapter one to one can be 13:23:50
further attached to transform the connector type of the 13:23:54
second connection interface 12 so that the required 13:23:59
B-type male connector of the USB specification can be 13:24:02
available. Thus, a user would only need one USB bridge 13:24:07
transmission line 5 for connecting with a normal host 13:24:12
device and a slave" or -- sorry, "and/or their 13:24:16
associated host-to-slave operation. But in addition, 13:24:20
you can use bridging function between a first host and a 13:24:25
second host, called 2 and 3, elsewhere called 1 and 2." 13:24:28
Q. And so 121 in Figure 3 is an adapter used to 13:24:35
connect to a slave device, right? 13:24:39
A. That's correct. 13:24:41
Q. Okay. And that's something that would be 13:24:42
operating in device mode, correct? 13:24:44
A. Right. 13:24:46
Q. Okay. If we just look at what Chang 2 seems to 13:24:47
be saying is, without adapter 121, the cable we see at 13:24:53
item 5 in Figure 3, that prong labeled 12, that would 13:24:57
typically connect to another host, right? 13:25:03
A. Mm-hmm. 13:25:05
Q. Okay. And so then in Figure 4, if we go to 13:25:05

that, we see here two different cords without the adapter. One is for connecting to a host, which is shown as a PC 3. The other appears to me to be shown connected to a solid-state drive or something of that, labeled No. 4, right? 13:25:10 13:25:17 13:25:19 13:25:24 13:25:27

MR. JENSEN: Object to form. 13:25:29

THE DEPONENT: Okay. I'm looking at Figure 4. The scale is much reduced, and so you sort of have to squint to answer your question. But let me try and be clear. 13:25:30 13:25:37 13:25:41 13:25:46

Okay. All right. He's referring to something called 122, which looks a little bit like Figure 3, but it's not -- the label is not actually on Figure 3. So let me -- let me be sure not to misquote him. 13:25:55 13:25:57 13:26:06 13:26:10

Okay. All right. You know, sometimes -- sometimes there are mistakes made here. 13:26:41 13:26:43

BY MR. BRAUSA: 13:26:48

Q. You think there's a mistake in the Chang 2 reference? 13:26:48 13:26:50

A. Well, it's possible. 13:26:50

Q. What's the mistake you think there is? 13:26:52

A. Well, it's possible that -- oh, I see. He's got 122 prime and 122. God, nomenclature. Okay. No, no it's not an error. All right. 13:26:53 13:26:58 13:27:10

Okay. These appear to be slightly -- these 13:27:16

appear to be versions of what appear on Figure 3. On the face of it, what's called 122 prime in Figure 4 is the Device No. 5 on Figure 3, whereas the thing called in Figure 4 122 looks like it's a composite of 5 plus 121. That's based on sort of what's -- appears to be drawn here where you see on the left side looks something that could be an A connector on the right side, looks like it could be a B connector. And also, the language in -- where was I? 39 or 40. No, no. Sorry. 32. Okay. Well, based on a quick reading, that looks like that's what's going on. 13:27:20 13:27:27 13:27:34 13:27:41 13:27:49 13:27:52 13:27:54 13:27:56 13:27:59 13:28:06 13:28:15

Q. Okay. But in Figure 4 -- I guess maybe this would help clear it up. In Figure 4, the control chip with the switch in it is shown as part of the PC labeled 2, right? The control chip 13 is no longer part of the cord, in Figure 3? 13:28:16 13:28:19 13:28:22 13:28:24 13:28:31

A. Oh, I see. You're right. You're right. I misread that. Okay. All right. You're right. So I didn't -- I didn't spend enough time reading what 122 is. That makes it look like 122 and 1 -- and 122 -- 122 prime and 122, those are both standard -- quote/unquote, standard USB cables without any intelligence. 13:28:33 13:28:35 13:28:39 13:28:42 13:28:48 13:28:52

Q. Right. And in the implementation in Figure 4, the control chip is shown as part of the circuitry in the PC, correct? 13:28:56 13:28:59 13:29:04

A. That's what's in Figure 4, yeah. 13:29:05

Q. Okay. And so the bridge is part of the PC and the switch within the bridge is part of the PC in Figure 4 as well, right? 13:29:07 13:29:09 13:29:11

A. That's right. 13:29:13

Q. And there's no hub shown in Figure 4, is there? 13:29:13

A. Okay. Not in the picture. But the -- the POSITA knowledge suggests that every PC has a root hub, and oftentimes, ordinary PCs like this have internal hubs even beyond the root hub. 13:29:15 13:29:24 13:29:28 13:29:33

Q. Okay. But certainly -- 13:29:35

A. You can't -- you can't -- 13:29:36

Q. Chang's disclosures -- 13:29:37

A. Yeah, you can't -- 13:29:39

Q. -- description of a bridge is not talking about a hub? 13:29:39 13:29:41

A. Doesn't talk about hub. He doesn't show a hub. A POSITA could know there's hubs in the background. The point there is the upstream view of a USB device of a downstream-facing port either of a host or from a hub are identical, and almost without exception indistinguishable. That's just how USB works. 13:29:42 13:29:46 13:29:49 13:29:52 13:29:56 13:29:58

Q. Sure. But just to confirm, in Figures 1, 3, 4, and Chang 2's disclosure as a whole, he doesn't explicitly describe any hubs, right? 13:30:01 13:30:06 13:30:10

A. Not explicitly, no. 13:30:11

Q. All right. In some of the claims of the patent, 13:30:13

there's -- the claims of the Aptiv patents, there's 13:30:40

reference to an infotainment system. Do you recall 13:30:42

that? 13:30:45

A. I do recall that. 13:30:45

Q. Okay. And what's your understanding of what an 13:30:46

infotainment system is? 13:30:49

A. Which claim? 13:30:51

Q. Sure. Let me -- why don't we go to claim 2 of 13:30:53

the '643 patent, which I can hand to you and is 13:30:57

Exhibit 1011. 13:31:06

(Referencing Exhibit 1011.) 13:31:10

THE DEPONENT: Okay. Yep. Claim 2. 13:31:37

BY MR. BRAUSA: 13:31:38

Q. Okay. And this refers to an infotainment 13:31:39

system, right? 13:31:41

A. Right. 13:31:42

Q. What is your understanding of what a POSITA 13:31:43

would understand an infotainment system to be in 2013? 13:31:46

A. I -- I believe that a POSITA would have 13:32:09

understood infotainment system to refer to, certainly, 13:32:11

electronics in a car that provided information and 13:32:15

entertainment. So it could have had a radio or CD 13:32:21

player or various other kinds of things, and in the 13:32:24

context of these things may also, as it is in claim 2, have a USB host embedded in it. 13:32:26 13:32:32

Q. Okay. And does an infotainment system require streaming audio or video, as of 2013? 13:32:34 13:32:39

MR. JENSEN: Object to form. 13:32:44

THE DEPONENT: I could only -- yeah, I won't speculate about that. I don't actually know. And that question doesn't come up in any of the claims or in my analysis, so that's sort of outside the scope. 13:32:45 13:32:52 13:32:55 13:32:57

BY MR. BRAUSA: 13:33:01

Q. Okay. So you sitting here today don't have an opinion on whether infotainment system in at least claim 2 of the '643 patent requires streaming audio or video capabilities? 13:33:01 13:33:03 13:33:07 13:33:10

A. As of 2013, that's right, I don't have an opinion about that. 13:33:12 13:33:14

Q. Okay. Do you have an opinion about that today? 13:33:15

A. No. 13:33:17

Q. Let's turn to column 6, lines 65 through 67, of the '643 patent, Exhibit 1011. 13:33:18 13:33:25

MR. JENSEN: What lines did you say? 13:33:48

MR. BRAUSA: I'm sorry. Column 6, lines 65 through 67, or the start of the sentence is at line 63. So column 6, line 63 through 67. 13:33:50 13:33:53 13:33:58

THE DEPONENT: "Number of supported devices, 13:34:10

such as data connections, streaming audio and streaming video to and from the vehicle via the USB bridge." 13:34:11 13:34:14

BY MR. BRAUSA: 13:34:20

Q. Right. And so this is referring to one of the capabilities of an infotainment system, right? 13:34:21 13:34:23

MR. JENSEN: Object to form. 13:34:26

THE DEPONENT: On the face of it, yeah. 13:34:26

BY MR. BRAUSA: 13:34:28

Q. Okay. Are you aware that there's a USB audio standard? 13:34:28 13:34:31

A. I am aware of that. Generally, I wasn't asked to opine on its relevance to this, but yes, I am aware that such a standard exists. 13:34:35 13:34:38 13:34:41

Q. Okay. Do you know who was the primary contributor to the USB audio standard? 13:34:42 13:34:45

A. I don't know that. 13:34:47

Q. Okay. Do you know if it was another expert of microchips? 13:34:48 13:34:50

A. Expert of Microchip's? No, I don't -- I don't know that. 13:34:50 13:34:57

Q. Okay. To facilitate streaming audio, is it correct that you have to have a chip that supports isochronous data transfer? 13:34:57 13:35:02 13:35:07

MR. JENSEN: Object to form. 13:35:09

THE DEPONENT: Okay. Outside the scope. But my 13:35:10

knowledge of USB includes understanding what isochronous is, how it works, how it's used. And I do know that the USB standard for USB audio includes the use of isochronous endpoints. 13:35:17 13:35:22 13:35:25 13:35:34

BY MR. BRAUSA: 13:35:36

Q. Okay. Do you know whether streaming audio could be accomplished using control endpoints? 13:35:37 13:35:39

MR. JENSEN: Object to form. 13:35:50

THE DEPONENT: Control endpoints. Okay. This is a hypothetical. Well, I do know that control endpoints were not intended for such a purpose. I can't rule out that they could be used at a -- at a very low bandwidth perhaps. 13:35:51 13:35:57 13:36:09 13:36:12 13:36:16

BY MR. BRAUSA: 13:36:16

Q. Okay. Maybe taking a step back in, general USB, my understanding is it specifies four different types of data transfers, control, interrupt, bulk and isochronous, right? 13:36:17 13:36:20 13:36:23 13:36:28

A. Mm-hmm. 13:36:28

Q. Okay. Isochronous is the only one of these four that is intended for streaming audio and video applications, right? 13:36:28 13:36:32 13:36:35

MR. JENSEN: Object to form. 13:36:36

THE DEPONENT: Okay. This is interesting. It's outside the scope, but I will comment on it anyway. 13:36:45 13:36:49

It's true when the standard was written that they were -- the authors of the standard were aware that there was a -- there were different categories of time-sensitive data, and audio was an example of that and video is another example of that, and they had this idea that the isochronous endpoint could be designed in such a way that you could sort of guarantee how much bandwidth was available to the isochronous -- a given isochronous endpoint, and the devices could even negotiate about it based on descriptors and -- and other sorts of minutiae about how USB works so that you could have other devices on the same bus, like mice, keyboards and so on, but that the isochronous traffic would get priority. So I do know that that was -- that was amongst the original ideas. And the same applies to video, although to do video over even full speed USB, it has to be compressed. Isochronous was intended to support uncompressed audio, amongst other things.

Okay. So I know that that was amongst the original intention. In my experience, developers of USB systems have made use of those original ideas in any number of different ways. It's like this toolbox thing. Oh, isochronous, okay, here is what they thought originally, here is what it actually does, how can that help me. Oh, well, I can use it for X or I can use it

for this. 13:38:21

Or conversely, an audio person might think, I don't want to do it that way because of blah, blah, blah, you have to worry about clock and this and that, and my audio system is going to use buffered stuff anyway and it's going to be the only device in the bus. So I'm only going to use -- I'm only going to use bulk endpoints. 13:38:22 13:38:24 13:38:26 13:38:28 13:38:31 13:38:34 13:38:38

My point here is that the USB IF promulgating these standards, and going back to my -- my original background thing about, you know, if it's not in the standard, the standard doesn't say you may only use isochronous for audio. It says, here is what isochronous is, you might want to use it for audio. 13:38:39 13:38:42 13:38:46 13:38:47 13:38:50 13:38:53

And then they also published a specification for standard audio over USB, and it does use isochronous. Okay. That's fine. None of that means that a person wanting to do streaming audio has to do it that way. They could do it other ways if they wanted, and there might be good reasons to do in other ways. 13:38:54 13:38:57 13:39:00 13:39:03 13:39:06 13:39:09

BY MR. BRAUSA: 13:39:11

Q. Okay. Sitting here today, are you aware of any implementations of streaming audio in an infotainment system in a vehicle that don't rely on isochronous transfer? 13:39:13 13:39:15 13:39:19 13:39:24

MR. JENSEN: Object to form. 13:39:25

THE DEPONENT: I wasn't asked to look at that, 13:39:27

so I don't actually have an opinion about that. 13:39:28

BY MR. BRAUSA: 13:39:32

Q. Okay. Let's turn back to your declaration from 13:39:32

the '420 -- or regarding the '420 patent, IPR 2024-228. 13:39:40

It's Exhibit 1013. And -- 13:39:47

A. Okay. I got that. 13:39:57

Q. I want to go to the section of your report -- 13:40:00

you have it tabbed -- about secondary considerations. 13:40:04

A. Mm-hmm. 13:40:06

Q. It starts on page 177, paragraph 302. Are you 13:40:07

there? 13:40:36

A. I am here. 13:40:37

Q. Okay. And I believe you alluded to this 13:40:37

earlier. But as part of formulating your opinions on 13:40:40

the secondary considerations of non-obvious, you were -- 13:40:43

non-obviousness, you were provided with a copy of at 13:40:47

least one of Aptiv's interrogatory responses -- 13:40:52

A. Mm-hmm. 13:40:56

Q. -- from a litigation between Aptiv and 13:40:56

Microchip, correct? 13:41:00

A. Mm-hmm. Yeah. That's right. 13:41:01

Q. And so you refer to that in this section, and 13:41:02

then at paragraph 305 you say that after reading about a 13:41:05

PACE Award referenced in that -- 13:41:13

A. Mm-hmm. 13:41:15

Q. -- interrogatory response, you -- you Googled it and there's a URL link and search result pasted below for the winners of that award in 2016, correct? 13:41:15 13:41:18 13:41:24

A. That's right. 13:41:27

Q. Okay. Beyond the interrogatory response and the PACE Award website that you looked up, did you rely on any other materials to provide your opinions regarding the secondary considerations you set forth in your report? 13:41:28 13:41:38 13:41:42 13:41:47 13:41:53

A. No. I was asked to consider that based on this information. 13:41:53 13:41:55

Q. Okay. And what's your understanding of what the secondary considerations of non-obviousness that you refer to in the subsection B on page 177 of your report refer to? 13:41:56 13:41:59 13:42:04 13:42:09

A. Well, again, I'm not a lawyer. But as it's been explained to me, when considering the question of whether certain prior arts or various combinations thereof may render something, a claim or set of claims, obvious, that there can be this so-called secondary considerations. So I don't want to go through all of them just by way of answering your overview question, but the idea is, if the patent in question, particularly 13:42:12 13:42:14 13:42:20 13:42:24 13:42:28 13:42:34 13:42:43 13:42:46

the claims in question, somehow could be shown in some of these secondary considerations to be of a kind of importance that whoever wrote this legal stuff to begin with, the law about -- about non-obviousness or whatever, Chang referenced that these things were important and, therefore, they could be considered alongside. 13:42:50 13:42:56 13:43:00 13:43:04 13:43:07 13:43:11 13:43:14

So in other words, you have all these other bits of information, you know, party A thinks that they have grounds that this is non -- this is obvious for this and grounds and all sort. You can have all those things. My understanding is that it's okay, it's actually encouraged, that the people that decide this stuff, presumably the patent board, can consider these other things, and that's why people are interested in them. 13:43:15 13:43:19 13:43:21 13:43:25 13:43:27 13:43:31 13:43:34 13:43:36

So I approach these things from that standpoint. I don't know anything about this stuff myself, but I was given this information, A, of what Aptiv said, and B, what these different things are, and I proceeded accordingly. 13:43:40 13:43:42 13:43:45 13:43:48 13:43:52

Q. Okay. And I think you testified to this earlier. But in considering these secondary considerations, and really with respect to all of your opinions, you never asked anyone from Microchip about their view of an industry award or their view of Aptiv's 13:43:52 13:43:58 13:44:01 13:44:04 13:44:08

success or -- 13:44:12
A. Mm-hmm. 13:44:13
Q. -- or their view of why Aptiv was successful? 13:44:13
MR. JENSEN: Object to form. 13:44:16
THE DEPONENT: No. I thought it was my job 13:44:17
to -- you know, to be the sort of independent view here, 13:44:19
you know, and I -- I tried to look at this from that 13:44:28
standpoint. I mean, I'm -- I'm -- I'm more than a 13:44:30
POSITA. I'm an expert here, and I have the POSITA view 13:44:32
in addition. And the point is, we want to look at this 13:44:35
stuff from that standpoint to consider, you know, what 13:44:37
we think about these different categories of -- of 13:44:45
secondary considerations. 13:44:47
BY MR. BRAUSA: 13:44:48
Q. Okay. Have you ever heard of a solution that 13:44:48
BMW had called iPad Out or iPod Out? 13:44:54
MR. JENSEN: Object to form. 13:44:57
THE DEPONENT: Not by that name. I did work on 13:44:58
an accessory for Microsoft's sync system, which I 13:45:05
mentioned in here somewhere. But no, I don't know 13:45:10
anything about what BMW did. 13:45:16
BY MR. BRAUSA: 13:45:18
Q. Okay. In paragraph 305 of your report, you say 13:45:18
that prior to your involvement in this case, you had 13:45:21
never heard of the Automotive News PACE Award? 13:45:23

A. That's correct. 13:45:26

Q. Prior to your involvement in this case, had you ever consulted with companies making automotive equipment or accessories? 13:45:27 13:45:29 13:45:34

A. In the case I mentioned, yes. 13:45:35

Q. Okay. 13:45:37

A. Microsoft and Ford came together, or one came on behalf of both of them, I forget which, to ask my previous company, Keyspan, to build an adapter for one of their use cases. 13:45:37 13:45:43 13:45:46 13:45:50

Q. Okay. What kind of adapter was it? 13:45:52

A. Okay. This system was meant to allow an early app -- an early Apple device -- this was pre iPhone. This is when it was an iPod. So Apple had this music player that was very popular and people wanted to use them in cars. And Ford and Microsoft already had a solution for newer iPods that had USB in them. They came to us because of our experience with the serial adapter I told you about earlier -- 13:45:53 13:46:00 13:46:03 13:46:09 13:46:10 13:46:15 13:46:24 13:46:26

Q. Mm-hmm. 13:46:26

A. -- and asked us, basically, to make a version of that serial adapter that would interface an older iPod, which only provided a serial interface. And at that company we had done some Smart Dock kinds of products and we had experience with serial interfaces, 13:46:28 13:46:31 13:46:34 13:46:39 13:46:41

particularly interfacing to these -- to these iPods and controlling them. 13:46:45 13:46:49

So that's what we did for Ford and Microsoft. We basically adapted some existing technology we had and a couple of different things that we had. 13:46:51 13:46:55 13:46:58

Q. In the course of that work, did you have any understanding as to what the solution Ford and Microsoft had come up with for connecting an iPod to a presumably Ford car or truck? 13:47:00 13:47:02 13:47:05 13:47:10

MR. JENSEN: Object to form. 13:47:12

THE DEPONENT: I don't actually remember any of the details of that because that -- that wasn't the part of the solution we worked on. 13:47:13 13:47:17 13:47:20

MR. BRAUSA: Sure. 13:47:22

THE DEPONENT: All I knew was that they had a solution for USB. They came to us for -- for something that did serial, because the other side of our product did do USB. So I guess in that sense, I knew that -- that the system in the car knew how to be a host, a USB host, because our device was a USB device. That's it. That's sort of as much as I know about technology there. 13:47:23 13:47:25 13:47:27 13:47:30 13:47:38 13:47:41 13:47:45

BY MR. BRAUSA: 13:47:48

Q. Okay. So in that embodiment, the iPod was functioning as a USB device? 13:47:48 13:47:51

MR. JENSEN: Object to form. 13:47:54

THE DEPONENT: Not actual -- no. It was actually our adapter which was the USB device. The iPod wasn't a USB device at all. 13:47:55 13:47:57 13:48:00

BY MR. BRAUSA: 13:48:01

Q. Okay. 13:48:01

A. In the use case that we solved. 13:48:02

The one that they sort of already had solved, that we didn't work on, I don't know what the iPod did. 13:48:03 13:48:05

Q. Okay. In the use case you had, though, your adapter -- 13:48:09 13:48:12

A. Was a device. 13:48:12

Q. -- adapted from a USB to the legacy port of the older iPods? 13:48:13 13:48:17

A. Yeah, that's right. 13:48:17

Q. And that adapter functioned as a downstream device in the system? 13:48:18 13:48:22

A. That's it. That's exactly right. 13:48:22

Q. Okay. And was the port that that was plugged into a dual-role port? 13:48:24 13:48:29

A. No idea. 13:48:30

Q. Okay. When was this? 13:48:31

A. Oh, Jesus. 2003, 2004, something like that. 13:48:33

Q. Okay. 13:48:41

A. I don't remember exactly. 13:48:41

Q. Got it. 13:48:42

A. It certainly predated the iPhone of 2007. 13:48:42
Q. Turning back to paragraph 305 of Exhibit 1013, 13:48:47
you state that you immediately observed, after Googling 13:48:54
the PACE Award, that the PACE Awards have little (if 13:48:57
anything) to do with USB technology? 13:49:03
A. Mm-hmm. That's right. 13:49:07
Q. And then you go on to say that there were other 13:49:08
winners that had products that didn't have to do with 13:49:10
USB technology, right? 13:49:16
A. That's right. 13:49:17
Q. Okay. Why did you feel that was important to 13:49:18
note in your expert report? 13:49:21
A. Okay. I took the term "industry praise" as 13:49:24
somehow fundamentally relating to the technology of the 13:49:31
patent that this was about, and the -- these patents 13:49:33
talk about USB devices, hosts and devices. And the 13:49:37
problem that they solve has to do with, what if you have 13:49:42
two USB hosts that need to talk to each other? And 13:49:45
that's what that was. And I would have said that that 13:49:48
plays out, those claims and those patents, they play 13:49:51
out -- if they play out in an industry at all, they play 13:49:55
out in the USB industry. So I would have said, just my 13:49:58
own view of this is, that if you were interested in 13:50:03
praise about that, it would be praise about what the 13:50:07
claims were actually about, which is about USB and about 13:50:09

hosts and devices talking to each other in unusual ways. 13:50:11
That's why my opinion is what it is. 13:50:15
Q. Okay. Now, you would agree, though, that the 13:50:17
specification of the Aptiv patents, the '420 patent and 13:50:19
the '643 patent, talks about the use of USB systems in 13:50:22
vehicle infotainment systems, right? 13:50:27
A. That's true. 13:50:29
Q. Okay. And we just looked at claim 2 -- 13:50:30
A. Which says that. 13:50:33
Q. -- of the '643 patent is about use of USB in 13:50:34
infotainment systems -- 13:50:37
A. Mm-hmm. 13:50:39
Q. -- as embedded hosts in vehicles? 13:50:39
A. Right. 13:50:42
Q. And so in that sense, it would make sense that 13:50:43
Aptiv would win an award from an automotive publication 13:50:46
because its solution was used in automobiles? 13:50:49
MR. JENSEN: Object to form. 13:50:53
THE DEPONENT: But was the award to do with this 13:50:56
clever USB thing or something else? See, I wasn't 13:50:59
persuaded that this award really -- as an automotive 13:51:05
award really met what I understand to be this idea of 13:51:10
secondary considerations. 13:51:14
BY MR. BRAUSA: 13:51:18
Q. Why would you think that it wouldn't be a 13:51:19

secondary consideration? 13:51:21

A. Again, I would have -- I would have thought that it's the USB industry where you ought to be praised because that's what -- okay. The point about USB in cars in this sense is secondary. It turns out USB could be used in cars, but there's sort of nothing magical about that. All of this stuff works equally well outside of cars. A POSITA's view of this is that at the level of these claims and this prior art and so on, cars are mentioned, but they are not the important thing. 13:51:22 13:51:24 13:51:27 13:51:31 13:51:35 13:51:38 13:51:42 13:51:44 13:51:47

Now, if it were different, if USB had a version from the USB IF, which was called USB automotive and have all the rules were different, okay, that would be -- these circumstances would be different, and possibly in that case an automotive award would make sense. But I'm an expert in USB, and from my perspective, I wouldn't have said an automotive award about USB stuff is actually what the -- the law about secondary considerations is about. 13:51:49 13:51:52 13:51:56 13:51:59 13:52:00 13:52:03 13:52:06 13:52:10 13:52:18

Q. Okay. But you're -- 13:52:20

A. That's -- 13:52:23

Q. You're not an attorney, though, correct? 13:52:23

A. Not an attorney. 13:52:25

Q. Okay. And do you have any understanding as to whether awards from other areas can be considered for 13:52:26 13:52:28

evaluating praise or commercial success? 13:52:33

A. I will be the first to admit that I look at this 13:52:36

from my own perspective as an expert in USB, and so 13:52:39

that's the perspective of this report and should be read 13:52:43

that way, certainly. 13:52:46

Q. Okay. So because the award is not from a USB 13:52:47

organization, you don't think it's indicative of any 13:52:51

secondary consideration of non-obviousness? 13:52:56

A. That's right. 13:52:58

Q. Okay. Did you ask anybody at Microchip what 13:52:58

they thought about the PACE Awards? 13:53:00

A. I did not. 13:53:02

Q. Do you know whether Microchip considers those to 13:53:02

be prestigious in its own practice? 13:53:06

A. I have no idea. 13:53:08

Q. Okay. You didn't think to ask? 13:53:09

A. What I thought was that I had been asked with 13:53:11

respect to these items to do a very specific thing, and 13:53:16

that was to look at this interrogatory response and to 13:53:21

consider that as a source for potential information 13:53:24

about secondary considerations, so that's what I did. 13:53:27

Q. On paragraph 306, which spans pages 180 to 181, 13:53:39

you say that you note that the article touts that Aptiv 13:53:52

achieved a lower cost and cost-effective solution, which 13:53:56

could be a reason for the award, correct? 13:54:01

A. Hold on a sec. Yes, okay, I find the language you're talking about. 13:54:03 13:54:44

Q. Okay. And you say that could be a reason for the award, lower cost or cost effectiveness, right? 13:54:45 13:54:48

A. Right. 13:54:51

Q. Okay. What if that were the reason for the award. Couldn't that be -- 13:54:52 13:54:57

A. My understanding of this is it has to do with what the -- what the claims are. 13:54:58 13:55:00

Q. Sure. But if the claims allowed for a lower cost or cost-effective solution, wouldn't that be a benefit? 13:55:02 13:55:06 13:55:09

MR. JENSEN: Object to form. 13:55:10

THE DEPONENT: I will stick with what I wrote here. All I say is these things could be the -- could be the reason for the award. I don't know. But, you know, across all the things that I talked about, I -- I don't think this stuff at large qualifies as industry praise in the sense set out for the standard that I was asked to look at. 13:55:22 13:55:24 13:55:26 13:55:32 13:55:34 13:55:38 13:55:42

BY MR. BRAUSA: 13:55:42

Q. Okay. So you don't actually know why Aptiv received this award, fair? 13:55:43 13:55:46

A. That's true. I don't know. 13:55:48

Q. Okay. And you didn't ask anyone at Microchip 13:55:49

about that or do any other investigation -- 13:55:52
A. That's correct. 13:55:54
Q. -- beyond Googling the PACE Award? 13:55:55
A. That's correct. 13:55:57
Q. Okay. 13:55:57
A. Nothing else. 13:55:58
Q. You say in paragraph 306 that -- it's the second full sentence. 13:56:02 13:56:07
"And even the unmodified version of Chang Figure 3's hub, which included a host-to-host bridge alongside several other simultaneous device connections, allows a downstream USB product to," quote, "operate as the sole host device without denying access to other devices," end quote. 13:56:08 13:56:10 13:56:16 13:56:18 13:56:22 13:56:26
Do you see that? 13:56:26
A. The word "sole" is a little confusing in that sentence, but I do see it, yes. 13:56:40 13:56:44
Q. That was going to be my first question. 13:56:45
A. Sure. 13:56:46
Q. Is where is that quoted portion of the sentence coming from? 13:56:46 13:56:49
A. Well, it comes from this quote, which is presumably from the award: 13:56:49 13:56:51
"iPhone running CarPlay wanted to operate as the sole host" -- 13:56:53 13:56:53

(Discussion off record.) 13:56:53

THE DEPONENT: I'm quoting from the bottom of 13:56:59

page 180. 13:57:00

"iPhone running CarPlay wanted to operate as the 13:57:01

sole host device, taking control of the car radio and 13:57:05

denying access to other devices." 13:57:09

I wasn't asked to render an opinion about 13:57:17

CarPlay, and I really couldn't because I don't know -- I 13:57:20

don't know how it works. 13:57:22

The claims that this -- appear to refer to about 13:57:36

a downstream host being able to operate along with an 13:57:42

upstream host, yeah, I can't -- I can't actually explain 13:57:45

why I included the word "sole" here from the original 13:57:55

quote, but it's in brackets because I sort of question 13:58:00

the accuracy of that. 13:58:02

The point is that. 13:58:05

BY MR. BRAUSA: 13:58:05

Q. Sorry. Sorry. 13:58:05

You question the accuracy of what? 13:58:06

A. Okay. This -- the original statement, the 13:58:08

statement that I quoted, "iPhone running CarPlay wanted 13:58:10

to operate as the sole host," blah, blah, blah, in 13:58:13

quoting that, I put the word "sole" in brackets because 13:58:16

I'm not sure I agree that the original statement was 13:58:20

correct. I don't know, but it would frankly surprise 13:58:23

me. 13:58:28

Q. Well -- 13:58:32

A. So -- 13:58:32

Q. What about the word "without." That's also in brackets. Is that accurate or not? Because if it's in a sentence, it says without denying access to other devices, and if it's not there, it says denying access to other devices. 13:58:32 13:58:34 13:58:39 13:58:41 13:58:43

A. Right. Right. We have the limitations of the English language with its sort of editorial things. The fact is, this first sentence, this first quote, is sort of wrong on two points. It's probably not -- I'm not an expert. I don't see the spec. But it would surprise me if CarPlay wanted to operate as the sole host. It would also surprise me if CarPlay wanted to do whatever it is it wanted to do and deny access to other devices about anything. And therefore, to try and say -- I'm trying to -- I'm trying to put over a complicated idea here. 13:58:44 13:58:46 13:58:49 13:58:56 13:59:00 13:59:03 13:59:07 13:59:11 13:59:14 13:59:20

If you just look at the problem to be solved as let's plug in a downstream host, I'm saying Chang unmodified does that. Look at Figure 3. And what it does, and here I'm trying to track the original language, operate as the sole, but it actually doesn't do that. Something something, denying access to other devices, but without because we're actually not doing 13:59:23 13:59:26 13:59:29 13:59:31 13:59:34 13:59:36 13:59:40

that. 13:59:43

I apologize for the sort of editorial complexity 13:59:44
here, but the point I'm making is that the only 13:59:47
information I have to go on here is that CarPlay 13:59:51
reportedly has to do with the claims -- practicing these 13:59:57
claims in some ways. What else it might have, I don't 14:00:00
know and that's outside the scope anyway. 14:00:02

So with that view of CarPlay, that's my 14:00:04
statement about Chang -- Chang and -- and his Figure 3 14:00:11
hub. 14:00:14

Q. Okay. I think you just testified, if you just 14:00:14
look at the problem to be solved as let's plug in a 14:00:18
downstream host. 14:00:21

A. I did say that. 14:00:23

Q. Okay. Is it your testimony that you view the 14:00:24
problem solved by the Aptiv patents as plugging in a 14:00:27
downstream host? 14:00:31

MR. JENSEN: Object to form. 14:00:33

THE DEPONENT: That's not the only problem. 14:00:34

BY MR. BRAUSA: 14:00:36

Q. What other problems do the patents address? 14:00:36

MR. JENSEN: Object to form. 14:00:38

THE DEPONENT: Okay. 14:00:41

BY MR. BRAUSA: 14:00:47

Q. What other problems do the Aptiv patents 14:00:48

address? Excuse me. 14:00:50

A. Okay. Let me -- let me answer that with a -- 14:00:51

let's find it here -- answer that with a reference to 14:00:53

Figure 4. 14:00:57

Q. And just for the record, you are in the '420 14:01:00

patent? 14:01:02

A. I'm in the -- I'm in the -- this -- this just 14:01:02

because it's convenient. I'm in the '643 patent. 14:01:05

MR. BRAUSA: Okay. And that's Exhibit 1011, for 14:01:10

the reporter. 14:01:13

THE DEPONENT: Okay. This is -- this is 14:01:14

Figure 4. The largely common specifications in these 14:01:15

various patents can be summarized, to -- to some extent, 14:01:26

by Figure 4, and the problem being solved by Figure 4 is 14:01:36

that these consumer-facing ports will accept plugging in 14:01:39

a USB host or a USB device. And there's a lot of 14:01:43

discussion about how that works. This thing on the face 14:01:47

of it is a traditional USB hub. That's how a POSITA 14:01:50

would view it. 14:01:53

MR. BRAUSA: Mm-hmm. 14:01:55

THE DEPONENT: And these things are whatever 14:01:57

they are. If you plug in a host, the switch routes it 14:01:58

through the bridge. If you plug in a device, the switch 14:02:00

routes that away from the bridge over here, which Chang 14:02:03

2 also does, but not with a hub. That's why we use 14:02:06

Chang 2. If you plug in two hosts, this particular configuration doesn't support that. But that's okay because, you know, my idea about a POSITA is that they can generalize both from here and from the prior art to do more than is just in the limited case. 14:02:09 14:02:13 14:02:17 14:02:21 14:02:23

But anyway, this -- when I talk about the problem to be solved, if the problem to be solved is plugging in a downstream host, I probably should have said if -- if it's to be able to support these things here, in the sense that you could either plug in a -- a host or you could plug in a device, you get that by Chang alone. Now, of course, as we discussed at length, Chang is limited in the sense that it's a hub and some of its ports are one kind and one of its ports is another kind and there's value in having dual-role ports. But all I'm saying here is that the one thing about being able to plug in a downstream host, which is, you know, maybe what this is about, if that's what this is about, let me say it that way, then Chang 2 meets that, Chang 1 meets that. 14:02:27 14:02:30 14:02:33 14:02:35 14:02:39 14:02:44 14:02:48 14:02:51 14:02:54 14:02:58 14:03:00 14:03:02 14:03:07 14:03:09 14:03:16

BY MR. BRAUSA: 14:03:16

Q. Okay. When you say "if that's what this is about," you were gesturing to paragraph 306 of your report? 14:03:19 14:03:21 14:03:24

A. What I mean by that is there's a discussion here 14:03:24

about CarPlay without any sort of detail and I don't know what CarPlay is. The implication is -- I'll say, is that if this is the vexing problem, that iPhone's CarPlay needed a device to be -- to be downstream USB host, then these patents are aimed at that by the virtue of -- of what they have, and so is the prior art. 14:03:28 14:03:31 14:03:39 14:03:43 14:03:48 14:03:54

But I say -- I preface that by saying if because if, in fact, CarPlay is -- is about something else here, then I don't have any opinion about that because I don't know anything about it. 14:03:58 14:04:01 14:04:05 14:04:08

Q. Okay. So in paragraph 306, there's a reference to a vexing problem, and then we have the quote about an iPhone running CarPlay wanting to operate as the sole host device, taking control from the car radio and denying access to other devices. 14:04:08 14:04:13 14:04:17 14:04:20 14:04:22

A. Mm-hmm. Mm-hmm. 14:04:25

Q. That comes from the award for Delphi Automotive's dual-role hub that it -- that it won the PACE Award that we've been talking about for -- in 2016, right? 14:04:26 14:04:29 14:04:32 14:04:35

A. Mm-hmm. Mm-hmm. 14:04:36

Q. And so that came from the award organization, right, their characterization of the vexing problem? 14:04:36 14:04:38

A. Mm-hmm. Mm-hmm. 14:04:41

Q. And this is an automotive award organization? 14:04:42

A. Mm-hmm. 14:04:44

MR. JENSEN: Object to form. 14:04:45

BY MR. BRAUSA: 14:04:47

Q. And so presumably, they know the problems that are vexing the automotive industry, right? 14:04:47 14:04:49

MR. JENSEN: Object to form. 14:04:52

THE DEPONENT: Well, I frankly question that, given the inaccuracy of this statement, or potential inaccuracy of it. You might be right but, you know, I'm not impressed with the language here. 14:04:52 14:04:55 14:04:58 14:05:01

BY MR. BRAUSA: 14:05:04

Q. Okay. So you think the PACE Award body who provides this -- 14:05:05 14:05:14

A. I -- I -- 14:05:14

Q. -- didn't know what they were talking about when they said this was a vexing problem? 14:05:15 14:05:17

MR. JENSEN: Object to form. 14:05:18

THE DEPONENT: I don't know if they knew what they were talking about. I don't -- I don't deny that award was given. I don't deny that it might have been deserved. I actually don't know anything about that at all. 14:05:19 14:05:20 14:05:25 14:05:29 14:05:31

The question I was faced with is, does that award add up to industry praise. And I'm not persuaded that it does, for the reasons that I said. I mean, is 14:05:31 14:05:34 14:05:38

CarPlay part of that? Well, I don't really know. And I'm not going to speculate about that. You know, I could go on for hours, but it's a waste of time. I just -- I don't know. I just don't know. 14:05:40 14:05:45 14:05:48 14:05:51

BY MR. BRAUSA: 14:05:52

Q. Turning back to the statement in, I guess it's still paragraph 306 on page 181, about Chang Figure 3's -- 14:05:54 14:05:57 14:06:01

A. Mm-hmm. 14:06:02

Q. -- unmodified hub. 14:06:02

A. Mm-hmm. 14:06:04

Q. You say that it allows a downstream USB product to operate as the sole host device without denying access to other devices, right? 14:06:04 14:06:08 14:06:12

MR. JENSEN: Object to form. 14:06:14

THE DEPONENT: Well, strike the word "sole," but yes, that is what I say here. 14:06:16 14:06:18

BY MR. BRAUSA: 14:06:19

Q. Okay. So is -- is that an errata we want to make to cross out the word "sole"? 14:06:19 14:06:22

A. No. No. I'm not admitting that it might not be obvious what I meant by writing the sentence this way, but I did mean it. Operate as the sole. That's because that's the quote from here. 14:06:24 14:06:27 14:06:29 14:06:31

There is an editorial convention where if you 14:06:32

want to quote something and yet point out places where you disagree with it or it's accurate, inaccurate, or there's a misspelling or there's a date which can't be a real date, sometimes you put in sic, and sometimes you put it in brackets. I put it in brackets. 14:06:35 14:06:37 14:06:40 14:06:43 14:06:45

Q. Okay. 14:06:48

A. And then down here, I added the word "without" in brackets because that's my addition to this thing over here. 14:06:48 14:06:50 14:06:53

Okay. Given how much trouble we're having here, it would have been better for me to have -- to have written a couple of paragraphs here to make it clear. I was just trying for shorthand here. 14:06:55 14:06:58 14:07:00 14:07:03

Q. Well, unfortunately, I got to ask another clarifying question. 14:07:05 14:07:08

A. Okay. That's all right. 14:07:08

Q. Which is, I think you said there's a convention where you use brackets to indicate an error, but then you said you use brackets around "without" to indicate that you were adding that word. 14:07:10 14:07:11 14:07:14 14:07:18

A. Mm-hmm. I did. 14:07:19

Q. It's that latter convention I'm familiar with is. It your testimony that when you put "sole" in brackets, what you intended to convey is that that might not be accurate? 14:07:20 14:07:22 14:07:25 14:07:27

A. Frankly, yes. I'm not an expert, but yes, that's what I had in mind here. 14:07:28 14:07:32

Q. Okay. Where in Chang does it describe a downstream host that operates as the sole host without denying access to other devices? 14:07:33 14:07:38 14:07:44

A. I'm sorry. I haven't made myself clear. There's nothing about Chang which requires that. There is nothing about USB or the backdrop to all the stuff that requires that. I think that this statement here, wherever it came from, is just wrong. The iPhone probably doesn't want to be the sole host. It never did. It doesn't require that. And doesn't deny access to anything else. 14:07:46 14:07:48 14:07:50 14:07:52 14:07:56 14:07:59 14:08:01 14:08:04

Okay. That's just my opinion from the standpoint of how USB works and something that I know about Apple, but -- but it's a guess. 14:08:06 14:08:10 14:08:14

Okay. Now, if you want to quote something and then take exception to it, you do need -- you know, you do -- you do need to do something. This is a convention that I've seen. Yes, the -- adding something and subtracting something, I -- I agree that's confusing. 14:08:17 14:08:21 14:08:23 14:08:25 14:08:28

Q. Okay. Let's -- assume that we actually just take out the word "sole." 14:08:30 14:08:34

A. Mm-hmm. 14:08:35

Q. Chang also doesn't describe any USB product 14:08:35

operating as a host device downstream that denies access to other devices, or does it? I mean -- 14:08:39 14:08:43

A. Well, no. Again, the -- the word "without" is -- is added here. Apologies again. But what I'm saying here is that Chang allows a downstream host to operate without denying access to other devices. 14:08:45 14:08:48 14:08:52 14:08:56

Q. Okay. 14:09:00

A. Meaning the other devices are plugged into that hub, and the way hubs work is that it's persistent and it's simultaneous. 14:09:00 14:09:03 14:09:07

Q. Okay. 14:09:08

A. That's what hubs do. 14:09:08

Q. So that's my question. Where in Chang does it disclose that you plug in a host downstream and that doesn't deny access to the other downstream ports and their simultaneous communication? 14:09:10 14:09:12 14:09:15 14:09:19

A. He discloses that by giving you a picture of a hub. 14:09:21 14:09:24

Q. Okay. 14:09:25

A. See if I can find that. 14:09:25

MR. JENSEN: Sorry. That one is my copy. 14:09:27

THE DEPONENT: Oh, okay. 14:09:29

If we printed Chang -- okay. This -- yeah, this picture -- this picture discloses it. When you say "hub," that conveys something to a POSITA. Hubs allow 14:09:29 14:09:32 14:09:34

activity on ports independently. 14:09:39

MR. BRAUSA: Okay. 14:09:43

THE DEPONENT: That's the background of this whole activity. You have to -- the POSITA knowledge has to be in there. And so the POSITA knowledge here, even if Chang didn't say it -- I don't remember if he did or not -- that does certainly supply the other words in that sentence. 14:09:43 14:09:45 14:09:47 14:09:51 14:09:53 14:09:55

BY MR. BRAUSA: 14:09:55

Q. Okay. And so my specific question is, does Chang explicitly say that you can plug a downstream host into port 50, not deny access to any of the other downstream ports, and simultaneously have communication between the host port downstream, the other downstream device ports, and the upstream port, or is that something a POSITA would provide based on their knowledge? 14:09:56 14:09:59 14:10:04 14:10:09 14:10:14 14:10:18 14:10:22 14:10:24

MR. JENSEN: Object to form. Asked and answered several times already. 14:10:24 14:10:27

THE DEPONENT: The answer is, again, that whether Chang talks about that or not, and I think he doesn't, he does provide that information implicitly by including this hub control unit and clearly providing the context that this is USB. A POSITA would know, since it's USB and this is a hub -- 14:10:27 14:10:33 14:10:36 14:10:39 14:10:43 14:10:46

MR. BRAUSA: Okay. 14:10:48

THE DEPONENT: -- those other things you get. 14:10:48

So I'd say he discloses them implicitly, not explicitly. 14:10:49 14:10:53

BY MR. BRAUSA: 14:10:53

Q. Okay. Got it. I think that answers the question. 14:10:54 14:10:57

Earlier you referenced to there being value with having dual-role parts? 14:11:07 14:11:10

A. I -- yes, we did talk about that. 14:11:12

Q. Okay. Is there value with having dedicated host or device ports? 14:11:15 14:11:18

A. You have to give me some context for that question. 14:11:19 14:11:21

Q. Well, sure. We can go right back to Chang, Figure 3. It has dedicated device ports 44 and dedicated host port 50. Is there any value to keeping those as dedicated ports rather than dual-role ports? 14:11:21 14:11:24 14:11:28 14:11:32

A. You can imagine that hypothetically. I wasn't asked to opine about that specifically, but it's not beyond the realm of possibility that you could have a hub where one port was special. I mean, we have that today. Everybody has USB-C on their laptops. If you buy a hub, even though there are USB-C ports on there, you have sometimes have to look closely at those to say, 14:11:36 14:11:38 14:11:41 14:11:44 14:11:49 14:11:51 14:11:55

oh, you can plug power into this one, you can plug only data into this one. It's not great. The USB-IF would prefer nobody ever did that, but it's done here and it's done today. 14:11:58 14:12:01 14:12:04 14:12:07

Q. Okay. 14:12:07

A. So value, I don't know. The value is that it's not uncommon. The value is maybe it's cheaper. I don't know. 14:12:09 14:12:13 14:12:15

Q. Okay. It might be cheaper to have dedicated ports as disclosed in Figure 3 of Chang than having dual-role ports in each location? 14:12:15 14:12:17 14:12:20

A. That's possible, yeah. 14:12:21

Q. Okay. Are there any other advantages or value or reasons that you'd want to keep the dedicated ports of Chang instead of switching them all to dual-role ports as you proposed? 14:12:22 14:12:26 14:12:31 14:12:34

MR. JENSEN: Object to form. 14:12:35

THE DEPONENT: Other things being equal -- that's a mouthful here -- in general, the world of USB, certainly the USB-IF would like there to be as few ports as possible and for them to not be special purpose. The whole original idea of USB is you have a port on your computer and you could tell what it does just by looking at it at a distance. You don't have these -- these old things where you have these funny connectors and you 14:12:36 14:12:37 14:12:44 14:12:47 14:12:49 14:12:52 14:12:55 14:12:57

don't always know. They're proprietary and all this kind of stuff. Fundamental to the existence of USB is this idea that you don't have a lot of extra ports, you just have enough ports to do what you want, and you can do it simply. You know which end of the cable to plug in. It's not a mistake. And, you know, the other end does what it does. That's just the raison d'etre that the USB-IF had for their original work. 14:12:59 14:13:02 14:13:04 14:13:06 14:13:09 14:13:12 14:13:14 14:13:19

BY MR. BRAUSA: 14:13:23

Q. Okay. Besides dedicated ports being cheaper, are there any other changes that you can think of for having a dedicated port versus a dual-role port? 14:13:23 14:13:27 14:13:29

MR. JENSEN: Object to form. 14:13:33

THE DEPONENT: No. I don't want to -- I mean, yeah, I could make up reasons, but no, I don't want to speculate about that. 14:13:35 14:13:37 14:13:40

BY MR. BRAUSA: 14:13:40

Q. Okay. But there are a lot of devices today that still have dedicated ports, right? It's not -- all ports aren't dual-role ports on USB devices? 14:13:41 14:13:43 14:13:46

A. All role -- all ports are not dual role, no. That's true. 14:13:49 14:13:54

Q. Why is that? 14:13:54

A. Oh, God. I could go on for hours about that. I think that's outside the scope, so let's not do that. 14:13:55 14:13:58

Q. Well, can you give me two or three reasons why we continue to have dedicated USB device or host ports if dual-role ports make more sense to you? 14:14:00 14:14:03 14:14:07

A. Well, okay. History and cost, and the extremely complex adaptation and adoption of USB-C. I mean, I talk about that a little bit in the report here. But USB-C takes all this past history and rolls it all up into one and says, okay, let's cover everything and we'll invent, you know, 97 different possible ways you can negotiate everything. 14:14:09 14:14:12 14:14:18 14:14:21 14:14:25 14:14:27 14:14:30

The history is that SOCs inside laptops tend to have host ports. Microcontrollers with USB ports tend to be cheaper if they're device. So in some way, economics drives this. History drives it. Yeah, that's enough. As I say, I could go on and on, but let's not. 14:14:31 14:14:37 14:14:41 14:14:45 14:14:53

Q. Okay. If we turn to paragraph 312 of your report, Exhibit 1013, again, from IPR 2024-228 -- 14:14:56 14:15:02

A. Mm-hmm. 14:15:02

Q. -- there's a section on copying. 14:15:08

A. Mm-hmm. 14:15:10

Q. And you state in your opinion that Aptiv's allegations regarding copying are vague and unclear. 14:15:10 14:15:13

A. Mm-hmm. 14:15:17

Q. Did you ask anyone from Microchip for help understanding what allegations Aptiv was making? 14:15:18 14:15:21

A. I was asked to take this on its own terms, and no, I wasn't encouraged to go ask other people what they thought this meant. 14:15:24 14:15:28 14:15:30

Q. Okay. And you didn't ask anyone -- 14:15:31

A. I didn't ask anybody, nope. 14:15:32

Q. -- whether there was more information that might help you understand? 14:15:34 14:15:35

A. Nope. 14:15:36

Q. Okay. Do you know what a breakout box is? 14:15:36

A. Yes. I could give you dozens of examples, but. 14:15:39

Q. Just at a high level, what does that terminology refer to? 14:15:47 14:15:49

A. From the POSITA's view, often it's used to mean, you know, you've got -- you've got two things plugged together, and if you need to figure out what's going on on these signals, you could plug these into a breakout box, which would have the same relevant ports on each side and then it would bring out all the signals to a -- a header, or in some cases switches, so that you could put volt meter, scope probes on it, or whatever. That's one view of a breakout box. 14:15:50 14:15:55 14:15:56 14:16:02 14:16:04 14:16:06 14:16:09 14:16:13 14:16:17

Q. Okay. And -- and so a breakout box, at a high level, helps you understand how a product is working. Is that fair? 14:16:20 14:16:22 14:16:24

MR. JENSEN: Object to form. 14:16:25

THE DEPONENT: Well, in my world it is. But then I'm an engineer and a lot of my job has to do with what's actually going on on the wire. 14:16:25 14:16:29 14:16:33

MR. BRAUSA: Sure. 14:16:35

THE DEPONENT: Now, I could imagine breakout boxes being used for other kinds of things. Maybe you have a breakout box with lights on it, and what it's intended to show is, okay, when these lights are on in a certain way, then power is being delivered in this direction. That's not necessarily a debugging tool, but maybe it's a user tool. 14:16:35 14:16:38 14:16:41 14:16:44 14:16:46 14:16:48 14:16:51

MR. BRAUSA: Okay. 14:16:53

THE DEPONENT: So I'm not -- that's just speculation. You know, you could have a lot of different things. 14:16:53 14:16:56 14:16:57

BY MR. BRAUSA: 14:16:57

Q. Do you know whether Microchip had a breakout box of Aptiv's product? 14:16:57 14:17:00

A. I don't know. 14:17:01

MR. JENSEN: Object to form. 14:17:02

BY MR. BRAUSA: 14:17:03

Q. Can you think of why a competitor would have a breakout box of it's competitor's product? 14:17:03 14:17:05

MR. JENSEN: Object to form. Beyond the scope. 14:17:08

THE DEPONENT: Yeah, I think that's beyond the 14:17:11

scope. 14:17:12

MR. BRAUSA: Okay. 14:17:14

THE DEPONENT: I'M not going to speculate about that. 14:17:15 14:17:17

BY MR. BRAUSA: 14:17:17

Q. Let me ask the question again. Your attorney can make the objections. 14:17:17 14:17:19

Do you have any reason that a competitor -- or any reason to think as to why a competitor would have a breakout box of its competitor's product? 14:17:20 14:17:23 14:17:25

MR. JENSEN: Same objections. 14:17:28

THE DEPONENT: I'll limit my answer to this. Writ large in the industry that I participate in, many people often look at some amount of reverse engineering for some device, whether it's a competitor's or not, in order to understand what it is, what it does. And for that reason, I am aware of people using breakout boxes to try and understand what something is. 14:17:28 14:17:33 14:17:36 14:17:41 14:17:46 14:17:49 14:17:52

BY MR. BRAUSA: 14:17:55

Q. Okay. 14:17:55

A. What something does. 14:17:56

Q. And if an implementation or the way something works were obvious, you wouldn't need to use a breakout box for it, right? You'd just know? 14:17:57 14:17:59 14:18:02

MR. JENSEN: Object to form. 14:18:04

THE DEPONENT: In general, yes. It's also -- 14:18:05
oh, God. We're sort of wasting time on this. I was 14:18:14
asked in another case to reverse engineer how some video 14:18:18
cameras worked, and the issue for the patented question 14:18:21
was, where is a certain function on the camera 14:18:23
implemented, is it implemented in the camera or in the 14:18:27
host. So we had to reverse engineer how it worked to 14:18:30
figure that out. We used breakout boxes and logic 14:18:33
analyzers and things like that. That was a -- that was 14:18:37
a -- I was an expert consultant, non-testifying 14:18:39
consultant, on a particular case where that -- that 14:18:43
question came up. 14:18:46
BY MR. BRAUSA: 14:18:46
Q. Okay. And you did that because without doing 14:18:46
the experiments, without using the breakout box, you 14:18:48
didn't know exactly how that worked, right? 14:18:52
A. That's right. 14:18:55
MR. JENSEN: Object to form. 14:18:56
BY MR. BRAUSA: 14:18:57
Q. All right. I'm going to switch gears. Do you 14:18:57
want to take another break or should we keep going? 14:18:59
A. What time is it? It's 2 o'clock. 14:19:01
Yeah, let's break for five minutes, something. 14:19:08
THE VIDEOGRAPHER: This marks the end of Media 14:19:10
No. 3 in the deposition of Eric Welch. The time is 2:19 14:19:12

p.m. We are off the record. 14:19:18

(A recess transpires.) 14:19:20

THE VIDEOGRAPHER: This marks the beginning of 14:33:54

Media No. 4 in the deposition of Eric Welch. The time 14:33:56

is 2:33 p.m. We are on the record. 14:34:00

BY MR. BRAUSA: 14:34:00

Q. Welcome back. Did you talk with counsel at all 14:34:04

during the break? 14:34:07

A. Not at all. 14:34:08

Q. And did you refer to the notes in the notebook 14:34:09

in your pocket at all? 14:34:10

A. Not at all. 14:34:11

Q. If I can direct you back to Exhibit 1013, your 14:34:12

declaration in the '420 proceedings, to page 15, 14:34:20

paragraph 18 and 19. 14:34:23

A. This is 228? 14:34:25

Q. Yes, it is. Thank you. 14:34:27

A. Okay. Page 13, you said. Okay. 13. Okay. 14:34:32

Thir -- and paragraphs 13 and 14. Got it. 14:34:39

Q. I'm sorry. I may have misspoke. Page 15. 14:34:42

A. Oh, okay. 14:34:45

Q. Paragraphs 18 and 19. It's the subsection 14:34:45

titled "Anticipation." 14:34:49

A. Oh, yes. Yes. Okay. 14:34:50

Q. And in paragraphs 18 and 19, you set forth the 14:34:51

legal standard you were provided by counsel -- 14:34:55
A. Mm-hmm. 14:34:57
Q. -- for something called anticipation, right? 14:34:57
A. Mm-hmm. 14:35:00
Q. You're not offering any opinions that any of the prior art you considered in this case anticipates any of the challenged claims, right? 14:35:00 14:35:03 14:35:09
A. I don't. That's correct. I'm not offering an opinion like that. 14:35:10 14:35:12
Q. Okay. Why did you include an anticipation legal standard in your report? 14:35:13 14:35:16
A. For completeness. You know when, we started, I said, okay, you know, I have some experience with this, but would you guys provide all the unusual stuff, and I sort of listed these different things. I find it -- I find it helpful for myself to go back occasionally and reread obviousness versus anticipation, especially at the beginning, you know, if it's been a while. These concepts are a little foreign to my regular engineering work, even though, you know, a lot of the technical concepts, there's a lot of overlap. But that's interesting. So that's the short answer to your question. 14:35:17 14:35:27 14:35:30 14:35:33 14:35:37 14:35:41 14:35:45 14:35:48 14:35:51 14:35:54 14:35:58 14:36:00
Q. Okay. Can I direct you to page 21, paragraphs 41 and 42? And this sets forth your understanding of 14:36:00 14:36:05

the legal standard for indefiniteness. Is that correct? 14:36:14

A. It does. 14:36:24

Q. Okay. 14:36:24

A. Just rereading it to remind myself. 14:36:25

Q. Sure. Go ahead. 14:36:28

A. Yeah. 14:36:33

Q. Okay. Paragraph 42, you say that you understand a claim can be found unpatentable due to the prior art, i.e., anticipated or obvious in certain circumstances, even if the claim is indefinite, right? 14:36:33 14:36:36 14:36:39 14:36:43

A. That's correct. 14:36:45

Q. And then you go on to say: 14:36:48

"One example is where the outer bounds of the claim limitation are not reasonably certain, but the prior art disclosure falls within the scope of the limitation that is not subject to uncertainty." 14:36:49 14:36:51 14:36:54 14:36:57

A. Yes. 14:36:59

Q. Do you see that? 14:37:00

A. That's exactly right. Yeah. 14:37:00

Q. What do you mean by that? 14:37:01

A. Well, the key phrase to me -- again, I'm not a lawyer, but this spoke to me -- is in the above, under indefiniteness, "POSITA of the invention is able to determine what the claim covers and then what it does not cover." 14:37:04 14:37:06 14:37:10 14:37:13 14:37:15

So if we have a claim that covers X, Y, and Z, but it might have other things in it, it might be indefinite. But we might still be interested in finding -- we are still interested in finding prior art for A, B, C. It's as simple as that. If there are more complicated legal issues here, you know, this -- this is what I've -- I'm not saying it the right way. 14:37:17 14:37:20 14:37:23 14:37:25 14:37:29 14:37:33 14:37:37

That's how I understand indefinite -- indefiniteness. And the reason why I have opined that some claims are indefinite and yet have gone on, despite that, to show an obviousness argument related to the -- you know, the prior art, POSITA knowledge, all that kind of stuff. 14:37:42 14:37:45 14:37:48 14:37:52 14:37:58 14:38:01

Q. And so I guess that's where my question is. How -- how are you able to perform the obviousness inquiry and your obviousness analysis if in your view the scope of the claim was not reasonably certain? 14:38:01 14:38:04 14:38:08 14:38:12

MR. JENSEN: Object to form. 14:38:14

THE DEPONENT: Well, I'm not sure what else to say about that. But it's -- it's this idea that if we know -- if we have some ideas of what the claim does cover and we're certain -- we're confident about that, we could look for prior art about that, but if at the same time we're not sure what it doesn't cover, that we might have an indefinite argument -- indefiniteness 14:38:14 14:38:22 14:38:25 14:38:27 14:38:32 14:38:36 14:38:40

argument about the same claim. That's my understanding 14:38:43
about how this stuff works, and I have proceeded from 14:38:49
that understanding. 14:38:51
BY MR. BRAUSA: 14:38:52
Q. Why does it matter if -- if you're not sure what 14:38:54
the claim doesn't cover? Isn't all the validity 14:38:57
analysis you've done relating to what the claim actually 14:39:00
covers? 14:39:02
A. It is. But, again, in my brief for this, I was 14:39:02
asked to consider not just, you know, unpatentability 14:39:08
due to obviousness, but secondary considerations and 14:39:13
also indefiniteness. I was asked to include that and I 14:39:16
was asked to consider these standards for that. That's 14:39:19
why. 14:39:24
Q. Okay. Can you give me any specific example of 14:39:24
this situation you describe in paragraph 42 where the 14:39:27
outer bounds of a claim limitation are not reasonably 14:39:31
certain, but the prior art disclosure falls within the 14:39:35
scope of the limitation that is not subject to 14:39:39
uncertainty? 14:39:41
A. Yes, but not quickly. There are claims in here 14:39:41
that fall into that. It would take me a few minutes to 14:39:44
find one. 14:39:47
Q. Okay. One of the materials that you said you 14:39:47
were provided by counsel in May of 2023, when you were 14:40:07

retained, are the file histories to the various Aptiv patents, correct? 14:40:10 14:40:16

A. Mm-hmm. Mm-hmm. 14:40:17

Q. And one of the file histories you were provided was for the '037 patent -- 14:40:17 14:40:20

A. Mm-hmm. 14:40:22

Q. -- which is actually not -- 14:40:23

A. Mm-hmm. 14:40:23

Q. -- one of the patents that we're dealing with here -- 14:40:25 14:40:26

A. Mm-hmm. 14:40:27

Q. -- in these five proceedings, that it's the subject of other proceedings, right? 14:40:27 14:40:30

A. Mm-hmm. Mm-hmm. 14:40:31

Q. And you reviewed the file history for the '037 patent, right? 14:40:32 14:40:35

A. That's correct. 14:40:35

Q. Okay. And do you recall a portion of the file history where the applicants clarified that if an element is part of another element, it's not considered interconnected with that element? 14:40:36 14:40:40 14:40:43 14:40:48

MR. JENSEN: Object to form. 14:40:50

THE DEPONENT: In a general sense, yes. If you want to talk about this in detail, I should -- I should pull up the actual document. But -- 14:40:51 14:40:59 14:41:01

BY MR. BRAUSA: 14:41:01

Q. Okay. 14:41:04

A. -- go ahead, we'll see if that's necessary. 14:41:04

Q. Sure. Why don't I hand you -- 14:41:07

A. Probably a good idea. 14:41:10

Q. Well, wait till you see the size. 14:41:11

A. Oh, wow. Okay. Wow. 14:41:14

MR. BRAUSA: This is Exhibit 1002 as filed in 14:41:16

PGR2024-11. This is a copy of the file history for the 14:41:21

'037 patent. 14:41:26

(Referencing Exhibit 1002.) 14:41:18

THE DEPONENT: Okay. All right. Well, I'll 14:41:28

give it back. I won't take this away because I don't 14:41:29

need more paper. 14:41:33

Boy, the short answer is I do remember the -- I 14:41:40

remember the issue you're talking about. I don't 14:41:43

remember where it appears in here. So you'll have to -- 14:41:46

BY MR. BRAUSA: 14:41:48

Q. Sure. 14:41:49

A. -- give -- 14:41:49

Q. I won't ask you to find it. 14:41:50

So it's on -- if you look in the lower 14:41:53

right-hand margin, there are page numbers. 14:41:55

A. Yes. Mm-hmm. 14:41:57

Q. It's on page 132 in a section called "Remarks 14:41:58

and Arguments." 14:42:02

A. Okay. Got it. Page 132. All right. 14:42:04

Okay. Just so that I know what I'm reading. 14:42:23

Okay. No. Here it is at the top. This is a reply to 14:42:25

the final office action of February 9, reply dated 14:42:28

April 11. Okay. All right. All right. 14:42:32

Q. And it's the last full paragraph that I'm going 14:42:37

to direct your attention to, that starts out, "Applicant 14:42:39

respectfully points out the hub controller 203." 14:42:45

Do you see that? 14:42:45

A. I do -- I do see that. 14:42:48

Q. Okay. And so in this paragraph, the applicant 14:42:50

is saying the hub controller and switching logic are 14:42:53

components of the hub, rather than separate elements, 14:42:56

right? 14:42:58

A. That's what -- yeah, that's the first sentence, 14:43:03

right. 14:43:04

Q. Okay. And so then they go on to say it's not 14:43:05

logical that the controller -- or the hub controller and 14:43:07

downstream switching logic are components of the USB 14:43:10

switching hub contained with the hub, and at the very 14:43:14

same time interconnected to that same USB switching hub, 14:43:17

right? 14:43:22

A. Yes. That does sound like a tangle on the face 14:43:22

of it. 14:43:27

Q. Okay. And so what they're essentially saying is, if a component like a hub controller is part of the hub, you wouldn't say it's interconnected with the hub, right? 14:43:27 14:43:29 14:43:32 14:43:35

MR. JENSEN: Object to form. 14:43:36

THE DEPONENT: I pause because throughout this stuff there's -- there are different ways in which hub, hub controller, hub unit, custom hub, whatever, get used, and you might hypothetically back into just exactly that situation where it wasn't entangled because you were actually talking about things that were inside other things or things interconnected to other things that were actually separate, and that part of the problem of untangling them is trying to understand the scope of what word is used. I say that as a general remark. I don't actually remember the drawing that this refers to. 14:43:39 14:43:43 14:43:47 14:43:51 14:43:56 14:44:01 14:44:04 14:44:07 14:44:10 14:44:12 14:44:15 14:44:18

So in general, I understand what's being said here, but just as a caveat, I say, okay, I can visualize a case where, you know, this might be rendered non-problematic based on some appropriate POSITA knowledge. 14:44:18 14:44:21 14:44:26 14:44:31 14:44:37

MR. BRAUSA: Okay. 14:44:37

THE DEPONENT: Anyway. Forget that. 14:44:37

/// 14:44:37

BY MR. BRAUSA: 14:44:37

Q. Well, let's look back at unmodified Figure 3 from the Chang reference, Exhibit 1014. 14:44:40 14:44:43

A. Mm-hmm. 14:45:12

Q. And here if we -- you know, and I acknowledge your testimony from earlier today that you think a POSITA would view hub control unit labeled 46 as -- 14:45:13 14:45:18 14:45:21

A. Mm-hmm. 14:45:25

Q. -- satisfying what you consider to be the functional definition of a hub. 14:45:25 14:45:26

But Chang also refers to the entire box 40 as the hub in the patent -- 14:45:28 14:45:33

A. Mm-hmm. 14:45:34

Q. -- itself, right? 14:45:34

A. Mm-hmm. That's right. 14:45:35

Q. And, in fact, when you created various drawings of what you call the cross/bar and MUX implementations of Figure 3, two of those are where you analyzed it from the perspective of a POSITA thinking that box 40 is the hub, right? 14:45:36 14:45:40 14:45:45 14:45:49 14:45:53

A. That's right. 14:45:53

Q. So I want to focus on that implementation where box 40 is the hub. 14:45:54 14:45:57

A. Okay. 14:45:58

Q. In that implementation, the bridge, you wouldn't 14:46:00

say is interconnected to the hub, it's -- it's part of the hub, right? 14:46:03 14:46:06

MR. JENSEN: Object to form. 14:46:08

THE DEPONENT: Okay. That would be -- let me look at that. 14:46:10 14:46:20

Okay. What I'm doing is pulling up the picture -- well, it was actually a series of pictures. But I'm pulling up the pictures from the section on motivation to combine where there's the most discussion. 14:46:40 14:46:43 14:46:47 14:46:49

BY MR. BRAUSA: 14:46:49

Q. Sure. If you're looking at the colored modified cartoons that got created, those are on page 1 of 3 of your report. 14:46:53 14:46:56 14:47:00

A. Yep. Okay. 14:47:01

Okay. All right. All right. Now I have the context. Ask your question again. 14:47:13 14:47:14

Q. Okay. So I guess maybe it's worth laying this out because I don't actually think these colored cartoons relate to my question, because what I want to know is, if you look at Figure 3 of Chang unmodified -- 14:47:15 14:47:19 14:47:22 14:47:26

A. Mm-hmm. 14:47:31

Q. -- and you shade box 40 blue, is the hub -- 14:47:31

A. Mm-hmm. 14:47:31

Q. -- which is what you've done on the right-hand pictures -- 14:47:37 14:47:38

A. Mm-hmm. 14:47:39

Q. -- but you don't move the bridge out of box 40, 14:47:39

as you did in both the cartoons we see on page 103 -- 14:47:42

A. Mm-hmm. 14:47:46

Q. -- and the bridge is still within box 40 of 14:47:46

Chang Figure 3 -- 14:47:51

A. Mm-hmm. 14:47:54

Q. -- then the bridge wouldn't be interconnected 14:47:54

with 40, it would be part of 40, right? 14:47:58

MR. JENSEN: Object to form. 14:48:02

THE DEPONENT: No. I think the POSITA's view 14:48:03

here is that you have a USB hub at the center. It 14:48:11

happens to be called hub control unit in Chang. It 14:48:16

might be called other things in other places. The 14:48:21

convention of drawing simple lines when you include 14:48:29

these functions sort of close together, whatever close 14:48:31

might mean, without boxes for ports and connectors and 14:48:33

so on is easily understood by a POSITA to be a 14:48:40

convenience that refers to implementation. In all these 14:48:44

cases, the bridge is interconnected to the hub by some 14:48:49

means or other. 14:48:52

I mean, the background here is the way USB works 14:48:55

electrically between a host and a device, the only -- 14:48:58

the only electrically visible thing that you might see 14:49:03

out there, that the host might see out there, is a hub. 14:49:06

And what that means is that the only thing between a downstream-facing port and the device itself that's electrically visible is the device itself. Cables, connectors, all these other sort of implementation details are invisible. 14:49:09 14:49:11 14:49:15 14:49:18 14:49:21

So what we have is a hub, which I've opined operates functionally, and we have to hang on to that because we've got different implementations here. You know, these things might be in a box where there are wires connecting them. Might be in separate boxes where you're using standard USB connectors and cables. All of those things would be understood by a POSITA to effectively mean the same thing, the implementation details and differences, the reasons for that, which we've talked about. 14:49:24 14:49:29 14:49:31 14:49:34 14:49:36 14:49:39 14:49:42 14:49:44 14:49:48 14:49:50

But going to your question, even though these bridge -- even though these pictures, you know, move the boxes around and supply colors and stuff, my original idea was that would make it easier to read, it doesn't change anything. The connection between the bridge and the UBS hub is the same in all these cases. And I think a POSITA would say it's interconnected to the bridge. 14:49:51 14:49:55 14:49:58 14:50:01 14:50:03 14:50:06 14:50:11

MR. BRAUSA: Okay. 14:50:15

THE DEPONENT: Now, this -- okay. But specifically to your point of if it's inside the box 14:50:16 14:50:17

called 40, then it's not interconnected. No, I disagree with that because what's happening in that case is that box 40 on here is not a USB hub. It's a modified custom hub, a local construct of this patent. But a POSITA has no trouble understanding what these things are. Okay, here's a hub, there's hub ports. Oh, here's a different thing. Here's a bridge. Now the bridge looks like a device to the hub because that's what bridges do, and this bridge looks like a device to the other host because that's how bridges work. So anyway, that's -- 14:50:21 14:50:24 14:50:27 14:50:33 14:50:37 14:50:40 14:50:42 14:50:46 14:50:48 14:50:50

BY MR. BRAUSA: 14:50:50

Q. Let me try and unpack some of that. 14:50:57

A. I'm sorry. 14:50:59

Q. I think you just testified that a POSITA would understand that in Figure 3, 40 is not a USB hub? 14:50:59 14:51:02

A. That's correct. 14:51:07

Q. Okay. And that's because it's a custom hub, in your view? 14:51:08 14:51:11

A. Okay. Let me say this differently. 14:51:11

It's not the USB hub that's described in the USB-IF spec. My own view of this entire world of patents and prior art and so on is that the word "hub" gets used and reused in a lot of different places, not always accurate ly. I'm not testifying that nobody would ever not call 40 a hub. They might do that. What 14:51:16 14:51:19 14:51:25 14:51:28 14:51:32 14:51:38

I'm trying to unpack is that if you go back to the UBS-IF view of what these things are, this thing called hub unit appears and probably is a USB hub, and that from that standpoint, the -- the thing called 40 might be described as a hub or a custom hub or even a USB hub, but it's not the same kind of -- it's not the USB-IF's USB hub. That's what I'm saying. 14:51:43 14:51:47 14:51:50 14:51:53 14:51:57 14:52:00 14:52:04

Q. Okay. Do you think bridge 52 in unmodified Chang Figure 3 is interconnected with hub 40 in unmodified Chang Figure 3? 14:52:06 14:52:13 14:52:17

MR. JENSEN: Object to form. 14:52:18

THE DEPONENT: As drawn here, bridge 52 is part of the -- the object called 40. 14:52:21 14:52:25

BY MR. BRAUSA: 14:52:30

Q. Okay. 14:52:30

A. Whatever it's called. 14:52:30

Q. Okay. And so it is not interconnected with it. It's part of it. Right? 14:52:31 14:52:34

A. If the "it" in your sentence is this construct called 40, yes. 14:52:36 14:52:38

Q. Okay. So let me -- let me make that clear so there's no confusion. 14:52:39 14:52:40

Bridge 42 is part of what Chang calls hub 40, correct? 14:52:42 14:52:47

A. In this drawing it is, yeah. 14:52:47

Q. Okay. In Figure 3, bridge 52 is not interconnected with what Chang calls hub 40, right? 14:52:50 14:52:53

A. Yes, that's right. 14:52:57

Q. Okay. And then that's because it's part of it, not interconnected with it? 14:53:00 14:53:02

A. Yes. 14:53:03

Q. Okay. Now, turning back to the various modifications you made to Figure 3 and then color coded on page 198. 14:53:03 14:53:08 14:53:12

A. I thought -- 14:53:17

Q. I'm sorry, paragraph 198. 14:53:18

A. One -- yes. 14:53:19

Q. Page 103. Excuse me. 14:53:19

A. Yep. Good. Got it. 14:53:21

Q. We have on the left two implementations where item 46 in Chang Figure 3 you characterize in shade blue as hub 46, right? 14:53:22 14:53:31 14:53:37

A. Mm-hmm. That's right. 14:53:39

Q. Okay. And just to confirm, that language, quote, hub 46, that's your own? We already talked about this. Chang never calls that, quote, hub 46, right? 14:53:40 14:53:43 14:53:46

MR. JENSEN: Object to form. Asked and answered. 14:53:50 14:53:51

THE DEPONENT: That could be true, yeah. 14:53:52

/// 14:53:55

BY MR. BRAUSA: 14:53:55

Q. Okay. And then on the right, we have two implementations where all of box 40, which Chang does call a hub, is shaded blue. Those are the two hub 40 implementations on the top and bottom of the right-hand portion of page 103, right? 14:53:55 14:54:01 14:54:04 14:54:08 14:54:12

A. It is. But 40 over here is not the same as the 40 over here, obviously. You know, I've taken some license here and I'm using the drawing conventions from here, but in this case I've moved the bridge outside. 14:54:13 14:54:18 14:54:20 14:54:24

Q. Right. Right. And you anticipated my next question, because I want to walk through all the licenses that you've taken with Figure 3 from Chang -- 14:54:28 14:54:31 14:54:35

A. Mm-hmm. 14:54:38

Q. -- in the cartoons that are shown on page 103. 14:54:39

A. I don't mind you calling them cartoons. 14:54:42

Q. Oh. Is there another word you'd like to use? 14:54:45

A. It's fine. 14:54:48

Q. Is there another word you'd like to use? 14:54:49

A. No, no. I'm just joking. It's fine. 14:54:54

Q. Oh, okay. Sorry. So -- so if we start at the top left-hand portion, this is Chang hub 46, right? 14:54:56 14:54:59

A. Right. Right. 14:55:05

Q. That diagram doesn't appear in Chang at all, right? 14:55:06 14:55:11

MR. JENSEN: Object to form. 14:55:12

THE DEPONENT: No. This is -- this is the 14:55:13
construct we get by taking Chang and adding the 14:55:13
teachings of Chang 2. 14:55:17

BY MR. BRAUSA: 14:55:19

Q. Okay. And -- and what are the -- walk me 14:55:19
through the steps that you think a POSITA would go 14:55:23
through, starting with Chang -- 14:55:26

A. Mm-hmm. 14:55:29

Q. -- in Figure 3 -- 14:55:29

A. Mm-hmm. 14:55:30

Q. -- to get to the cartoon shown on page 103. 14:55:30

A. Okay. 14:55:34

Q. In the top left-hand portion. 14:55:37

A. Okay. Okay. And then we'll separately talk 14:55:38
about the difference between the left and the right? 14:55:44

Q. We're going to go through each one of these. I 14:55:45
just want to make sure I have everything. 14:55:48

A. Okay. All right. Well, the essence of -- I'm 14:55:51
sorry. 14:55:51

The teaching of Chang 2 that we -- that we bring 14:55:57
over here has been simplified into this box called MUX. 14:55:59

Q. Mm-hmm. 14:56:04

A. What that includes, and we have some detail 14:56:06
about that elsewhere, is that there is a detection 14:56:09

circuit, there's a bypass circuit. I don't have Chang 2 here. But there's a couple of other things, and we're bringing those together. And what we're doing with those is we're connecting those to two different hub ports in the -- the item 46. So those are the two -- those are the two bits of teaching of Chang 2 that we're adding to Chang. 14:56:11 14:56:18 14:56:21 14:56:24 14:56:28 14:56:37 14:56:41

Q. Okay. So we're adding the -- 14:56:42

A. We're adding the green box MUX. 14:56:45

Q. Mm-hmm. 14:56:47

A. And we are allowing the connection -- the upstream connections from those two pieces, instead of going to one place, which is what Chang 2 has, we're -- we're now breaking those out so that they go to two places. 14:56:49 14:56:51 14:56:54 14:57:00 14:57:03

Q. Okay. And in this diagram at the top left-hand portion of page 103 in your report, the MUX is only connected to one downstream port, right? 14:57:03 14:57:08 14:57:14

A. Yeah, that's right. 14:57:16

Q. Okay. So in this implementation shown here, even given these modifications, Chang hub 46, as you call it, would not support simultaneous communication with the upstream port 42 and multiple downstream ports, right? 14:57:20 14:57:25 14:57:30 14:57:34 14:57:34

A. No. I'm not saying that. What you get from 14:57:40

this drawing, Chang -- on page 103, Chang hub 46, is 14:57:42
that if you plug in a host on the Port No. 50, there is 14:57:49
a -- there's a path through the bridge -- 14:57:54
Q. Mm-hmm. 14:57:58
A. -- that obtains. 14:57:59
But if at the same time you plug something into 14:58:00
44, or the other 44, those connections behave as -- as 14:58:03
the user would expect them to. They just work. They 14:58:06
don't disrupt. You have simultaneity, all of those 14:58:09
kinds of things. At the same time, if you plug a device 14:58:14
into 50, it goes through MUX onto a different path into 14:58:17
the hub, and as we show it here, it's a different hub 14:58:20
port. At the same time, you could have things plugged 14:58:23
into the other two ports. 14:58:26
Q. Okay. And what would happen if you plugged in a 14:58:27
host to one of the port 44s in the upper left-hand 14:58:29
cartoon shown on 103? 14:58:36
A. You get -- it doesn't work, and what you get is 14:58:38
the -- is the behavior that's called out in the spec 14:58:40
where it doesn't work, it doesn't break anything, it 14:58:44
doesn't cause any safety problems. And they'd love it 14:58:48
if you had a way to tell the user what you've done 14:58:51
wrong, but it doesn't work, is the short answer. 14:58:54
Q. Okay. There's no mechanism shown in this -- 14:58:56
A. Yeah. 14:58:58

Q. -- illustration you created where either of the ports 44 can support a host, right? 14:58:59 14:59:03

A. That's right. 14:59:07

Q. Okay. And so in this implementation that you have arrived at by modifying various aspects of Figure 3 of Chang -- again, this is the top left-hand -- 14:59:08 14:59:13 14:59:16

A. Yep. Yep. 14:59:19

Q. -- corner of page 103. 14:59:20

A. Yep. 14:59:21

Q. We added a MUX. It has a detection circuit and a bypass circuit, right? 14:59:23 14:59:26

A. Mm-hmm. 14:59:28

Q. And is there a modification of what's shown as port 50 at all, as compared to unmodified Chang Figure 3? 14:59:29 14:59:33 14:59:39

A. It doesn't have to be. I mean, I'm torn between saying no and no, but it's an implementation detail, which it is. So no, it's not different from what's shown in Chang. 14:59:44 14:59:48 14:59:51 14:59:55

Q. Okay. 14:59:55

A. Chang 2, rather. 14:59:56

Q. So in the upper left-hand quadrant of page 103, that Chang hub 46 implementation that you drew and color coded does not have any dual-role ports on it, right? 14:59:56 15:00:01 15:00:09

THE DEPONENT: Port -- 15:00:12

MR. JENSEN: Object to form. 15:00:13

THE DEPONENT: Port 50 is dual role because you can plug in either a host or a device, and because of that, it's -- it's dual role. 15:00:14 15:00:17 15:00:22

MR. BRAUSA: Okay. 15:00:25

THE DEPONENT: But only that one. 15:00:26

MR. BRAUSA: Okay. 15:00:27

THE DEPONENT: That's true, not the others. 15:00:28

BY MR. BRAUSA: 15:00:28

Q. But -- but that is a change from figure 3 of Chang? 15:00:29 15:00:31

A. Correct. 15:00:31

Q. Because port 50 as described in Chang Exhibit 1014 is a dedicated host port, right? 15:00:32 15:00:35

A. That's exactly right. 15:00:37

Q. Okay. So those are the modifications that you think a POSITA would find to be obvious based on Chang 1 in combination with Chang 2, right? 15:00:38 15:00:42 15:00:47

A. And their own knowledge, yes. 15:00:49

Q. Okay. And their own knowledge. Got it. 15:00:51

And this diagram, just to confirm, this is based, again, upper left-hand quadrant of page 103, this is based on your view that hub control unit 46 on its own satisfies the definition of a hub as set forth in the challenged Aptiv claims? 15:00:56 15:01:02 15:01:06 15:01:09 15:01:15

A. No, that's not what I'm saying. That might be partly true. What I'm saying is that 46 satisfies what the USB-IF calls a hub. And, again, that's a functional definition so, you know, the implementation of this could vary. 15:01:17 15:01:21 15:01:25 15:01:29 15:01:33

Q. Okay. Well, understanding that, does item 46 in Chang satisfy the definition of a hub as that term is used in the challenged claims of the Aptiv patents? 15:01:33 15:01:39 15:01:44

A. Let's look at one and figure that out. 15:01:47

Q. Okay. Sure. We can go to claim 1 of the '420 patent. And let me give you a copy of that. It's Exhibit 1003. 15:01:51 15:01:54 15:02:03

(Referencing Exhibit 1003.) 15:02:04

THE DEPONENT: The short answer is no. This construct in claim 1 is something that's more than a hub. It may contain a hub, but it also has other things. Let's ignore the preamble for a moment, but this hub thing has a way to accept the connection of both devices and hubs, and so -- I'm sorry, devices and hosts, and so it's not the USB-IF hub. What it is, is it's a thing that is rendered obvious by the Chang and Chang 2 drawings we were talking about. So 46 in Chang is not the same as claim 1, in my opinion. 15:02:43 15:02:45 15:02:51 15:02:54 15:03:05 15:03:11 15:03:16 15:03:20 15:03:25 15:03:30

BY MR. BRAUSA: 15:03:33

Q. Okay. If we go to the next diagram over to the 15:03:33

right, where we're now color coding all of box 40 blue. 15:03:45

A. Sorry. I mistakenly closed that. 15:03:54

Q. Oh. Sorry. It's on page 103. 15:03:57

A. Here we are. I got it back. Okay. 15:03:59

Q. Okay. So what about box 40 in Chang as you've shown it on page 103, does that correspond to claim 1 of the '420 patent? 15:04:03 15:04:09 15:04:13

MR. JENSEN: Object to form. 15:04:15

THE DEPONENT: In my analysis for claim 1, I don't pick the top ones. I pick the bottom ones. I pick the implementation that has the cross/bar switch because that makes all of the ports dual role. And as I understood claim 1, that's what it is supposed to do, and so that's what -- that's -- that motivated the prior art selection. 15:04:16 15:04:31 15:04:33 15:04:37 15:04:42 15:04:46 15:04:50

BY MR. BRAUSA: 15:04:53

Q. So you were -- you were motivated to choose and rely on the bottom two implementations -- 15:04:54 15:04:56

A. Mm-hmm. 15:04:59

Q. -- that you created on paragraph 103 because -- 15:04:59

A. Mm-hmm. 15:05:02

Q. -- those were the ones that you thought are what the claim was taking about? 15:05:02 15:05:05

A. Yes. 15:05:07

Q. Okay. So the top two implementations with the 15:05:07

MUX shown on page 103, why did you -- why did you include those at all? 15:05:10 15:05:15

A. Well, it was anticipating future things. You know, throughout all of these, I believe there were -- there were places, other claims, other circumstances, where it seemed that this implementation was a slightly better choice to illustrate the point or whatever. The motivation to combine argument says various things about getting here, but the jump from a MUX to a cross/bar switch is, in my opinion, a modest one. You know, it's -- it's the kind of thing that would be understood in the art and vastly predating USB. These are not UBS specialized components. Indeed, companies that sell these switches for, you know, decent margins may easily have taken switches they had for decades and said, oh, this is a USB switch and start selling it as that, you know, make some more money. That's perhaps unfair to people like Fairchild that make good products. 15:05:15 15:05:18 15:05:22 15:05:25 15:05:29 15:05:36 15:05:38 15:05:45 15:05:49 15:05:51 15:05:56 15:05:59 15:06:04 15:06:08 15:06:12 15:06:14

Anyway, that's the short answer. You know, we constructed both of these things and made these drawings in order to be able to use them where appropriate throughout the documents. And for -- what are we talking about, for '420 claim 1, it was the lower ones that made sense. 15:06:16 15:06:18 15:06:21 15:06:24 15:06:28 15:06:31

Q. Okay. I want to come back to those lower 15:06:32

diagrams in just a minute. But earlier when we were looking at claim 1 of the '420 patent, you said that this is not a claim to a USB hub, it's a hub module, which includes a hub but a lot of other stuff, right? 15:06:36 15:06:39 15:06:43 15:06:48

A. That's my understanding. 15:06:51

Q. Okay. And your understanding is that claim 1 has multiple downstream dual-role ports, correct? 15:06:51 15:06:53

MR. JENSEN: Object to form. 15:06:56

THE DEPONENT: Well, to be precise, it might -- as written, it might only have two. I don't remember. 15:07:12 15:07:15

MR. BRAUSA: Okay. 15:07:20

THE DEPONENT: But, yeah. Given that two is a version of multiple, yes. 15:07:20 15:07:26

BY MR. BRAUSA: 15:07:28

Q. Okay. And that's why you relied on the bottom two implementations you drew from -- or modified from Figure 3 of Chang set forth on page 103 of your report, because the top two implementations with just the MUX only have one dual-role port, right? 15:07:28 15:07:30 15:07:35 15:07:38 15:07:42

MR. JENSEN: Object to form. 15:07:44

THE DEPONENT: That's correct. Yeah. 15:07:45

BY MR. BRAUSA: 15:07:46

Q. And Chang 2, in fact, only has one dual-role port, right? 15:07:46 15:07:49

A. That's correct, too. 15:07:49

Q. Okay. As a result, Chang 2 doesn't have a cross/bar switch either, does it? 15:07:50 15:07:55

A. No. 15:07:57

Q. Okay. Why in -- so if we focus on the right two cartoons that are shown on page 103 that have the entire box 40 from Chang shaded blue, right? So in both of those implementations, you moved the bridge outside of box one -- of box 40, right? 15:07:59 15:08:28 15:08:31 15:08:38 15:08:44

A. Mm-hmm. Mm-hmm. 15:08:46

Q. That's different location from where Chang describes box -- or bridge 52 being shown, correct? 15:08:46 15:08:50

A. That's correct. 15:08:56

Q. Why did you do that? 15:08:58

A. The primary reason was to do -- okay. I have said before that the target patents here have different definitions for things, and we wanted to make sure we covered everything. The background reality here is what I said earlier about these distinctions being invisible to the host. They're electrically invisible. None of this matters. Never -- nonetheless, if -- if we need to meet a claim which is written in terms of something that a POSITA would understand -- I'm just speaking hypothetically now -- as an off-the-shelf USB hub, that is to say its hub function in a box with an upstream connector, downstream connectors, and that in order to 15:08:59 15:09:13 15:09:16 15:09:21 15:09:25 15:09:27 15:09:30 15:09:36 15:09:39 15:09:41 15:09:45 15:09:50

describe our prior art, in terms of that, we sometimes found that the drawing on the right was more convenient, just because it -- it -- it brings the -- it brings the physicality of the location of the ports out, and in some cases that made it easier to discuss what was going on. 15:09:56 15:10:00 15:10:04 15:10:09 15:10:14 15:10:18

Q. So your testimony is that you decided to modify Figure 3 of Chang and move the bridge 52 outside of box 40 as it's shown in Chang? 15:10:22 15:10:27 15:10:31

A. Mm-hmm. 15:10:33

Q. Because putting it outside and moving the bridge to a different location in the two cartoons on the right on page 103 makes it more convenient to talk about those implementations? 15:10:33 15:10:37 15:10:40 15:10:46

MR. JENSEN: Object to form. 15:10:46

THE DEPONENT: Well, it's partly that. It's partly that if in the final analysis the distinction between these two things is thought to be important, even if I wouldn't suggest that it was, I wanted to make it clear that the prior art worked equally in both cases. I think that's -- that's the best way to explain it. In other words, it wasn't necessarily about whether a specific claim had language which required one of these things. It was about if a specific claim had language which could be interpreted in order to have one 15:10:47 15:10:49 15:10:57 15:10:59 15:11:03 15:11:09 15:11:11 15:11:13 15:11:17 15:11:19

of these rather than the other. And because of the way USB works and because of what the art is, it turns out that it's equally good in both places, and so I thought it was good to include both, just in the interest of completeness. 15:11:23 15:11:26 15:11:29 15:11:33 15:11:36

BY MR. BRAUSA: 15:11:37

Q. Okay. I guess I'm still struggling when you say "include both." You're referring to including proposed modifications where the bridge is located inside box 40 and outside box 40? 15:11:43 15:11:45 15:11:51 15:11:53

A. That's correct. 15:11:54

Q. Okay. And there's nothing in Chang that suggests moving bridge 52 outside of box 40, is there? 15:11:55 15:11:58

MR. JENSEN: Object to form. 15:12:03

THE DEPONENT: Well, it depends on how you read Chang. If you -- if you read it where these pieces are functional, as I think a POSITA would, it's irrelevant. It could be either way. And the -- and the POSITA would see the drawings that we have drawn just as a convenience of the inventor and would understand that it works equally if you've got this or you've got that. In a way, that's another part of why we did it this way, in order to sort of demonstrate the POSITA view. 15:12:04 15:12:06 15:12:10 15:12:12 15:12:15 15:12:18 15:12:22 15:12:25 15:12:29

The POSITA view of this stuff is that these distinctions don't really matter, not from the 15:12:31 15:12:33

standpoint of the underlying functionality. You know, if you put a bus analyzer upstream of this stuff, none of these would be different. That's an important part of the POSITA view, another reason why I included both of these things. 15:12:37 15:12:39 15:12:42 15:12:44 15:12:47

BY MR. BRAUSA: 15:12:47

Q. Okay. So you think a POSITA would look at Figure 3 of Chang and conclude that the bridge was located inside of box 40 just for the convenience of the inventor? 15:12:48 15:12:50 15:12:54 15:12:58

MR. JENSEN: Object to form. 15:13:00

THE DEPONENT: Basically, yeah. 15:13:01

BY MR. BRAUSA: 15:13:02

Q. Okay. And now, just to be clear, in the upper right version of this cartoon, where you have highlighted all of box 40 in blue and then moved the bridge outside of the hub -- 15:13:02 15:13:07 15:13:12 15:13:19

A. Mm-hmm. 15:13:21

Q. -- but there's a MUX, right? 15:13:22

A. Right. 15:13:24

Q. You didn't rely on that implementation for your obviousness analysis of claim 1? 15:13:24 15:13:27

A. No. 15:13:30

Q. Okay. 15:13:30

A. No. It seemed to me that the lower ones were a 15:13:31

better fit for that. 15:13:34

Q. Okay. And so the lower ones, you mean the one 15:13:35

on the left and the right? 15:13:40

A. The one on the left and the one on the right -- 15:13:41

Q. Okay. 15:13:41

A. -- with the cross/bar. 15:13:46

Q. And what's the difference between those two 15:13:47

implementations that you created on the bottom that have 15:13:49

the cross/bar switches? 15:13:53

A. You mean between one and the other or you mean 15:13:54

between the corresponding ones and the top and the 15:13:56

bottom. 15:13:59

Q. I'm sorry. Between -- let's focus on the bottom 15:13:59

two. 15:14:01

A. Mm-hmm. Right. 15:14:02

Q. That I think you testified these were the ones 15:14:02

that you relied on for your obvious analysis. 15:14:04

A. Right, right, right. 15:14:08

Q. What's the difference between the bottom left 15:14:08

quadrant labeled Chang Hub 46 and the bottom right 15:14:10

quadrant labeled Chang Hub 40, both of which have the 15:14:14

cross/bar switch? 15:14:18

A. Okay. Those two things are functionally 15:14:18

identical, but a POSITA could easily imagine that the 15:14:20

one on the left has to do with a custom hub that has 15:14:27

these interesting dual-role ports all in one box. On the right side, again, it's functionally identical, but this is the case where you have maybe an off-the-shelf hub and then some external circuitry for whatever reason. It could be about, you know, system integration or, you know, it's a convenient way to connect things together, lots of different things. 15:14:29 15:14:33 15:14:36 15:14:39 15:14:43 15:14:48 15:14:53

You know, to -- to somebody that doesn't understand USB, these things look quite different. The fact is that they -- the differences are only sort of implementation details, but electrically it's the same, functionally it's the same. As I said earlier, if you put an upstream protocol analyzer on this, it wouldn't see anything different. 15:14:55 15:14:57 15:15:01 15:15:06 15:15:10 15:15:12 15:15:15

Q. Okay. If we look at claim 1 of the '420 patent. Do you have that in front of you? 15:15:16 15:15:21

A. Claim 1 of 420. I do. 15:15:23

Q. It's Exhibit 1003. 15:15:25

A. Oh, okay. I'm looking at this and you're talking about, sorry, 420. Claim 1. Okay. Okay. Claim 1. Got it. 15:15:28 15:15:33 15:15:50

Q. Does claim 1 set forth any specific structural requirements for the USB hub module, or is it purely functional in your view? 15:15:51 15:15:54 15:15:58

MR. JENSEN: Object to form. 15:16:00

THE DEPONENT: In reading this, I'm reminded of something that I saw the very first time I read about it and hadn't thought -- thought about since, and that is, in No. 1 it says universal serial bus, USB, hub module, comprising various things, and one of the things it comprises is a USB hub. That's, you know, potentially confusing. But POSITAs, in my view, are used to that kind of ambiguity. 15:16:01 15:16:21 15:16:24 15:16:26 15:16:34 15:16:39 15:16:47 15:16:50

I'm sorry. This isn't really answering your question. Let me go back and -- and look here. 15:16:56 15:16:58

Okay. I -- I read this claim as functional. I understand what's going on and what's intended by this claim language as referring to well-known things put together in a specific way where you have this non-UBS-IF behavior where you plug in something which is acting as a host and you have to route it through a bridge, plug in something that's acting as a device and you route it directly to the host. So as this claim is written, it's -- it's purely functional. Of course, there are other versions of this claim that say other things, like it's all on an IC or, you know, I forget. There may be other cases. 15:17:27 15:17:31 15:17:34 15:17:42 15:17:47 15:17:51 15:17:54 15:17:57 15:18:01 15:18:05 15:18:07 15:18:12

MR. BRAUSA: Okay. 15:18:13

THE DEPONENT: That's a long answer to your question. 15:18:14 15:18:15

BY MR. BRAUSA: 15:18:15

Q. So you don't think a -- for instance, a USB routing switch, that doesn't have any specific structure for you? 15:18:15 15:18:18 15:18:20

A. It has a functional structure. 15:18:23

Q. Okay. What do you mean by a functional structure? 15:18:24 15:18:26

A. Well, it does something and you can define what it does by the -- the operation of the switching elements, the operation of the control elements, the net effect of that switch operation on the end-to-end connectively through a device. That's what I mean by functional. You describe what it does, not necessarily how it does it and not necessarily the physical form that it takes. 15:18:27 15:18:29 15:18:33 15:18:37 15:18:41 15:18:43 15:18:47 15:18:51

You know, this thing leaves out discussion of UBS connectors and cables because what a POSITA knows about that is those don't change things. The stuff described this way can operate whether they're directly connected with wires or whether you use cables and connectors and so on. 15:18:52 15:18:54 15:19:02 15:19:07 15:19:08 15:19:11

Q. Okay. So in your view, the two bottom cartoons that are modified versions of Chang Figure 3, those perform the same function, I think is your testimony, right? 15:19:13 15:19:19 15:19:27 15:19:27

A. Mm-hmm. That's right. 15:19:30

Q. And do you think these are different structures or no? 15:19:31 15:19:32

MR. JENSEN: Object to form. 15:19:35

THE DEPONENT: Different structures. Do you mean -- when you say "these," do you mean 46 and 40? 15:19:36 15:19:48

MR. BRAUSA: Correct. And again, I'm at the bottom of -- well, page 103. It looks like you're on a different page. 15:19:56 15:19:58 15:20:03

THE DEPONENT: Well, I'm on -- I'm on the analysis in the -- 15:20:03 15:20:05

MR. BRAUSA: Okay. 15:20:06

THE DEPONENT: -- in the thing for claim 1. 15:20:07

MR. BRAUSA: Fair enough. Same figures. Yep. 15:20:08

THE DEPONENT: Yeah, it's the same drivers. 15:20:09

MR. BRAUSA: That's easier. 15:20:11

This is, just for the record, paragraph 220 -- 15:20:11

THE DEPONENT: Yeah. 15:20:14

MR. BRAUSA: -- page 114 of Exhibit 1013. 15:20:14

THE DEPONENT: 1013. 228. Yes. 15:20:16

Okay. What's written down for claim 1 is, as I have testified, mostly or entirely functional. In that sense, either of these drawings meets it. Why did we do that? We did that because if the interpretation of claim 1 in the -- in the final analysis or, you know, 15:20:26 15:20:29 15:20:33 15:20:42 15:20:46

whoever has to look at and rule on these things is done with an eye towards a specific implementation, I wanted to make it clear that both of these implementations, even though they're only different in physical forms, not functional ones, that they both meet it. That's what I've done here and what I've done in a lot of other places? 15:20:52 15:20:58 15:21:02 15:21:05 15:21:09 15:21:12 15:21:14

Q. Okay. Do you have an opinion on which physical form claim 1 of the '420 patent is actually referring to with respect to the two implementations shown on page 114? 15:21:14 15:21:16 15:21:23 15:21:27

A. No, I don't -- I don't have an opinion about that. 15:21:27 15:21:30

Q. Okay. So you don't know whether the requirements of claim 1 require or allow for the structure of the top, Chang hub 46, or the bottom, Chang hub 40? 15:21:30 15:21:32 15:21:38 15:21:41

MR. JENSEN: Object to form. 15:21:42

THE DEPONENT: That's correct. Yep. 15:21:43

BY MR. BRAUSA: 15:21:44

Q. So focusing in on these, again, neither of these figures as color coded, as drawn, as labeled, appear in Chang 1 or Chang 2 or any of the prior art, right? 15:21:46 15:21:51 15:21:56

A. No. No. These are -- these are an expression of the combined art that was developed earlier. 15:21:59 15:22:01

Q. Okay. And I think you testified to this, but you -- a graphics vendor from counsel helped you create these -- 15:22:07 15:22:09 15:22:15

A. That's correct. 15:22:15

Q. -- color-coded versions? 15:22:16

A. That's correct. 15:22:17

Q. Okay. And one of the things we talked about was adding a -- that's not in Chang Figure 3, is any sort of switching mechanism, right? That comes from Chang 2? 15:22:18 15:22:26 15:22:32

A. That comes from Chang 2, that's right. 15:22:35

Q. Okay. But we also talked about Chang 2 doesn't actually disclose a cross/bar switch, it just has a simple two-way switch between one host, one device, right? 15:22:37 15:22:39 15:22:42 15:22:42

A. That's correct. 15:22:46

Q. Okay. So where does the cross/bar switch come from? 15:22:46 15:22:48

A. The knowledge of a POSITA looking at the Chang system as modified by the Chang 2 teaching would readily see that this addresses a system with multiple dual-role ports via the simple modification of a one to two bucks two-way N to M cross/bar. The reason that that's true is that it is well within the wheelhouse of the POSITA to be familiar with all of these kinds of switching elements. As I said, these predate USB by decades. You 15:22:49 15:22:56 15:23:01 15:23:12 15:23:18 15:23:22 15:23:27 15:23:29

know, you see these in old analog control systems from the 1940s. It's very well-known technology and it's been used forever. So I regard that as an extremely simple step. 15:23:36 15:23:39 15:23:42 15:23:45

Q. Okay. At the start of your answer, you said: 15:23:45

"The knowledge of a POSITA looking at the Chang system as modified by the Chang 2 teaching would readily see that this addresses a system with multiple dual-role ports." 15:23:48 15:23:51 15:23:55 15:23:58

Right? I'm just reading back your testimony. 15:24:00

A. I'm sure I said that. I might change the word "addresses" in the last one. Rather, I should have said there's an incentive to move from the first step of the modification, as we showed in one of those drawings, to a later step, which I claim is a very small step, so MUX to cross/bar. 15:24:05 15:24:10 15:24:14 15:24:19 15:24:22 15:24:25

Q. Right. 15:24:26

A. Yes. 15:24:27

Q. Because, again, not to belabor the point, but Chang 2 doesn't disclose multiple dual-role ports, right? 15:24:28 15:24:30 15:24:32

A. Correct. 15:24:33

Q. So a POSITA would have to look at Chang 2 and say, I want to modify Chang 1 Figure 3 by first making at least one port dual role? 15:24:33 15:24:37 15:24:42

A. Right. 15:24:44

Q. Adding a switching mechanism? 15:24:45

A. Well, the switching mechanism comes from 15:24:47

Chang 2. 15:24:50

Q. Right. 15:24:51

A. So you have that -- you have that already by 15:24:51

that -- by that combination. The second step, where you 15:24:53

go from MUX to cross/bar, I'm saying that that's a very 15:24:55

simple and obvious one based on the knowledge of the 15:24:58

POSITA. 15:25:00

Q. Right. But it's not just going from MUX to 15:25:01

cross/bar, is it? It's making all the other ports in 15:25:04

Chang Figure 3 dual role, as well as port 50, right? 15:25:07

A. Mostly, that's just going from MUX to cross/bar. 15:25:10

Q. Okay. 15:25:12

A. Yeah. 15:25:14

Q. And, again, back to a question I asked earlier 15:25:15

in the day. Why didn't you identify a specific 15:25:17

reference in your motivation to combine section for a 15:25:21

cross/bar teaching? 15:25:28

MR. JENSEN: Object to form. 15:25:28

THE DEPONENT: I'm just trying to remember what 15:25:31

we did do. Okay. What -- what we looked at were a 15:25:34

bunch of switches that are on -- that are off-the-shelf 15:25:41

switches. And then we looked at cross/bars that were in 15:25:45

some of the cited prior art, Hesse or Overtoom or whatever. And the point I'm making is that a POSITA would recognize that all of that stuff is very common. And to answer your earlier question, we didn't see that as a sort of -- another motivation to combine issue, but rather, all that stuff is in the toolbox. 15:25:50 15:25:57 15:26:00 15:26:04 15:26:11 15:26:14

BY MR. BRAUSA: 15:26:18

Q. Okay. And -- and so if it's in the toolbox, you don't need to identify a specific reference as part of the motivation to combine. 15:26:18 15:26:20 15:26:23

Is that your understanding? 15:26:26

MR. JENSEN: Object to form. 15:26:26

THE DEPONENT: Because -- because that's the knowledge of the POSITA, yes. 15:26:27 15:26:28

BY MR. BRAUSA: 15:26:29

Q. Okay. Now, with respect to how a cross/bar switch operates, I think I understand it, which is it connects to all the ports, all the downstream ports? 15:26:29 15:26:43 15:26:46

A. Mm-hmm. 15:26:48

Q. And it can route any particular downstream port to any particular -- 15:26:49 15:26:53

A. Mm-hmm. 15:26:55

Q. -- upstream port, right? 15:26:56

MR. JENSEN: Object to form. 15:26:57

THE DEPONENT: Mm-hmm. 15:26:58

BY MR. BRAUSA: 15:27:00

Q. A cross/bar switch, as you have shown it in these modified variants of Chang set aside on paragraph -- or page 114 of your report, it can't merge two signals onto a single output, can it? 15:27:01 15:27:03 15:27:08 15:27:10

A. No. 15:27:12

Q. Why not? 15:27:13

A. It's not a hub. You need a hub to do that. 15:27:17

Q. Okay. Got it. And so the cross/bar switch can't, for instance, merge a signal from port 44 and 50 onto a single output, right? 15:27:19 15:27:22 15:27:26

A. No. 15:27:27

Q. Turning back to Chang 1, so this is Exhibit 1014. Can I direct your attention to paragraph 24? 15:27:28 15:27:43 15:27:51

A. This is really small type. 15:28:06

Yep, I see that. 15:28:28

Q. Okay. And in this portion of Chang, it says that the present invention can be implemented merely by integrating or adding a bridge to a USB hub, right? 15:28:29 15:28:31 15:28:35

A. That's what it says. 15:28:38

Q. And then it says: 15:28:39

"And thus, does not require too many modifications on the current hub control unit." 15:28:41 15:28:42

Right? 15:28:44

A. Right. 15:28:44

Q. And then it says: 15:28:45

"Therefore, the derived cost is relatively low." 15:28:47

Do you see that? 15:28:47

A. Mm-hmm. Yes. 15:28:54

Q. What do you think a POSITA would understand this paragraph to be describing? 15:28:54 15:28:57

A. Well, at the risk of belaboring an earlier point, you know, there's a little bit of language sloppiness at the beginning, which we see everywhere. A USB hub, according to the current invention, is a USB hub, except it isn't because it's different. You know, I just -- that grates on me. But let's forget that. No. I say that not to be silly, but just to remind myself and remind all of us that a POSITA has to cope with that sort of language challenge throughout all of this stuff. Things are not always described accurately. Nevertheless, a POSITA would understand what it is. 15:28:59 15:29:08 15:29:16 15:29:18 15:29:21 15:29:24 15:29:27 15:29:31 15:29:33 15:29:36 15:29:41

Okay. So what's -- what's going on here is that the inventor is talking about, sort of conceptually, the idea that, well, imagine you had a regular hub and you -- and you -- let's say you took it apart, and then you put some of these extra things together with a soldering iron and put it back together. For some reason, that's the mental image that's -- that's 15:29:42 15:29:45 15:29:49 15:29:52 15:29:54 15:29:59 15:30:01

conjured up here. It's not too hard. You know, you can put it back, and you might even make it fit in the same enclosure. That's fanciful, and I have no idea if that's really what he meant. But without all the -- the -- the color there, the basic idea in this paragraph is the step from this -- the step in this invention is a simple one from a hub to a custom hub, which has one of it's ports modified to include a bridge. 15:30:02 15:30:04 15:30:07 15:30:09 15:30:13 15:30:18 15:30:22 15:30:27

Q. Okay. And in this paragraph, though, the Chang inventor is saying that one advantage of this is that you don't have to make too many modifications, right? 15:30:30 15:30:33 15:30:38

A. He does say that. 15:30:40

Q. And, therefore, the derived cost is relatively low, right? 15:30:41 15:30:45

A. That's right. 15:30:46

Q. The modification is not adding much to the cost of the hub? 15:30:46 15:30:48

A. That's correct. 15:30:49

Q. Okay. The modifications you're talking about would add additional cost to the hub, right, switching to dual-role ports, adding a cross/bar switch, moving the location of the bridge, that sort of thing, right? 15:30:49 15:30:54 15:30:56 15:30:59

MR. JENSEN: Object to form. 15:31:02

THE DEPONENT: That's true, but to a purpose. 15:31:04

MR. BRAUSA: Okay. 15:31:07

THE DEPONENT: The cost -- the things we're adding have costs and significant benefits, which we think justify those costs. 15:31:07 15:31:09 15:31:12

BY MR. BRAUSA: 15:31:13

Q. Okay. Where in your report did you set forth an opinion on the justification of the additional costs being outweighed by the benefits? 15:31:13 15:31:16 15:31:20

A. I wasn't asked to look at cost at all. In my -- in my comments now, I'm talking about the POSITA's view, which, you know, might just be sort of background to our present discussion. I understand from being a professional engineer that the issues of costs are often critical. You know, they only appear here in the opinion of various prior art references where people say things like, you know, there's some cost to make a port dual role, but that cost is justified. They're just saying this in general terms. They're not doing a financial analysis because in the context in question, like in a vehicle, there's benefit that everybody understands to having fewer ports. Okay. That comment is compelling. It's not a detailed analysis. And I wasn't asked to make that kind of detailed analysis, so. 15:31:23 15:31:27 15:31:30 15:31:33 15:31:36 15:31:40 15:31:44 15:31:49 15:31:52 15:31:57 15:31:59 15:32:02 15:32:04 15:32:08 15:32:11

Q. Okay. Do you have any sense for how much increase in cost would occur by making the three ports shown in Figure 3 of Chang dual role? 15:32:14 15:32:18 15:32:22

A. I -- I wasn't asked to look at that at all. 15:32:24
Q. Okay. But it would increase the cost, right? 15:32:27
MR. JENSEN: Object to form. 15:32:30
THE DEPONENT: Presumably. But, again, I wasn't asked to look at that. 15:32:32 15:32:35
BY MR. BRAUSA: 15:32:35
Q. Okay. And do you have any idea how much increase in cost it would cause to add a cross/bar switch to Chang after making these ports dual role? 15:32:36 15:32:39 15:32:42
A. Again, I wasn't asked to look at that. 15:32:46
Q. Okay. But it would be an increase in cost, right? This is not cost even. This is -- 15:32:48 15:32:51
A. Presumably, yes. But, again, I wasn't asked to look at it, so -- 15:32:54 15:32:57
Q. Okay. 15:32:57
A. -- I would say. 15:32:58
Q. In addition to changing the -- the physical components in Chang's Figure 3 to include all dual-role ports, cross/bar switch, you would also need to include some additional programming logic and things like that, right? 15:32:59 15:33:00 15:33:07 15:33:10 15:33:13
MR. JENSEN: Object to form. 15:33:14
THE DEPONENT: Okay. You're asking me to do circuit design on the fly, and I decline to do that. I know how to do that. I know exactly the sort of 15:33:15 15:33:20 15:33:23

technical details involved here. But I wasn't asked to do a technical detailed design of one of these things where I could answer questions about cost or tradeoff or this or that. 15:33:25 15:33:29 15:33:31 15:33:34

BY MR. BRAUSA: 15:33:34

Q. Respectfully, you -- you put forth an alternative circuit design in page 114 of your report, right? 15:33:35 15:33:37 15:33:41

A. I wouldn't call this a circuit design. This is a functional design at a fairly high level of detail, which matches the level of detail in the patents and appropriate for that reason. 15:33:41 15:33:53 15:33:55 15:33:57

Q. Okay. 15:33:59

A. All this stuff leaves out many lower-level details about USB, which I could go on and on for hours, but they aren't really relevant here. 15:34:00 15:34:03 15:34:08

Q. A POSITA would recognize that making the types of modifications that you propose in these two modified cartoons on page 114 would add to the cost of the hub described in Figure 3 of Chang, right? 15:34:10 15:34:12 15:34:16 15:34:21

MR. JENSEN: Object to form. 15:34:23

THE DEPONENT: As a general concept, yes. But this is getting off the subject and getting out of context. 15:34:23 15:34:33 15:34:36

/// 15:34:36

BY MR. BRAUSA: 15:34:36

Q. Okay. And a POSITA would also recognize that in addition to increased cost, making all these modifications, to Chang's hub would add to the complexity of the operation of the hub, right? 15:34:36 15:34:38 15:34:41 15:34:44

A. Okay. You are asking me to speculate and I'm not. 15:34:47 15:34:49

MR. JENSEN: Object -- hold on, hold on. 15:34:49

Object to form. 15:34:51

THE DEPONENT: Sorry. 15:34:51

Yeah, no, I -- I'm going to decline to answer more questions here because I've already said that I wasn't asked to look at detailed designs or detailed costs or the question of complexity. I was asked, as I said before, about does this prior art render the things obvious, and it's my opinion that it does. 15:34:52 15:34:57 15:35:00 15:35:03 15:35:08 15:35:13

BY MR. BRAUSA: 15:35:16

Q. So you don't know whether actually implementing these cartoons in practice would increase the complexity of the operation of the hub compared to unmodified Figure 3 in Chang? 15:35:16 15:35:19 15:35:23 15:35:26

MR. JENSEN: Object. Object to form. 15:35:28

THE DEPONENT: Okay. Yeah, I'm not going to answer that. 15:35:30 15:35:31

/// 15:35:32

BY MR. BRAUSA: 15:35:32

Q. So respectfully, unless your attorney instructs you not to answer, I'm entitled to an answer to the question. It's fine if the answer is "I don't know." But let me re-ask the question. 15:35:32 15:35:35 15:35:37 15:35:39

You don't know whether actually implementing these cartoons in practice would increase the complexity of the operations of the hub shown on page 114 of your report as compared to unmodified hub in Figure 3 of Chang? 15:35:41 15:35:43 15:35:48 15:35:52 15:35:55

MR. JENSEN: Object to form. Let me just state what my objection is there, because you might be able to -- to fix it. 15:35:55 15:35:59 15:36:01

I'm objecting to the phrase "complexity of operation," whether that's from a technical implementation perspective or whether it's a -- from the perspective of a user. 15:36:03 15:36:05 15:36:08 15:36:12

BY MR. BRAUSA: 15:36:12

Q. Do you understand my question? 15:36:16

A. I understand some aspects of your question. But, you know, you're going -- you're going to areas that are outside what I was asked to look at, so I don't have an opinion about those things. 15:36:25 15:36:27 15:36:33 15:36:36

Q. Okay. Let me try and be a little more specific. 15:36:37

Do you have an opinion on whether the technical 15:36:40

implementation in practice of the modified hubs that you created for the purposes of your obviousness analysis shown on page 114 of your report are more complex from a technical implementation standpoint than the unmodified hub shown in Figure 3 of Chang, Exhibit 1014? 15:36:42 15:36:48 15:36:51 15:36:57 15:37:03

THE DEPONENT: Is it okay to answer? 15:37:13

MR. JENSEN: Yeah, you can answer. 15:37:14

THE DEPONENT: I will say it this way. Superficially, yes. What makes this complicated to answer is that you have to consider those cost questions in context and as a cost of the system overall. So drilling down to these things individually and focusing on the difference in cost between one thing and another is not really the way that I think about these things. 15:37:15 15:37:20 15:37:22 15:37:26 15:37:32 15:37:35 15:37:39

So I will just repeat. On the face of it and superficially, and considered apart from everything else, yes, the modifications I'm talking about would probably increase the cost. 15:37:43 15:37:48 15:37:51 15:37:55

BY MR. BRAUSA: 15:37:56

Q. Okay. Understood. And I appreciate that. 15:37:57

In terms of complexity of implementing the details of this configuration that you've come up with on page 114, would adding the cross/bar switch, changing the role of the ports, and modifying the associated firmware somewhere, whatever, would that increase the 15:38:01 15:38:06 15:38:10 15:38:16 15:38:21

technical complexity of the design of these modified hubs as compared to the unmodified hub in Figure 3 of Chang? 15:38:24 15:38:29 15:38:33

A. Well, okay. I have to take your question. You have asked multiple questions there. It's not clear to me that you have other sort of software or system costs. There could be a whole other discussion about that. 15:38:34 15:38:39 15:38:42 15:38:46

For the most part, these changes are entirely local. You know, in his remarks, Chang says, you don't have to do much to modify the hub, may it well be the case you don't have to do anything. In many ways, you're relying on USB to just do what it does already, out of the box. You don't have to do anything or pay anything for that. 15:38:50 15:38:52 15:38:56 15:39:01 15:39:04 15:39:07 15:39:09

It is true that the local circuitry for a cross/bar switch probably has more wires and components in it, and so on, than a simple two-to-one MUX and, in fact, I detail that in my report. I give examples of how you could build one out of the other. And so, yes, one has more than the other. 15:39:10 15:39:12 15:39:15 15:39:20 15:39:24 15:39:27

But -- but to -- but to go from there and say, you know, you've made the system is a whole more complicated. No, I'm not -- I'm not saying that. This is a very local and well-controlled complexity and one that has -- again, this goes back to the motivation to 15:39:30 15:39:34 15:39:37 15:39:39 15:39:41

combine -- that has spectacularly straightforward testability characteristics. That's very important to real-world engineering. So, yeah, I'll -- I'll say it that way. 15:39:47 15:39:51 15:39:53 15:39:57

Q. I think I understood you to testify that a cross/bar switch has more wires and circuitry than a MUX. Right? 15:39:57 15:40:00 15:40:03

A. Mm-hmm. 15:40:04

Q. And so it's more -- the implementation of it is, grant me, at least a little bit more complex, and that's -- 15:40:04 15:40:08 15:40:11

A. Of the -- of the one thing, yeah, that's right. 15:40:11

Q. And so by extension, adding a cross/bar switch to Figure 3 of Chang, which doesn't have any switch, increases the technical complexity of the -- of the hub shown in Figure 3, right? 15:40:13 15:40:16 15:40:20 15:40:27

A. In the context where you're only looking at the modification of one component. I mean, real world engineering of these kinds of things, you can sometimes find a way to subsume complexity of -- you know, you -- you increase a bunch of circuit complexity. You might sometimes find that you can -- you can consume all of that stuff into a less expensive single processor with no net addition in cost. You know, these things are very subtle and very complicated. 15:40:28 15:40:34 15:40:37 15:40:42 15:40:49 15:40:51 15:40:53 15:40:56 15:41:00

So I'm -- I'm answering your question with respect to the specific thing. If you had Chang Figure 3 by itself, and you considered moving that to the case where you add these things that we have here, yeah, this stuff is a little more complicated locally. I'm not saying that these things add to other complexity. You require extra software, extra configuration stuff or more trouble for the user. In fact, these have, arguably, less trouble for the user. 15:41:02 15:41:03 15:41:08 15:41:11 15:41:15 15:41:18 15:41:21 15:41:24 15:41:26

So I just want to be clear that we can't over-generalize this stuff. I understand your question, and if you go to the specific components, yes, it's a little more complicated. There's a few more circuits. 15:41:30 15:41:33 15:41:35 15:41:38

Q. Okay. And it's also going to be a little more costly. I think you already testified to that. Right? 15:41:41 15:41:44

MR. JENSEN: Object to form. 15:41:45

THE DEPONENT: In the hypothetical sense where you made no other changes but the one, yes, it might cost a little more. 15:41:46 15:41:48 15:41:52

MR. BRAUSA: Okay. I'm going to switch gears a little bit. Do we want to take another break or keep plugging? 15:41:53 15:42:00 15:42:04

THE DEPONENT: I'm okay. What time is it? It is quarter to 4:00? 15:42:04 15:42:08

MR. BRAUSA: You know what, maybe I'll suggest 15:42:21

we take a five-minute break and I can consolidate. I don't have a lot left, so I can try and finish today. 15:42:25 15:42:26

THE DEPONENT: Okay. That would be great. 15:42:29

THE VIDEOGRAPHER: This marks the end of Media No. 4 in the deposition of Eric Welch. The time is 3:42 p.m. We are off the record. 15:42:31 15:42:32 15:42:35

(A recess transpires.) 15:42:37

THE VIDEOGRAPHER: This marks the beginning of Media No. 5 in the deposition of Eric Welch. The time is 3:58 p.m. We are on the record. 15:58:31 15:58:41 15:58:47

MR. BRAUSA: All right. Welcome back, Mr. Welch. 15:58:50 15:58:52

THE DEPONENT: Thank you. 15:58:52

BY MR. BRAUSA: 15:58:52

Q. During the break did you talk with counsel? 15:58:52

A. No. 15:58:54

Q. Did you look at your notebook in your pocket? 15:58:54

A. I didn't. 15:58:56

Q. All right. It's been in your pocket all day? 15:58:57

A. It's been in my pocket all day. Yeah. 15:58:59

Q. All right. I wanted to ask you a couple of questions. We've been talking a lot about Chang 1, Exhibit 1014. I wanted to shift gears dramatically and talk about Chang 2, Exhibit 1015. 15:59:01 15:59:05 15:59:08 15:59:12

Now, to reiterate, the routing switch 15:59:18

functionality required in the challenged claims, you're relying on Chang 2 to provide that teaching, correct? 15:59:24 15:59:27

A. Chang -- Chang 2 gives a detection circuit and a basic sort of AB switch where, to use Chang's language, it's either the bypass path or the -- the other one is called bridge path. I forget exactly what term it uses. Yes, Chang gives us a simple MUX kind of switch. 15:59:31 15:59:40 15:59:46 15:59:52 15:59:55

Q. Okay. And Figure -- if we turn to Exhibit 1015, Chang 2. 16:00:01 16:00:04

A. Okay. Do I have a copy of that? I thought I did. 16:00:05 16:00:08

Q. I think you should somewhere. If not, let me know. 16:00:08 16:00:12

A. Okay. You said it was 10? 16:00:14

Q. 1015. 16:00:15

A. Okay. 1014. Here is 2019, 2020, something -- no. 16:00:16 16:00:26

MR. JENSEN: I might have taken his copy. 16:00:27

THE DEPONENT: Okay. That's possible, because I think I had one before. All right. So. 16:00:29 16:00:31

MR. JENSEN: I put it in my stack. I apologize. 16:00:35

THE DEPONENT: Okay. Fine. All right. No. So -- okay. So I'll make sure to give this to you when we're done. 16:00:37 16:00:38 16:00:40

Okay. I'm sorry. Which picture now? 16:00:40

BY MR. BRAUSA: 16:00:44

Q. So I wanted to ask you some questions about 16:00:44

Figure 6 of Exhibit 1015. I think you're looking for 16:00:46

page 153 of your report. 16:01:34

A. Actually, I was looking at the Chang 2 summary. 16:01:37

Q. Okay. 16:01:40

A. In paragraph -- oh, yeah, paragraph 153. You 16:01:40

were right. But it wasn't page -- yes. 16:01:44

Q. Oh. 16:01:46

A. That's all right. We've all -- we've all done 16:01:48

it. 16:01:51

Okay. Yeah, all right. So I have the -- I have 16:01:51

the Chang Figure 6. I have my summary of Chang in the 16:01:53

prior art section. 16:01:57

Q. Great. So in the summary of the prior art, 16:02:00

there's not a reference to Figure 6, correct? 16:02:04

A. Not in this section. 16:02:05

Q. Okay. 16:02:09

A. But -- but there is -- there is later because 16:02:10

we -- as part of adapting Chang's teaching, we changed 16:02:12

the logic in his flow chart slightly. 16:02:17

Q. Right. And coincidently, that appears on 16:02:21

page 153 of your report. 16:02:24

A. Okay. Okay. That's actually what I was looking 16:02:26

for. Yes, there it is. Okay. All right. Got it. 16:02:30

Q. Okay. And so just to be clear, on page 153 of your report, which is Exhibit 1013, the figure on the left is Figure 6 as it actually appears in Chang 2. The figure on the right is, again, something that you -- you modified? 16:02:45 16:02:48 16:02:51 16:02:57 16:03:00

A. That's correct. 16:03:01

Q. Okay. And I want to focus first on Figure 6 as it actually appears in Chang 2. And I'm looking at Chang 2, Exhibit 1015. This is basically just a flow diagram describing how the bridge in Chang determines whether to switch the downstream port to device or host mode, right? 16:03:01 16:03:05 16:03:08 16:03:14 16:03:20 16:03:25

A. That's right. 16:03:26

Q. Okay. And so I'll call out the numbers of the functional blocks and I just want to make sure my understanding is correct. 16:03:27 16:03:30 16:03:32

A. Okay. 16:03:33

Q. The first thing you do is, on the upstream side you plug in a -- or connect a first host device and an external device on the downstream port? 16:03:34 16:03:37 16:03:40

A. Mm-hmm. 16:03:42

Q. That's block S601, right? 16:03:42

A. Mm-hmm. 16:03:45

Q. And then the bridge at S603 switches to a virtual slave state? 16:03:45 16:03:48

A. Mm-hmm. 16:03:49

Q. In order to produce an inquire signal to that downstream device, right? 16:03:50 16:03:53

A. Mm-hmm. 16:03:54

Q. And then that's at block S603, right? 16:03:55

A. Mm-hmm. 16:03:59

Q. Block S605, there's a determination made if there's a response from the external devise -- device in response to that inquire signal, right? 16:03:59 16:04:04 16:04:07

A. Mm-hmm. Yep. 16:04:09

Q. And so if the answer is yes in block S607, that means the external device is a second host device, right? 16:04:13 16:04:16 16:04:16

A. Mm-hmm. Right. 16:04:20

Q. And that makes sense because it's -- the upstream of that, the bridge is acting as a virtual device, right? 16:04:20 16:04:23 16:04:26

A. Right. 16:04:27

Q. And if it gets a virtual response, it's communicating with the host, right? 16:04:27 16:04:32

A. That's right. 16:04:33

Q. If it doesn't get a response from the external device at block S605, that effectively means that the device is not a host, right? 16:04:33 16:04:36 16:04:41

A. Mm-hmm. 16:04:42

Q. And so the bridge in Chang 2 switches to a virtual host state at S615 -- 16:04:42 16:04:47

A. Mm-hmm. 16:04:50

Q. -- right? 16:04:50

And that's the sort of second pathway that it can go down? 16:04:51 16:04:53

A. Mm-hmm. Yep. 16:04:54

Q. And then a determination is made at S617 if there's an inquire signal from the external device, correct? 16:04:55 16:04:59 16:05:02

A. Mm-hmm. 16:05:02

Q. And if there is, the -- that signal is at block S619, that the external device is a slave device or operating in device mode -- 16:05:03 16:05:13 16:05:16

A. Mm-hmm. 16:05:16

Q. -- correct? 16:05:16

A. That's correct. 16:05:19

Q. And then, so the bridge knows to switch to the bypass path? 16:05:20 16:05:22

A. Mm-hmm. 16:05:23

Q. And then in either scenario, after making the determination that it's a host or a device, it either goes through, as we talked about, the bypass path if the downstream device is a device or it goes through the bridge if it's a host device connected to the downstream 16:05:23 16:05:29 16:05:35 16:05:38 16:05:41

port, right? 16:05:46

A. Mm-hmm. That's right. 16:05:47

Q. Okay. And so that takes us all the way to 16:05:48

blocks 7 -- blocks S613 and S625, right? 16:05:54

A. Correct. 16:05:58

Q. Okay. And as Chang discloses, there are checks 16:05:59

done to see whether the user has exchanged for another 16:06:03

external device, right? 16:06:07

A. That's right. 16:06:09

Q. Chang does not describe, in Figure 6 or anywhere 16:06:09

else, ever pulling a downstream device while it's 16:06:13

connected into the downstream port to see whether it's 16:06:17

changed from device mode to host mode or from host mode 16:06:20

to device mode, right? 16:06:24

MR. JENSEN: Object to form. 16:06:25

THE DEPONENT: That's not strictly true. I may 16:06:26

be skipping ahead a little bit here, but most USB 16:06:32

transactions where there's mode switching mimic what 16:06:38

happens when a user unplugs the device. Now, you 16:06:44

haven't said, but we have modified the language here to 16:06:49

make that more clear that we're not just talking about 16:06:53

the user making a change, but we're also talking about 16:06:55

whether the -- the device has on its own decided to 16:06:59

change roles. The underlying fact known to a POSITA, 16:07:04

and this is not the only way to do this, but the most 16:07:09

common way of doing mode switching in the -- in the sense that the device itself, the plugged-in device itself, is affecting the change, the most common way to do that is to disconnect electrically, because the way USB works, and I won't go into the details, but the way USB works, if you do certain things electrically, it's indistinguishable from physically pulling out the connector. So since that's often, I would even say most often, done to affect a mode switch, the language as it is here and the language as it is here is not actually describing different operations. And in that sense, I would say no to your question, because actually what is done here is essentially the same thing. 16:07:11 16:07:16 16:07:19 16:07:22 16:07:26 16:07:29 16:07:32 16:07:34 16:07:40 16:07:46 16:07:49 16:07:53 16:07:56

MR. BRAUSA: Okay. 16:07:58

THE DEPONENT: As described here. 16:08:00

BY MR. BRAUSA: 16:08:00

Q. So understanding that that's your opinion, you -- you did think it was important to present a modified version of Figure 6 in your report, right? 16:08:01 16:08:03 16:08:06

A. Mm-hmm. That's right. 16:08:09

Q. Okay. 16:08:09

A. Just to clarify this. 16:08:10

Q. And that's because the unmodified version of Figure 6 in Chang 2, Exhibit 1015, doesn't say anything about checking to see if a connected device has switched 16:08:11 16:08:13 16:08:18

modes while remaining plugged in, right? 16:08:23

A. That's absolutely correct. 16:08:25

Q. Okay. And so there's no reference to that in 16:08:26

Chang 2. That's what the modification you propose is, 16:08:28

right? 16:08:32

MR. JENSEN: Object to form. 16:08:32

THE DEPONENT: Yeah. 16:08:34

BY MR. BRAUSA: 16:08:36

Q. Okay. In your report at paragraph 265 -- 16:08:36

A. Mm-hmm. 16:08:45

Q. -- you refer to Exhibit 1025, which is 16:08:52

Castelbury, right? 16:08:56

A. Mm-hmm. 16:08:57

Q. And I read paragraph 265 to be saying that 16:08:57

Castelbury describes dynamically switching without 16:09:02

unplugging a device. Right? 16:09:06

A. Mm-hmm. Mm-hmm. 16:09:07

Q. Fair? 16:09:11

A. Correct. 16:09:12

Q. And that's what we're talking about when we look 16:09:12

at claim 4 of the '420 patent, Exhibit 1003 in claim 4, 16:09:14

right? That's what this analysis pertains to? 16:09:21

A. I think that's right. Yes. Claim 4 on -- 16:09:23

starting at paragraph 260, right. 16:09:28

Q. Right. And -- and claim 4 refers to a hub 16:09:29

module configured to dynamically switch operation between a device mode or host mode, right? 16:09:34 16:09:37

A. Mm-hmm. 16:09:39

MR. JENSEN: Object to form. 16:09:39

BY MR. BRAUSA: 16:09:40

Q. Okay. And the Castelbury reference is not one of the references that you explicitly included in your motivation to combine analysis, right? 16:09:40 16:09:44 16:09:47

MR. JENSEN: Object to form. 16:09:49

THE DEPONENT: Mm-hmm. 16:09:50

BY MR. BRAUSA: 16:09:53

Q. Sorry. Your answer was a yes? 16:09:53

A. That's right. We refer to Castelbury, but we don't -- we don't name him in the motivation to combine specifically. 16:09:54 16:10:00 16:10:03

Q. Okay. While we have it up in front of us, in the '420 patent, Exhibit 1003, can I direct you to claim 20? 16:10:04 16:10:17 16:10:20

MR. JENSEN: I'm sorry. Where did you say? 16:10:41

MR. BRAUSA: Claim 20 in the '420 patent. 16:10:42

THE DEPONENT: Okay. Yes. 16:11:54

BY MR. BRAUSA: 16:11:55

Q. And so in claim 20 of the '420 patent, we again see reference to the USB routing switch being configured to simultaneously provide two communication paths 16:11:55 16:11:58 16:12:02

between two downstream ports and an upstream port, right? 16:12:07

A. Mm-hmm. 16:12:10

Q. And here it says: 16:12:10

"Without interrupting the first communication path between said first USB port and said second USB port, right? 16:12:11

A. Yes, although I see in the -- in my report that there's a correction from second communication path to third communication path that we think is necessary to make sense of this. But we will come to that. 16:12:18

Yes, I -- I see what this says. 16:12:53

Q. Okay. And in this instance, I'm going to need to direct you to a different declaration. It's the second '420 declaration. 16:12:55

A. Mm-hmm. 16:13:03

Q. Which is Exhibit 1013 -- 16:13:05

A. Mm-hmm. 16:13:05

Q. -- in IPR2024-495. 16:13:07

A. Yep, I have that open. 16:13:08

Q. And I want to direct your attention to paragraph 307, where you provide your analysis of this claim, or one of the paragraphs where you provide your analysis of this claim element. 16:13:11

A. Yes. Okay. Paragraph 307. 16:13:12 16:13:17 16:13:22 16:13:25 16:13:54

Q. Okay. And at the end of 307, you conclude: 16:13:56

"As a result, Chang supports upstream host 16:13:58

connections to both downstream USB devices and a USB 16:14:01

host without interruption." 16:14:03

Right? 16:14:04

A. That's right. 16:14:05

Q. Okay. But claim 20 of the '420 patent actually 16:14:05

requires a routing switch configured to simultaneously 16:14:10

provide these communication paths without interruption, 16:14:14

right? 16:14:14

A. That's correct. In 308, I go on to reiterate 16:14:52

the previous cross/bar configuration routed for claim 19 16:14:59

and say that the same principles apply here. 16:15:03

Q. And what I'm looking for is any description in 16:15:08

your analysis of claim 19 or claim 20 where you explain 16:15:10

why the cross/bar implementation would necessarily allow 16:15:15

for simultaneous communication between two downstream 16:15:20

ports and an upstream port without interruption, as 16:15:23

claim 20 requires? 16:15:26

A. Well, a POSITA would understand a cross/bar to 16:15:30

provide separate and simultaneous connections between 16:15:33

entities on -- on the opposite sides of it. That just 16:15:40

gives you electrical connectivity. The non-interruption 16:15:43

part is because the way hosts -- is because of the way 16:15:47

hubs work. And since the cross/bar connects these 16:15:51

things, whatever they are, to the appropriate next device above, that is either directly to the hub or indirectly to the hub through a bridge, what you get out of that is the standard operation of a hub, which is all of its ports operate independently and simultaneously and in parallel. 16:15:55 16:16:01 16:16:04 16:16:09 16:16:13 16:16:16

Q. Is there any disclosure in Chang -- well, there is no disclosure in Chang of a cross/bar switch, so there is no disclosure in Chang of a cross/bar switch that allows for simultaneous communication between two downstream ports and an upstream port without interruption, right? 16:16:23 16:16:25 16:16:28 16:16:31 16:16:34 16:16:37

A. Not in Chang. 16:16:38

Q. Okay. And Chang 2 doesn't have that disclosure either, because it only has one downstream port and doesn't have a cross/bar switch either, right? 16:16:39 16:16:42 16:16:46

A. That's correct. But you do get this effect by taking Chang and adding the teachings of Chang 2. Chang has a hub. Chang 2 has a multifunction dual-role port. You put those together. At the initial case, you just have a MUX for the two ports in Chang that you inherit Chang 2 -- which you inherit directly from Chang 2, and then we discussed the scaling up of that from a POSITA's knowledge to have the cross/bar. Therefore, we have -- we have a cross/bar, we have a hub, and we have a 16:16:48 16:16:52 16:16:56 16:17:00 16:17:04 16:17:07 16:17:10 16:17:13 16:17:17

bridge. 16:17:23

Q. So is it your testimony that the without interruption portion of claim 20 is necessarily met by the using a cross/bar switch? 16:17:24 16:17:27 16:17:33

MR. JENSEN: Object to form. 16:17:35

THE DEPONENT: Well, it's -- it's met by the combination of the cross/bar switch and the hub and the bridge for those connections which require it, yes. 16:17:36 16:17:42 16:17:46

BY MR. BRAUSA: 16:17:48

Q. Okay. And so in paragraph 307, where you say, "As a result, Chang supports upstream host connections to both downstream USB devices in a USB host without interruption" -- 16:17:49 16:17:53 16:17:56 16:18:00

A. Right. 16:18:00

Q. -- that's not quite right, is it? 16:18:01

Chang doesn't support that? 16:18:03

A. It does. 16:18:04

MR. JENSEN: Object to form. 16:18:05

BY MR. BRAUSA: 16:18:05

Q. Chang on its own supports that? 16:18:05

A. Chang on its own supports that because Chang has a hub. The hub gives you that. 16:18:07 16:18:10

Q. Okay. So all you need for claim 20 is a hub, in your view? 16:18:12 16:18:14

A. No. 16:18:15

MR. JENSEN: Object to form. Asked and answered. 16:18:16 16:18:19

THE DEPONENT: What you need for claim 20 is you need Chang and Chang 2, and you need to scale up -- as appropriate, you need to scale up the switch from Chang 2 to a cross/bar. That's what meets claim 20. 16:18:19 16:18:21 16:18:25 16:18:29

BY MR. BRAUSA: 16:18:29

Q. Okay. So as long as you switch to a dual-role port, based on Chang 2 -- 16:18:33 16:18:37

A. Mm-hmm. 16:18:38

Q. -- you add a cross/bar switch -- 16:18:39

A. Mm-hmm. 16:18:40

Q. Which I guess is based on the knowledge of POSITA, because that's not in Chang 2, right? 16:18:42 16:18:45

A. It has a simple switch. The scaling up from the one to the other, as I discuss, is straightforward, yeah. 16:18:48 16:18:50 16:18:52

Q. The scaling up is changing from Chang 2's MUX to a cross/bar switch? 16:18:52 16:18:55

A. Using the knowledge of a POSITA. 16:18:56

Q. Okay. And then as long as you do that, you will necessarily have a routing switch configured to simultaneously provide the required two communication paths without interruption? 16:18:57 16:19:00 16:19:04 16:19:07

A. Exactly. 16:19:08

Q. Okay. Where do you explain that in paragraphs 305 to 309 of your report? 16:19:09 16:19:14

MR. JENSEN: Object to form. Asked and answered. 16:19:20 16:19:21

THE DEPONENT: Well, there are references here to the discussion for claim 19, and also for background material in 6B2. I think net of all of those things, this concept of simultaneously with hubs and cross/bar switches has been discussed many times. So, you know, it's here and it's in the abbreviated form, but it's -- it's appeared elsewhere many times. 16:19:27 16:19:29 16:19:32 16:19:37 16:19:43 16:19:46 16:19:50

BY MR. BRAUSA: 16:19:52

Q. Including the aspect of claim 20 that I'm focused on, which is this without interruption requirement? 16:19:52 16:19:56 16:19:57

A. That's right. 16:19:57

Q. Okay. So you think if I go to these -- I'm not going to do it here today. But if I go back and look at these various sections where you say C6A2, see also 8A, it's going to talk about a cross/bar switch not interrupting communication-wise? 16:19:58 16:20:00 16:20:03 16:20:09 16:20:11

A. Okay. 6B2 gives you routing switches. I won't read it here, but 19 gives a sort of discussion of the flow through the Chang 40 and 46, which includes hubs. Yeah, here we have the hub from Chang 1 at Figure 4. I 16:20:13 16:20:25 16:20:30 16:20:35

think it's all here, yes. 16:20:43

Q. Okay. I just wanted to confirm. Earlier we were talking about some consulting work you did on a project for Ford and Microsoft relating to -- your work was to create an adapter for iPod implementation in a car, right? 16:20:44 16:20:52 16:20:56 16:21:01 16:21:04

A. Mm-hmm. 16:21:05

Q. Aside from that consulting work, have you done any other consulting work in the automotive industry relating to USB? 16:21:05 16:21:08 16:21:11

A. Boy, not that I can remember. I can't rule out that things I have worked on have been used in cars because, as I've said, USB in cars is not fundamentally different. So, I mean, I have -- I've created just dozens of different sorts of adapter products. Oh, well, actually, here -- here's an example, and this might even be relevant. 16:21:21 16:21:24 16:21:27 16:21:31 16:21:36 16:21:40 16:21:43

We created an adapter for a customer called Red Park. Red Park is an adapter brand from the company InnoSys, which I cofounded in 1976, still a co-owner. We, Bramson Welch, are now InnoSys, essentially 100 percent of their engineering department, so we do a lot of their product development. They have an adapter device which allows you to connect an iPad to a bunch of different kinds of drinks vending machines, and this is 16:21:46 16:21:48 16:21:54 16:21:56 16:22:01 16:22:03 16:22:07 16:22:13

used extensively by people driving trucks, okay, not cars, but trucks. And we've -- and so this is -- this is automotive USB in the sense that we -- we use the power system in the truck as part of the charging circuit to make sure the iPad doesn't run out of juice. And what's interesting is the extent to which vending machine service personnel can just spectacularly destroy USB adapters. We have had some amazing things come back. 16:22:16 16:22:21 16:22:26 16:22:30 16:22:34 16:22:37 16:22:42 16:22:49 16:22:53

Okay. So that's -- that's USB in a car, but not this kind. It's not like we have a head-end unit that we plug into. No. We provide sort of -- well, okay. We and the iPad provide all of the USB that's used there. And as I say, the -- what's interesting about the car is its power system and the way in which that -- anyway. 16:22:54 16:22:57 16:23:00 16:23:03 16:23:06 16:23:10 16:23:13

Q. Okay. 16:23:13

A. That -- that's -- 16:23:13

Q. So aside from that, there's nothing else you can -- 16:23:15 16:23:18

A. Nothing -- nothing that I can relate -- 16:23:18

Q. -- think of that's related to USB -- 16:23:19

A. Right. 16:23:19

Q. -- implementations and automotive specifically? 16:23:20

A. Right. Right. 16:23:22

MR. BRAUSA: Okay. All right. Subject to any redirect by Mr. Jensen, I don't have any questions for you at the time. 16:23:23 16:23:26 16:23:29

THE DEPONENT: Okay. 16:23:30

MR. BRAUSA: Pass the witness. 16:23:30

THE DEPONENT: Thank you. 16:23:31

MR. JENSEN: Let's just go ahead. I don't think we need to take a break, if that's -- 16:23:34 16:23:36

THE DEPONENT: Sure. 16:23:38

MR. JENSEN: -- if that's okay. 16:23:38

EXAMINATION 16:23:39

BY MR. JENSEN: 16:23:39

Q. Good afternoon, Mr. Welch. 16:23:39

A. Good afternoon. 16:23:42

Q. You and I know each other, right? 16:23:42

A. We do. We've worked together for a year and a half. 16:23:45 16:23:48

Q. Since what was it? 16:23:48

A. May of 2023. 16:23:50

Q. May 2023. Okay. So I just want to ask some follow-up questions on a handful of topics that patent owner's counsel asked you about. Let me start with a question or two about the Castelbury reference. 16:23:51 16:23:55 16:23:59 16:24:05

A. Mm-hmm. 16:24:08

Q. Do you recall being asked about -- 16:24:08

A. I do. 16:24:10

Q. -- the Castelbury reference? 16:24:10

A. Yes. 16:24:12

Q. And can I direct your attention in the '420 16:24:12

patent report, your declaration, excuse me, for the '420 16:24:21

patent? 16:24:29

A. 495 or 228? 16:24:29

Q. In 228. 16:24:31

A. 228. Okay. I got that. 16:24:32

Q. And let me ask you turn to paragraph 175. 16:24:35

A. Okay. This is motivation to modify Chang in 16:24:56

view of Chang 2 and the knowledge of the POSITA. 16:24:59

Q. Well, you anticipated my first question, which 16:25:01

is what -- what is this section? 16:25:04

A. Okay. 16:25:05

Q. And I believe you said it's the motivation to 16:25:09

modify? 16:25:10

A. That's right. 16:25:11

Q. Thank you. 16:25:12

A. It's the first paragraph in that section, which 16:25:12

is No. 9. 16:25:14

Q. Okay. Let me direct your attention to 16:25:15

paragraph 177, and I will just have you go ahead, and if 16:25:18

you wouldn't mind reading that out loud. 16:25:23

A. Paragraph 177? 16:25:25

Q. Yes. 16:25:27

A. Okay. 16:25:27

"Second, dual-role ports that could attach to dual-role products have several common-sense benefits. It would be impractical and contrary to the goals of the USB specifications to require consumers that use dual-role products to understand when to switch connections between a dedicated host port, e.g., Chang's port 50, and a dedicated device port, the corresponding port 44 in Chang. The consumer would not necessarily know when to connect the product to the appropriate port. At the very least, it would be inconvenient for the consumer to have to disconnect and reconnect the product to different ports. Further dual-role ports save costs. Dedicated ports have a disadvantage in that it requires multiple connectors, multiple ASIC pins and so on, which add overhead and increases the costs. The 1025 Castelbury reference has some comment about this. Also, the, what, 1022 1.1, an OTG product, is a portable device that uses a single micro AB receptacle and no other USB receptacles to operate at times as a USB-targeted host and at times as a USB peripheral. Dual-role ports reduce the cost and the number of necessary ports relative to dedicated ports and host ports." 16:25:28 16:25:31 16:25:35 16:25:38 16:25:41 16:25:43 16:25:46 16:25:51 16:25:55 16:25:57 16:25:59 16:26:02 16:26:06 16:26:08 16:26:11 16:26:19 16:26:25 16:26:32 16:26:36 16:26:40 16:26:44 16:26:46 16:26:50

Q. Okay. Thank you. And apologies that it was a long -- a long paragraph. 16:26:50 16:26:53

A. That's okay. 16:26:54

Q. So is it correct that you discussed the Castelbury reference in the motivation to modify section of your report? 16:26:55 16:26:58 16:27:02

MR. BRAUSA: Objection. Leading. 16:27:03

THE DEPONENT: It's -- it's here. I've just read it out. 16:27:04 16:27:07

BY MR. JENSEN: 16:27:07

Q. Yes. And I may have misheard you earlier to say that Castelbury was not part of the -- I don't remember the exact word, the combination that you used. Can you explain what -- what you meant by that? 16:27:08 16:27:11 16:27:15 16:27:18

A. I was possibly answering a limited version. The title of the section is Motivation to Modify Chang in View of Chang 2 and the Knowledge of the POSITA. All I really meant was that Castelbury did not appear in that overview of the section. Obviously, as we've just seen, Castelbury is here in paragraph 177. 16:27:19 16:27:24 16:27:27 16:27:31 16:27:34 16:27:38

Q. And Castelbury is not one of the references that formed any of the grounds in your report, correct? 16:27:42 16:27:46

A. To the best of my memory, yes. 16:27:48

Q. Okay. But it is discussed in the motivation to modify section? 16:27:50 16:27:52

A. That's right. 16:27:52

Q. Okay. Let me follow up with something that you 16:27:53

read from paragraph 177. And why don't we -- I think 16:27:57

it's in the middle of the page there, and I will just go 16:28:03

ahead and read this sentence. It says: 16:28:06

"Further, dual-role ports save costs. Dedicated 16:28:08

ports have," quote, a disadvantage in that it requires 16:28:13

multiple connectors, multiple ASIC pins and the like, 16:28:16

which adds," quote, "overhead an," quote, "increases the 16:28:20

costs." 16:28:24

Do you see that? 16:28:24

A. I do. Yep. 16:28:25

Q. Do you agree with that statement from the 16:28:26

Castelbury reference as of 2013? 16:28:28

A. I do. 16:28:30

Q. And can you read the last sentence in paragraph 16:28:31

177? 16:28:34

A. "Dual-role ports reduce the cost and number of 16:28:36

necessary ports relative to dedicated device and house 16:28:39

ports." 16:28:44

Q. Can you further explain what you mean by that? 16:28:44

Because I -- I think I heard you say earlier that in 16:28:47

certain circumstances dual-role ports could increase the 16:28:50

cost of a product? 16:28:54

A. All right. Okay. I see what you're asking 16:28:56

about. Yes, in -- in earlier testimony, I was taking questions as having to do with isolated circuit elements and the rather trivial modification that if you take a circuit element with a MUX in it and you modify stand-alone that circuit element to include a more complicated circuit like a cross/bar, the marginal cost between those things is probably small, perhaps even tiny, but it's not zero. So in that discussion, I was talking about an isolated case. 16:28:57 16:29:05 16:29:09 16:29:14 16:29:17 16:29:24 16:29:28 16:29:33 16:29:37

What Castelbury is talking about here is the overall cost of the -- of the system and the extremely beneficial effect, both for user experience and cost of having fewer ports. So the difference here is that this is talking about sort of the overall cost, and in that previous exchange, I was talking about marginal costs in a very hypothetical stand-alone circuit engineering example. 16:29:40 16:29:44 16:29:51 16:29:55 16:29:59 16:30:03 16:30:08 16:30:13

Q. Let me direct your attention to the Chang 2 reference. And let me know when you have that in front of you. 16:30:14 16:30:21 16:30:27

A. I have it. 16:30:28

Q. And you were asked a number of questions about this reference during your cross-examination, correct? 16:30:28 16:30:30

A. Mm-hmm. 16:30:37

Q. Okay. Please turn to Figure 2. And this is 16:30:37

Exhibit 1015, Figure 2? 16:30:46

A. Mm-hmm. 16:30:47

Q. What is shown in Figure 2 of Exhibit 1015, 16:30:48

Chang 2? 16:30:52

A. This appears to be an electrical schematic with 16:30:52

a number of components and parts and -- and other 16:30:56

things, which I can readily identify and discuss based 16:31:04

on my knowledge of electrical engineering and my 16:31:08

extensive experience reading schematic diagrams. 16:31:12

Q. And I just want to ask you about one specific 16:31:14

aspect to this, which is the box labeled 13. 16:31:18

Do you see that? 16:31:18

A. Right. 16:31:24

Q. Can you describe for me what is illustrated by 16:31:24

the component 13, or the box 13? 16:31:28

A. Well, first of all, one presumably takes that in 16:31:29

the context of the other drawings here. So elsewhere, 16:31:35

we have a block diagram of 13, in Figure 5, for example. 16:31:39

So a POSITA looking at Figure 2 that would say, oh, 16:31:45

here's the wiring diagram for this thing, what does it 16:31:49

do, oh, here's what it does in Figure 5. But then as 16:31:53

you drill down and look at things here, it all sort of 16:31:55

adds up because, for example, you can see the USB data 16:31:58

lines coming and going. They're called DP and DM. 16:32:02

That's a -- that's a standard term that you see on 16:32:05

schematics everywhere. There's an A port and a B port, and then there's -- I don't see it offhand, but then there's -- then there's the upstream port someplace. 16:32:08 16:32:14 16:32:20

Q. So -- well, I'll let you finish. Were you done? 16:32:29

A. Hang on a sec. 16:32:34

All right. Well, I won't -- I won't finish this exercise. But go ahead. 16:32:46 16:32:48

Q. So, yeah, in directing your attention to what's identified as -- as 13 in this figure. 16:32:50 16:32:54

A. Mm-hmm. 16:32:56

Q. Would a POSITA understand what's shown in box 13 to be a single chip or multiple chips? 16:32:57 16:33:02

MR. BRAUSA: Objection. Leading. 16:33:06

THE DEPONENT: Based on normal schematic label and practices, the appearance of the reference designator U1 almost universally means this is one chip, because if it was multiple chips, there would be 1, U2, U3. 16:33:08 16:33:11 16:33:14 16:33:21 16:33:25

BY MR. JENSEN: 16:33:26

Q. Would the cost of that chip be any different if a POSITA were to program that chip to perform the functions of a multiplex or a cross/bar? 16:33:27 16:33:29 16:33:34

MR. BRAUSA: Objection. Compound. 16:33:38

THE DEPONENT: If you're talking about something that can be changed only by reprogramming it, no. 16:33:39 16:33:49

BY MR. JENSEN: 16:33:52

Q. You can set that aside. 16:33:52

A. Okay. 16:33:55

Q. Do you recall being asked some questions related to costs during your cross-examination? 16:34:02 16:34:05

A. Yes. 16:34:07

Q. And I believe you testified that you were not asked to look at certain cost information. Is that correct? 16:34:08 16:34:11 16:34:11

A. That's right. 16:34:15

Q. Can you further explain what you mean -- what you meant by that in view of, for example, paragraph 177 of your report that does discuss certain costs? 16:34:16 16:34:19 16:34:23

MR. BRAUSA: Objection. Leading. 16:34:29

THE DEPONENT: The Castelbury reference is certainly part of my report, and Castelbury certainly says, and I agree with, the notion that looking at overall system costs, having fewer ports is a -- is a better cost prospect. The conversation you were referring to before, and I apologize if I misunderstood the question there, but what I was actually talking about was an isolated hypothetical example of -- of just circuit engineering in -- in a vacuum. If you take a circuit that does certain things and then you add components to it, considering nothing else, yes, it's 16:34:30 16:34:35 16:34:38 16:34:43 16:34:46 16:34:49 16:34:51 16:34:54 16:34:58 16:35:01 16:35:04

going to cost a little more. Now you have to take the overall context of what it is that you're doing, and you gave an example, if you could change the function a little bit by reprogramming one of those parts, well, then there's an example where it doesn't change anything. 16:35:08 16:35:13 16:35:15 16:35:17 16:35:20 16:35:22

The thing I had in mind was changing a 1 to 2 MUX into 3 to 4 cross/bar. And while it's not the only way to do it, if you're doing it with transistors, yes, you need a few more transistors in the one case than the other, the marginal case being, you know, vanishingly small. 16:35:22 16:35:28 16:35:34 16:35:37 16:35:39 16:35:43

BY MR. JENSEN: 16:35:43

Q. Do you remember being asked some questions about the complexity of implementing the conceptual diagrams in your reports on page -- 16:35:46 16:35:47 16:35:53

A. Are you still in 228? 16:36:08

Q. -- page 103? 16:36:09

A. In 228? 16:36:11

Q. In 228, I believe. Yes. 16:36:12

A. Okay. 103? Page 103? 16:36:15

Q. Yes, page 103? 16:36:17

A. Okay. Yeah. 16:36:19

Q. -- of 22 -- 16:36:20

A. Yes. 16:36:21

Q. Do you recall being asked some questions about the complexity of implementing the conceptual diagrams illustrated on page 103 of your report? 16:36:22 16:36:24 16:36:29

A. I do. 16:36:31

Q. Okay. And do you recall being asked some questions about the complexity of a cross/bar switch relative to a MUX? 16:36:31 16:36:34 16:36:39

A. I do, yes. 16:36:40

Q. How difficult would it be, in your opinion, for a POSITA to program a 2-to-1 MUX? 16:36:41 16:36:44

A. Not difficult at all. 16:36:48

Q. How difficult would it be for a POSITA to program, for example, a 2-by-3 cross/bar? 16:36:49 16:36:54

A. It would be essentially the same. I mean, the additional complexity, any way you look at it, is trivial. 16:36:59 16:37:04 16:37:10

Q. Would your answer be any different for a 3-by-4 cross/bar? 16:37:11 16:37:14

A. No. 16:37:14

Q. And that's something that would have been within the knowledge and skill of a POSITA in 2013? 16:37:14 16:37:17

A. Certainly, yes. 16:37:19

Q. So sticking with page 103 of your report and looking at the diagram in the upper left-hand corner labeled Chang Hub 46. 16:37:38 16:37:42 16:37:47

Do you see that? 16:37:50

A. I do. 16:37:50

Q. Do you recall being asked some questions about the hub control unit 46 in that diagram? 16:37:51 16:37:54

A. Yes. 16:37:57

Q. And you were asked some questions about the hub control unit 46 in connection with claim 1 of the '420 patent? 16:37:58 16:38:01 16:38:07

A. Right. 16:38:07

Q. Let me direct your attention in your report to claim 1 of the '420 patent. 16:38:07 16:38:15

A. Mm-hmm. Page 115, I think. 16:38:23

Q. Yes. And you're looking on page 115? 16:38:26

A. Mm-hmm. 16:38:33

Q. Is the preamble of '420 patent claim 1? 16:38:33

A. Mm-hmm. Right. 16:38:36

Q. Okay. And can you just read what the preamble recites? 16:38:37 16:38:40

A. "A universal serial bus USB hub module comprising." 16:38:40 16:38:45

Q. And let me direct your attention to claim element 1C that's at paragraph 227. 16:38:49 16:38:55

A. "A USB hub interconnected to the first port and the second" -- sorry, "first USB port and the second USB port." 16:39:07 16:39:09 16:39:12

Q. So claim 1 recites in the preamble a USB hub module and claim element 1C recites a USB hub, correct? 16:39:12 16:39:22

A. That's right. 16:39:26

Q. Okay. And I want to make sure I -- I understand your previous testimony about how the Chang hub on page 103, and in particular the hub control unit 46 -- 16:39:29 16:39:31 16:39:39

A. Mm-hmm. 16:39:42

Q. -- maps to claim 1 of the '420 patent, and in particular with respect to the recited USB hub module and USB hub. 16:39:43 16:39:47 16:39:53

A. Yes. Is that a question? 16:39:54

Q. Yes. 16:40:01

A. Okay. If I remember, I previously said that the Chang 46 reference did not map to the USB hub in claim 1. What I meant by that was the hub module in the -- in the drawing of page 103, I take that to be a USB hub, whereas the claim 1 of 420 describes a USB hub module, which is -- which is quite different. And in particular, the Chang hub -- hub control unit No. 46 does map to the USB hub in -- in the claim 1C, where it says a USB hub interconnected to the first port and the second port. 16:40:01 16:40:07 16:40:14 16:40:18 16:40:23 16:40:32 16:40:35 16:40:42 16:40:49 16:40:54

Q. All right. Thank you. 16:40:54

Let me direct your attention to the Chang reference, Exhibit 1014. 16:40:57 16:41:01

A. Okay. Got that. 16:41:16

Q. And do you recall being asked some questions about the various figures in the Chang reference? 16:41:17 16:41:20

A. Correct. I do. 16:41:26

Q. And you were asked some questions having to do with whether the Chang reference would disclose to a POSITA that two downstream USB devices could simultaneously communicate with an upstream host 42? 16:41:28 16:41:31 16:41:34 16:41:39

A. Yes, I remember that. 16:41:43

Q. Okay. Let me direct your attention to Figure 4 -- 16:41:46 16:41:49

A. Okay. 16:41:51

Q. -- of Chang. 16:41:52

What is illustrated in Chang Figure 4? 16:41:55

A. On the face of it, Figure 4 is Figure 3 with the -- the inside pieces left out, for whatever reason. And what's added is PC 20 connected to the upstream port 42 and downstream devices connected a host 70 to port 50 and devices numbered, variously, 60 connected to the port 44. 16:41:57 16:42:08 16:42:12 16:42:17 16:42:24 16:42:28

Q. Would a POSITA understand, in view of Chang Figure 4, that three downstream devices and one downstream host could simultaneously communicate with the upstream host, PC 20? 16:42:29 16:42:33 16:42:38 16:42:40

MR. BRAUSA: Objection. Leading. And form. 16:42:44

THE DEPONENT: Assuming that what I said before is correct, which I think it is, that this is really Figure 3 with stuff added, yes. And -- and in addition to that, I'm aware there's language in the patent that talks about this. 16:42:46 16:42:51 16:42:55 16:42:58 16:43:00

So the answer is yes, because what you have in between hub control unit is a USB hub, and a POSITA would know how that works. And one of the things that does is these downstream ports, 44 and -- and all the different 44s, they're all separate and simultaneous. And downstream port 50 is also simultaneous because it goes through a dedicated bridge, and then the bridge occupies yet another dedicated hub port. 16:43:01 16:43:04 16:43:07 16:43:10 16:43:16 16:43:19 16:43:23 16:43:28

MR. JENSEN: You can set that aside. 16:43:33

BY MR. JENSEN: 16:43:57

Q. So I want to ask you a question about both Chang and Chang 2 references. 16:43:57 16:44:02

If I recall correctly, you testified earlier that neither of the Chang or Chang 2 references were in your personal toolbox? 16:44:04 16:44:08 16:44:12

A. Mm-hmm. 16:44:13

Q. Do you recall that? 16:44:14

A. Prior to this, yes, that's right. 16:44:14

Q. What is your understanding as to whether a POSITA would have had Chang and Chang 2 in its toolbox? 16:44:16 16:44:20

A. I understand that the way this works is that a POSITA has access to everything that's published, including, you know, all the references we have here, specifications, textbooks, patents, and so on. 16:44:24 16:44:32 16:44:37 16:44:40

Q. Do you recall being asked some questions about the meaning or definition of an integrated circuit? 16:44:46 16:44:56

A. I think we've touched on that a couple times, yes. 16:44:59 16:45:04

Q. And one of the things that you said was an integrated circuit would include transistors? 16:45:04 16:45:07

A. Mm-hmm. Right. 16:45:10

Q. And you were asked whether it would be possible or whether -- strike that. 16:45:12 16:45:14

You were asked whether a POSITA would be able to implement either a pull-up or pull-down resistor in an integrated circuit? 16:45:16 16:45:21 16:45:25

A. I remember this discussion, yes. 16:45:26

Q. Okay. What is your understanding as to whether a POSITA would be able to implement a resistor, either using transistors or otherwise, in an integrated circuit? 16:45:28 16:45:30 16:45:36 16:45:40

A. It's my understanding that there are or there might be several different ways of doing this, and that it's -- it's not necessarily the case that you can add a physical resistor to the inside of an integrated circuit 16:45:40 16:45:46 16:45:50 16:45:54

package or that it's desirable to do so. But that instead, it's -- it's possible to use a transistor configured in a particular way. The marginal cost of transistors inside an integrated circuit is incredibly small, and so any circuit elements which can be done with transistors are, you know, fair game for a chip designer. Other sorts of circuit elements that don't map on to transistors as well, for example, special power banks or whatever, those tend to be more to implement inside -- inside an integrated circuit. 16:45:59 16:46:02 16:46:06 16:46:08 16:46:12 16:46:17 16:46:24 16:46:29 16:46:33 16:46:39

Q. Let me direct your attention to Exhibit 2019. 16:46:42

A. I think that's one of the new ones. Yes. The Welch patent publication from 2000 something, filed 2003. Right. 16:46:50 16:46:53 16:46:58

Q. And this is a publication of a patent application on which you were the -- a named applicant? 16:46:59 16:47:08

A. Mm-hmm. 16:47:12

Q. To the best of your knowledge, did this application ever issue as a patent? 16:47:12 16:47:14

A. To the best of my knowledge, it did not. 16:47:16

Q. When, approximately, was this application filed? 16:47:18

A. Filing date was September 25, 2003. 16:47:23

Q. Prior to filing this application, had you filed any other patent applications? 16:47:27 16:47:30

A. No. This was the first one I ever did. 16:47:31

Q. And at the end of the application, there were a number of numbered claims? 16:47:33 16:47:38

A. Mm-hmm. 16:47:40

Q. I think you said there was a big number? 16:47:40

A. Eighty -- 80 claims, yeah. 16:47:42

Q. Eighty claims. If you recall, who drafted those claims? 16:47:45 16:47:47

A. Most of this patent, especially including the claims, were -- were drafted by a patent attorney that we hired to help with this process. And, you know, being busy with other things and being less experienced with patents, I agreed to go along with that, and at the end of it, or sometime after that, I concluded that wasn't the -- I wouldn't do it that way again. 16:47:49 16:47:53 16:47:59 16:48:03 16:48:05 16:48:11 16:48:14

Q. I seem to have misplaced my copy of Exhibit 2019. Could I just look at yours for a moment? 16:48:18 16:48:30

I see in here, at least starting with Figure 10, there are a number of figures that appear to be hand drawn? 16:48:48 16:48:52 16:48:55

A. Mm-hmm. 16:48:55

Q. Is that correct? 16:48:55

A. Yeah, that's right. 16:48:57

Q. Who prepared those hand-drawn figures, if you recall? 16:48:57 16:49:03

A. I don't recall. But looking at them, I can 16:49:03

guess. For one thing, the writing on these is much -- 16:49:06
the lettering, anyway, is much too neat to be me. So if 16:49:10
I had to guess, I would say I drew these freehand and 16:49:15
then the -- and then the attorney got someone else with 16:49:17
better penmanship to actually write them. But, frankly, 16:49:20
that's a guess. 16:49:23
Q. And when you filed -- no. Strike that. 16:49:24
Was part of what you considered the invention in 16:49:48
Exhibit No. 2019 software related? 16:50:00
A. Definitely. 16:50:07
Q. You can set that aside. 16:50:07
A. Okay. 16:50:11
Q. Let me ask you to turn back to the Chang 2 16:50:11
reference. And please turn to Figure 5. 16:50:33
A. Okay. I have that. 16:51:02
Q. And do you recall being asked some questions 16:51:03
about Figure 5? 16:51:07
A. I do. 16:51:09
Q. And one of those questions had to do with a 16:51:09
routing switch. 16:51:14
Do you recall that? 16:51:14
A. I do. Yes. 16:51:16
Q. Okay. And I believe you had identified that the 16:51:16
box labeled 133 -- I forget exactly what you said, but 16:51:24
it was part or all of the routing switch? 16:51:30

A. Well, I think that what I said is that 133 is sort of the physical switch. The CPU 135, as this is drawn, would appear to be the place where a decision is made about what the -- what the switch ought to be set to. 16:51:32 16:51:36 16:51:39 16:51:44 16:51:47

Q. And you're not saying that Chang 2 Figure 5 expressly discloses a multiplexor, correct? 16:51:50 16:51:57

MR. BRAUSA: Objection. Leading. 16:52:00

THE DEPONENT: I'm not saying that, no. 16:52:01

BY MR. JENSEN: 16:52:02

Q. Or a cross/bar? 16:52:02

A. No. 16:52:03

MR. BRAUSA: Same objection. 16:52:04

BY MR. JENSEN: 16:52:05

Q. And if you look at the CPU 135, it has a vertical line coming out of it with an arrow at the end. Presumably, it's going from the CPU downward. 16:52:21 16:52:24 16:52:28

Do you see that? 16:52:28

A. Mm-hmm. 16:52:33

Q. And it looks like that arrow is going to two different locations. Is that correct? 16:52:33 16:52:36

A. Mm-hmm. Mm-hmm. 16:52:37

Q. What are those two locations that that signal is going to? 16:52:37 16:52:40

A. Well, the lower one is the bypass circuit, and, 16:52:41

as I said, I guessed that the bypass circuit No. 133. The other place the arrow goes is the second USB controller, 132. 16:52:44 16:52:50 16:52:53

Q. Okay. And what is your understanding as to why the CPU would also send a signal from the detection unit to the block labeled 132? 16:52:56 16:52:59 16:53:07

MR. BRAUSA: Objection. Form. Mischaracterizes the figure. And leading. 16:53:09 16:53:11

THE DEPONENT: Okay. Rather than guessing, paragraph 39, I think answers that question. Detection unit 134 -- sorry. That's the wrong part of it. 16:53:23 16:53:40 16:53:44

Okay. "Detection unit 134 will produce a bridging detection signal which causes the CPU 135 to activate the second USB in controller 132 for operation according to the bridging detection signal, thus making it possible for the second USB controller and first USB controller to be achieved." 16:53:56 16:53:59 16:54:03 16:54:07 16:54:14 16:54:19

I read that as meaning when the CPU has figured out the downstream device is a host, that the CPU causes the appropriate things to be done, including turning on the unit 134 and causing it to sort of insert itself into the -- into the switch. I don't know that. That's just plausible. It's not certain. 16:54:23 16:54:26 16:54:33 16:54:39 16:54:46 16:54:52

Q. I think you referenced 134. Did you mean 132? 16:54:55

A. Sorry. I'm sorry. I meant 132. Yeah. 134 is 16:54:58

the detection unit -- 16:55:01

Q. Okay. 16:55:01

A. -- and I had those numbers wrong. 16:55:02

So, right. 16:55:03

MR. JENSEN: I'll pass the witness. 16:55:05

EXAMINATION 16:55:05

BY MR. BRAUSA: 16:55:05

Q. Just to confirm, CPU 135 and detection unit 134 16:55:13

in Figure 5 of Chang 2, those are all part of the 16:55:15

control chip, right? 16:55:20

A. Yes. That's my understanding. 16:55:21

Q. Earlier you testified, I think with respect to 16:55:22

claim 1 of the '420 patent, that a hub module was very 16:55:25

different than a hub in your view, correct? 16:55:28

A. The language of claim 1, the hub module, as I 16:55:31

remember the wording, is about everything in claim 1. 16:55:35

Q. Okay. 16:55:38

A. And the USB hub that's part of that is just a 16:55:38

USB hub. 16:55:41

Q. Okay. And so is there any disclosure in Chang 16:55:42

of the difference between the claimed hub module and 16:55:47

just a hub? 16:55:50

MR. JENSEN: Object to form. 16:55:51

THE DEPONENT: Well, it's at least implicit 16:55:55

by -- by the way things are drawn and described. It may 16:55:57

rely somewhat on the knowledge of the POSITA to fully appreciate. We talked about this a little bit earlier. Chang may not have said that you get simultaneous connectivity. And so what I said in answer to one of your questions is that Chang implicitly discloses that because it has a hub, a POSITA would know what a hub does, and that's one of the things that the hub does. 16:56:00 16:56:04 16:56:08 16:56:11 16:56:14 16:56:18 16:56:22

BY MR. BRAUSA: 16:56:24

Q. Okay. So there's no explicit disclosure in Chang of the difference between a hub module as claimed in the '420 patent and just a hub standing on its own? 16:56:24 16:56:27 16:56:30

MR. JENSEN: Object to form. 16:56:39

THE DEPONENT: Let me just look at this again. Excuse me while I'm looking for some specific wording in here that I think bears on this. 16:56:40 16:57:13 16:57:16

Okay. I'm sorry for the delay here. There -- there's a somewhat folksy discussion in paragraphs 19 and 20 that describes the process of, okay, you start with a conventional hub, and that has various different kinds of things. And then in paragraph 20, he talks about adding things and ends up saying it's -- this may still not be in paragraph 20. He's talking about adding the bridge. 16:58:13 16:58:15 16:58:18 16:58:21 16:58:27 16:58:30 16:58:44 16:58:47

My reason for referencing this thing is that implicitly he's talking about the difference between 16:58:47 16:58:49

those things, because he says, let's start with a conventional hub -- that's what he tends to call it -- and then we'll talk about what it does by itself. And we note what that is. And then -- and then we can get these additional capabilities by making these changes, and, you know, done in the right way, it's not going to cost very much, it's not going to be too difficult. So implicitly from that sort of language, he's saying these things are different. You know, you start with a conventional hub, and it does what it does, and then my invention is this other thing, which is different from that. 16:58:53 16:58:56 16:58:57 16:59:01 16:59:03 16:59:07 16:59:11 16:59:15 16:59:18 16:59:21 16:59:23 16:59:26

BY MR. BRAUSA: 16:59:26

Q. Okay. And I think you testified earlier that the requirements of claim 1 of the '420, in your view, and the description in Chang are largely functional, right? They can take various physical forms that's not specified in the claim or in Chang? 16:59:27 16:59:29 16:59:34 16:59:37 16:59:40

A. That's certainly true in the claim. Again, Chang's folksy discussion, if I can characterize it that way, it sounds awful physical, you know, take the thing apart and these other things. 16:59:42 16:59:46 16:59:49 16:59:54

Q. Got it. So in the context of the claim, the elements of a -- the hub module could all be located on a single chip, right? 16:59:56 16:59:59 17:00:02

MR. JENSEN: Object to form. 17:00:03

THE DEPONENT: Yes. As we have discussed 17:00:07
before, the claims that don't mention ICs specifically 17:00:10
could, in my view, have been done either way and -- and 17:00:16
whichever way is chosen doesn't affect my analysis of 17:00:21
those claims, yes. 17:00:24

BY MR. BRAUSA: 17:00:25

Q. Okay. And when you say either way, one 17:00:25
implementation would be -- 17:00:28

A. On a chip. 17:00:30

Q. A chip can be the hub module? 17:00:30

A. Yeah. And the other way could be discrete 17:00:32
parts. 17:00:33

MR. JENSEN: Object to form. Beyond the scope. 17:00:33

MR. BRAUSA: Thank you for your time. 17:00:36

THE DEPONENT: Thank you. 17:00:37

MR. JENSEN: I just want to ask a follow-up 17:00:38
question on that -- on that last line of questions, to 17:00:39
make sure I understand your testimony, Mr. Welch. 17:00:41

EXAMINATION 17:00:45

BY MR. JENSEN: 17:00:45

Q. So taking '420 patent claim 1 as an example. 17:00:46

MR. BRAUSA: So I'm going to object to this. I 17:00:49
don't think you have a right to do a further redirect 17:00:51
under patent -- PTAB procedures. 17:00:54

MR. JENSEN: Well, we disagree with that. But... 17:00:58 17:00:59

MR. BRAUSA: Okay. I'm going to have a standing objection. I think this is inappropriate. 17:00:59 17:01:01

BY MR. JENSEN: 17:01:04

Q. Well, so you were just asked some questions about -- Mr. Welch, about the scope of '420 patent claim 1, correct? 17:01:04 17:01:06 17:01:09

A. Mm-hmm. 17:01:10

Q. And you were asked some questions about whether that claim would read on an implementation where everything was integrated on one chip or whether it would read on an implementation that was implemented using discrete components, correct? 17:01:10 17:01:13 17:01:21 17:01:25 17:01:28

A. Right. 17:01:31

Q. When you performed your invalidity analysis, was it necessary for you to determine whether claim 1 either required or prohibited a fully integrated solution or a solution implementing discrete components? 17:01:31 17:01:35 17:01:40 17:01:47

MR. BRAUSA: Objection. Leading. 17:01:49

THE DEPONENT: I don't -- I don't think it's required. I think as a matter of habit, I think about these things in both ways and there -- therefore, quickly concluded there are alternatives here, but they don't make any difference to the analysis. 17:01:49 17:01:59 17:02:04 17:02:07 17:02:11

MR. JENSEN: Okay. No further questions. 17:02:13

MR. BRAUSA: I think we're all set. 17:02:17

THE VIDEOGRAPHER: I will conclude -- this concludes today's deposition of Eric Welch. The number of media used was five. The time is 5:02 p.m. We are off the record. 17:02:19 17:02:23 17:02:27 17:02:30

(Proceeding Concludes at 5:02 p.m.)

I declare under penalty of perjury under the laws that the foregoing is true and correct.

Executed on _____ , 20___, at _____, _____.

_____

SIGNATURE OF THE WITNESS

REPORTER'S CERTIFICATE

STATE OF CALIFORNIA) ss.

I, DEREK L. HOAGLAND, CSR #13445, State of California, do hereby certify:

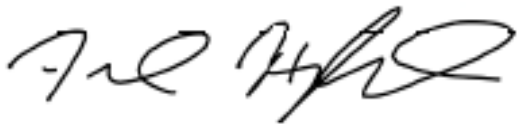
That prior to being examined, the witness named in the foregoing proceeding was by me sworn to testify to the truth, the whole truth and nothing but the truth;

That said proceeding was taken down by me by stenotype at the time and place therein stated and thereafter transcribed under my direction into computerized transcription.

I further certify that I am not of counsel nor attorney for nor related to the parties hereto, nor am I in any way interested in the outcome of this action.

In compliance with section 8016 of the Business and Professions Code, I certify under penalty of perjury that I am a certified shorthand reporter with license number 13445 in full force and effect.

Witness my hand this October 14, 2024.



DEREK L. HOAGLAND, CSR #13445

&

& 2:14 3:3,7,12 6:11 7:15,19 10:18 11:10 22:23

0

037 198:5,15 199:10

1

1 5:12 17:4,7 19:17 20:10,16 28:18 43:23,25 45:18,18 47:5 57:7 61:6,18 63:10 65:10 66:9 76:4 83:7 85:17 86:2 91:5 93:24 121:13 130:7 145:21 146:2 146:15,18,19 149:9 150:13 152:20 153:23 177:20 203:12 214:17 215:10 215:15,23 216:6,9,13 217:23 218:2,6 222:22 224:15 224:17,20,21 224:22 225:4 227:13,21,25 228:9,15,23 230:24 233:13 245:22 260:25 270:17 272:7 273:10 274:7 274:11,15 275:1,8,15,17 284:13,15,16 286:15 287:22 288:8,17

1,000 25:21

1-1 83:25

1.1 265:19

1.2 132:10

10 1:11 2:14 14:11 87:1 119:22 246:14 280:17

10,000 100:15

100 21:9 141:14 261:22

1000 2:15 3:4 5:18

1002 199:8,11

1003 215:12,13 224:18 253:21 254:17

1011 154:12,13 155:20 176:9

1013 42:19,22 43:4,8,11,14 44:6 45:23 72:3 86:21 87:10 113:5,9 140:19 160:7 167:2 188:17 193:13 227:19 227:20 248:2 255:17

1014 53:11,14 53:20 54:25 57:7 85:17 110:9 130:6 133:14,17 143:15 202:3 214:14 233:14 241:5 245:23 246:16 275:25

1015 54:1,7 57:7 85:22 110:19 145:10 245:24 246:8 246:15 247:3 248:9 252:24 269:1,3

1016 54:10,12 55:6 57:12

1017 55:13,15 87:20

1022 265:19

1025 55:21,23 87:24 88:3 253:11 265:18

1029 56:1,3 111:7 112:3

103 204:3 208:13 209:6 209:15 210:12 211:17 212:1 212:17 213:8 213:22 214:22 216:3,6,20 217:1 218:17 219:5 220:13 227:8 272:18 272:21,21,22 273:3,23 275:6 275:16

1030 113:9

1031 59:10

1033 56:9,11

1060 59:24

1068 60:5,7,8 60:10,11

1069 60:13,14 60:16,17

1073 60:19,20 60:23

1074 60:19,21 60:23

10:25 63:11

10:45 63:16

10th 5:4 118:25

11 87:5 97:14 146:5 200:6

11,176,072 43:9

11,681,643 43:12

114 227:19 228:11 233:4 238:7,19 240:8 241:3,23

115 274:12,13

118 4:19

12 28:19,23 43:24,25 44:2 44:3 45:15

150:1,6,22
121 149:20 150:14,21 152:5
122 151:12,23 151:23 152:2,4 152:19,20,20 152:20,21
128 4:10
12:12 129:13
12:13 129:2
12:50 129:17
13 30:10 119:24 146:16 146:17,23 147:4 149:18 152:15 193:18 193:18,19 269:11,15,15 269:18 270:9 270:11
132 199:25 200:2 283:3,6 283:14,24,25
133 147:24 148:14 281:24 282:1 283:1
134 283:11,12 283:21,24,25 284:8
13445 1:15 291:4,19,24
135 282:2,15 283:13 284:8
14 30:10 193:19 291:20
141 113:8
15 7:18,18 193:14,20
1500 77:11
153 247:4,7,23 248:1
16 4:16 139:7
16th 133:21 134:1,21
17 57:12 98:25 102:22 103:3 122:4 124:24
175 264:10
177 160:12 161:16 264:23 264:25 266:20 267:3,17 271:12
18 98:25 99:6 193:15,22,25
180 170:22 173:3
181 170:22 180:7
19 106:12 136:6 138:18 138:21,24,25 139:2,10 193:15,22,25 256:12,15 260:6,23 285:17
1940s 230:2
1969 30:8
1976 11:14 22:10 261:20
198 208:9,11
1980 8:9 11:4
1996 24:11
1998 23:15 24:5,20
1c 274:22 275:2 275:20

2

2 17:5 19:6,9 19:17 20:10,16 28:22 40:6 54:7 55:2 57:7 61:6,18 63:15 64:22 65:10 66:9 76:4 83:9 85:1,5,22 86:2 86:23 87:2,6 89:16 90:4 92:18 93:25 101:7 110:19 112:19,24 113:1,19 115:21 116:22 116:23 117:21 118:7 129:12 137:12 138:4 139:7 145:10 145:21,25 146:14,16 147:5 148:12 148:21 149:7,9 149:14,20,24 150:13,13,20 151:18 152:15 154:10,14 155:1,13 168:8 176:25 177:1 177:19 192:22 210:4,21 211:1 211:6,13 213:21 214:18 215:22 218:23 219:1 228:23 229:9,10,11,19 230:7,20,23 231:4 245:24 246:2,3,9 247:5 248:3,8 248:9 250:1 252:24 253:4 257:14,18,19 257:22,22 259:4,6,9,14 264:12 266:17 268:18,25 269:1,3,4,19 272:7 273:10 273:13 277:17 277:19,25 281:13 282:6 284:9
2's 153:24 259:18
20 11:1 14:1 254:18,20,23 256:7,15,19

258:3,23 259:3 259:6 260:13 276:17,24 285:18,20,22 290:5
2000 279:13
2000s 12:18
2001 130:17
2003 109:15 166:22 279:14 279:22
20037 3:8
2004 166:22
2005 133:21 134:1,21
2007 11:14 22:24 167:1
2008 22:25
2009/0024746 4:16 16:14
2013 31:5 33:14 36:18 41:21 134:23 154:20 155:4 155:15 267:14 273:21
2015 8:11 11:4
2016 161:5 178:20
2019 4:16 16:10,12 20:16 28:16 246:16 279:11 280:16 281:9
2020 4:17 96:22,24,25 98:25 102:23 106:12 246:16
2020-01391 4:18 96:23
2021 4:19 97:2 97:5 118:17,20
2023 9:7,13 50:13 52:8 54:24 57:6 64:7 67:5,12 73:17 92:17 126:14 128:7 197:25 263:19 263:20
2024 1:11 2:14 5:4 126:14 291:20
2024-00228 42:25
2024-00229 43:5
2024-00230 43:9
2024-00495 43:15
2024-228 160:6 188:17
203 200:9
2050 4:18 96:23
21 194:24
2100 3:8
22 272:24
220 227:17
227 274:22
228 44:6 86:19 113:5 193:16 227:20 264:7,8 264:9 272:17 272:19,20
229 45:23
231 28:20
24 233:15
249 113:8 115:20,22
24th 97:2,5
25 11:1 23:24 28:15 279:22
250 62:5 67:7 117:3 118:7
26 139:5
260 253:24
263 4:5
265 253:9,14
268 127:15
275 62:5 67:7
284 4:4
287 4:5
29 57:12 149:24
2:19 192:25
2:33 193:5

3

3 101:8 129:16 135:2,4,16 137:10 139:25 142:25 143:14 149:13,20 150:13,14,22 151:3,12,13 152:1,3,16 153:23 174:21 175:9 185:16 186:10 192:25 202:2,18 203:12,20 204:6 206:15 207:9,10 208:1 208:8,16 209:13 210:10 213:5,15 214:10 218:17 220:8 222:8 226:23 229:8 230:24 231:13 236:25 237:18 238:20 239:21 240:9 241:5 242:2 243:14 243:16 244:3 272:8 273:13 273:17 276:15 277:3
3's 172:10 180:8
30 57:12
302 160:12
305 160:25 163:23 167:2 260:2
306 170:22 172:7 177:23

178:11 180:7
307 113:21
255:22,25
256:1 258:10
308 256:11
309 260:2
30th 62:11
31 141:1
312 188:16
32 57:12
152:10
32525 291:23
33 57:12
34 57:13
35 105:6
36 102:22
103:3,4,17
38 57:13
39 57:13
119:18,20
121:20 122:7
122:12,22
123:2 124:24
124:25 125:8
152:9 283:10
395 62:8
3:42 245:6
3:58 245:10

4

4 43:11 68:24
109:15 149:1,2
150:1,25 151:5
151:7 152:2,4
152:12,13,23
153:1,4,6,23
176:4,12,14,14
193:4 245:5
253:21,21,23
253:25 260:25
272:8 273:17
276:11,14,15
276:22
4-3 141:25
4-5 141:16
40 57:13
106:11 135:15
137:18 140:1,5
152:9 202:11
202:19,23
203:22 204:2,5
204:9,9 206:1
206:3,15,25
207:4,9,13,20
207:23 208:2
209:3,4,7,8
216:1,5 219:6
219:8 220:9
221:9,10,13
222:9,16
223:21 227:6
228:17 260:24
41 57:13
194:25
415.268.6053 3:9
415.268.6080 3:14
42 57:13
135:12 136:7,8
144:4,16
194:25 195:7
197:16 207:23
211:23 276:8
276:18
420 44:8
112:19 140:19
148:12 149:2
160:6,6 168:4
176:5 193:14
215:10 216:7
217:23 218:2
224:15,17,20
228:9 253:21
254:17,20,23
255:15 256:7
264:4,5 274:7
274:11,15
275:8,17
284:13 285:11
286:15 287:22
288:7
425 3:12
44 135:5 136:8
144:4,14
185:16 212:7,7
213:2 233:10
265:10 276:20
277:9
44s 212:16
277:10
45 94:22
46 135:22
136:1,3,7
137:17,25
138:9,12,17
139:19 140:1,5
140:10 141:4
141:23 202:7
208:16,17,20
208:21 209:22
211:5,21 212:1
213:23 214:23
215:2,6,22
223:20 227:6
228:16 260:24
273:25 274:4,7
275:6,14,19
47 57:14
49 35:11
495 264:7
4:00 244:24

5

5 146:25 147:5
147:11,19,20
148:13 149:9
150:9,22 152:3
152:4 245:9
269:18,21
281:14,17
282:6 284:9
50 92:10 135:9
143:19,23,24
144:4,14
184:12 185:17
212:2,11
213:14 214:2
214:13 231:13
233:10 265:9
276:18 277:11

52 57:14 143:15 207:8 207:12 208:1 219:11 220:8 221:13
53 57:14 137:3
5:02 289:5,7

6

6 127:19,20 155:19,22,24 247:3,13,16 248:3,7 251:10 252:19,24
60 276:19
63 155:23,24
643 154:11 155:13,20 168:5,10 176:8
65 140:19,21 143:7 155:19 155:22
66 57:15
67 155:19,23,24
68 143:8
6b2 260:7,22

7

7 4:4 57:15 127:20 251:4
70 30:8 276:18
70s 30:19
746 28:17
75 11:2

8

8 26:8 98:24 127:19,22
80 17:3 280:5
8016 291:16
8a 260:19

9

9 4:10 86:22 88:15 200:5 264:21
9,619,420 43:2 43:16
9,645,962 43:6
900 3:8 74:20
94025-1015 3:4
94105 3:13
96 4:17
962 45:24
97 188:9
9:10 2:13 5:1,4

a

a.m. 2:13 5:1,4 63:11,16
ab 132:9 133:9 133:9 246:4 265:20
abbreviated 260:10
ability 8:16 92:16
able 15:4 29:25 45:3 77:16 83:21 95:3 110:5 127:1 173:11 177:9 177:17 195:23 196:15 217:21 240:12 278:14 278:19
above 28:20 195:22 257:2
abrausa 3:10
absolutely 128:24 253:2
abstract 148:7
accept 133:1,2 176:15 215:18
access 172:13 173:6 174:6,7 174:16,24 178:15 180:14 182:5,12 183:1 183:6,15 184:12 278:2
accessories 164:4
accessory 163:19
accomplished 157:7
accuracy 173:15,19
accurate 9:2 58:16,17 64:11 71:13 100:9 174:5 181:2,25 206:24
accurately 234:17
achieved 170:24 283:17
acknowledge 202:5
acknowledging 142:1
acronym 29:22
acting 131:19 225:16,17 249:16
action 5:23 200:5 291:15
actions 20:1
activate 283:14
active 8:7
activity 184:1,4
actual 58:21 99:19 107:21 166:1 198:25
actually 12:25 13:14 25:7 26:5 32:21 33:5,6 35:4 54:14 60:1 73:3 76:20 84:18 102:10 113:17 114:17 115:8 117:24 124:15 138:11 139:19 151:13 155:7 158:24 160:3 162:12 165:11 166:2 167:25 169:18 171:22 173:12

174:23,25 179:21 182:22 190:3 197:7 198:7 201:11 201:13,16 203:7,18 228:9 229:12 239:18 240:6 247:5,24 248:3,8 252:10 252:12 256:7 261:16 271:21 281:5
adam 3:9 6:5 50:8
adaptation 188:5
adapted 67:24 165:4 166:12
adapter 23:9 23:17 24:4 26:7 27:11,20 28:9 150:4,14 150:21 151:2 164:9,11,19,22 166:2,10,15 261:5,15,18,19 261:23
adapters 23:2,3 23:11,14 24:2 262:8
adapting 247:20
add 38:13 76:11 137:13 179:24 235:20 237:8 238:19 239:4 244:4,6 259:11 265:17 271:24 278:24
added 88:16 181:7 183:4 213:10 276:17 277:3
adding 117:23 137:12 181:20 182:20 210:3 211:7,8,9 229:8 231:2 233:20 235:16 235:21 236:2 241:23 243:13 257:18 285:21 285:22
addition 35:3 57:6 58:1 89:19 139:11 150:11 163:10 181:8 237:17 239:3 243:24 277:3
additional 6:18 46:12 64:9 74:5 75:24 131:24 132:4 140:23 235:20 236:6 237:20 273:15 286:5
additionally 149:25
address 175:21 176:1
addressed 81:6
addresses 229:20 230:8 230:12
adds 106:17 267:9 269:23
adjunct 45:10
admit 56:6 170:2
admitting 180:21
adopted 20:20
adoption 188:5
advanced 28:13
advantage 235:10
advantages 186:13
affect 24:8 30:9 74:22 252:9 287:5
affecting 252:3
affiliations 6:1
afternoon 263:13,14
ag 1:6 2:6 5:15 6:7
agnostic 136:25
ago 46:18 125:20 126:13
agree 5:10 8:17 8:18 15:21 21:13 31:6 34:10 41:3 93:25 99:2 101:22 104:1 104:11 105:17 106:6 118:6 144:1 168:3 173:24 182:21 267:13 271:17
agreed 9:24 21:11 92:25 119:7 280:12
ahead 195:5 199:3 251:17 263:7 264:23 267:5 270:7
aid 10:18
aimed 178:5
allegations 188:22,25
alleged 94:22
allegedly 47:10
allow 133:24 164:12 183:25 228:15 256:16
allowed 171:10
allowing 211:11
allows 172:12 180:12 183:5 257:10 261:24
alluded 20:23 160:15
alongside 72:5 162:7 172:11

alternative 49:10 238:7
alternatives 288:24
amazing 23:18 262:8
ambiguity 142:19 225:8
amount 21:6 191:14
an96527 87:6 88:16
analog 41:16 90:10 149:7 230:1
analyses 69:16
analysis 10:8 35:18 38:7 40:17,25 51:18 56:23 57:18 67:18,23 68:11 68:14,21,23 69:5,9,21,22 70:9,23,24,25 71:9,14 79:19 79:25 80:6 81:1,13 85:10 88:10 98:12 105:16 109:23 109:25 113:11 113:15,19 114:9,16 115:1 123:16 124:5 127:10,11 134:18 136:25 137:15,19 138:3 145:16 155:9 196:16 197:7 216:9 220:17 222:22 223:17 227:11 227:25 236:18 236:21,22 241:2 253:22 254:8 255:22 255:24 256:15 287:5 288:16 288:25
analyze 9:17 79:23 98:9
analyzed 114:6 202:18
analyzer 222:2 224:13
analyzers 192:9
analyzing 20:5
andrew 6:16,18
anew 79:11
angry 25:5,15
announced 24:19
announcement 25:12
answer 4:8 8:15,16 23:25 25:9 32:24 82:16 88:5 90:13 91:9 100:11,20 104:25 122:14 123:11 124:8 125:12 126:20 128:10 138:6 139:9 141:9 151:9 176:2,3 184:20 191:12 194:22 199:15 212:23 215:14 217:19 225:24 230:5 232:4 238:3 239:11 239:24 240:3,3 240:4 241:6,7 241:10 249:11 254:12 273:17 277:6 285:4
answered 25:8 31:17 49:19 58:9 125:2,4 184:18 208:23 259:2 260:4
answering 80:24 161:24 225:9 244:1 266:15
answers 44:18 185:6 283:10
anticipate 89:6
anticipated 68:7 133:11 195:9 209:11 264:13
anticipates 194:6
anticipating 141:25 217:3
anticipation 193:23 194:3 194:10,17
anybody 6:15 93:13 170:10 189:5
anymore 21:24
anyway 26:20 27:9 46:10 54:20 58:18 70:17 101:21 116:17 132:11 157:25 159:6 175:7 177:6 201:24 206:10 217:19 262:16 281:2
apart 47:5 124:5 234:22 241:16 286:22
apologies 183:4 266:1
apologize 175:2 246:21 271:20
app 164:13
apparent 29:8
apparently 149:3
appeal 1:2 2:2 5:16
appear 45:24 47:1,3 151:25 152:1,1 173:10

209:24 228:22 236:13 266:18 280:18 282:3
appearance 6:3 270:15
appearances 3:1 6:1
appeared 96:17 260:11
appears 35:18 57:25 79:6 113:8,25 114:22 139:3 151:3 152:5 199:17 207:3 247:22 248:3,8 269:5
apple 14:15 23:2,3 24:9,12 25:6 26:6,8,22 94:4 164:13,14 182:16
applicable 122:12
applicant 200:8 200:12 279:16
applicants 198:19
application 15:1 16:17 28:17 29:3 30:4 111:21 138:3 279:16 279:19,21,23 280:1
applications 11:19 110:16 110:20 157:22 279:24
applies 67:18 69:24 158:15
apply 88:16 98:15,22 105:14 126:5 127:6 256:13
applying 39:8
appreciate 44:20 241:20 285:2
approach 9:17 10:5 64:25 65:5 110:3 162:16
approaches 93:11
appropriate 29:7 36:12 49:17 51:2 58:25 65:4 98:6,18 100:13 101:4,13,18,19 108:17 109:5 109:18 116:6 126:19 201:21 217:21 238:12 257:1 259:5 265:11 283:20
approximately 9:7 279:21
april 200:6
aptiv 1:6 2:6 5:15 6:6,7 31:24 33:14 50:1 52:9,23 53:5 57:1 62:16 72:11 93:15 95:3 154:3 160:21 162:18 163:3 168:4,16 170:23 171:22 175:16,25 188:25 198:1 214:25 215:8
aptiv's 94:12 94:23 160:19 162:25 188:21 190:18
area 12:17 32:8 33:3 83:13 110:4 113:13
areas 101:24 169:25 240:21
arguably 244:9
argue 104:14
arguing 103:8
argument 79:18,18 196:11,25 197:1 217:8
arguments 200:1
arrived 213:5
arrow 282:16 282:20 283:2
art 29:8 30:23 30:24 40:3,4,5 41:5,6 46:1 50:20 51:9,12 51:15,17,18,20 51:22,25 52:1 52:4,13 53:1 53:14 57:6,11 57:17,19 58:21 58:22 65:2 67:18 69:24 70:23 75:7,10 81:15 82:20 84:14 97:18,18 98:1 105:12 106:2 107:8,11 109:4,18 114:22 132:17 139:7 169:9 177:4 178:6 194:6 195:8,15 196:4,12,23 197:18 206:22 216:15 217:12 220:1,20 221:2 228:23,25 232:1 236:14 239:15 247:14 247:15
article 77:20 80:22 111:22 170:23

arts 161:20
asic 29:22,24 30:17 265:16 267:8
aside 233:3 261:8 262:19 271:2 277:14 281:11
asked 32:21 35:17,19 37:4 37:18,20,25 38:9,21 39:7 39:11,12,24 40:11 48:14,19 48:21,23,24 49:2,3,25 50:15 51:7 54:21 66:17 68:16 79:10 86:14 91:10 104:23 107:25 122:19 123:6 125:1 126:6 156:11 160:2 161:12 162:24 164:21 170:17 171:20 173:7 184:18 185:20 189:1 192:3 197:10,12,13 208:22 231:17 236:8,22 237:1 237:5,10,13 238:1 239:13 239:14 240:22 242:5 259:1 260:3 263:22 263:25 268:22 271:4,8 272:14 273:1,5 274:3 274:6 276:2,5 278:5,12,14 281:16 288:6 288:10
asking 31:24 34:24 35:21 38:14,24 44:10 131:18 147:20 237:23 239:6 267:25
aspect 79:12 260:13 269:11
aspects 213:5 240:20
assemble 40:2 41:4
assets 21:22
assignment 64:25
assist 10:18
associated 13:2 15:3 150:11 241:24
associates 7:15 7:19 10:18 11:11 22:23
assume 50:25 182:22
assuming 49:13 277:1
assumptions 66:18
attach 141:23 265:3
attached 11:24 12:15 150:5
attachment 141:2
attempting 47:10
attention 24:15 28:19 97:14 125:8 200:8 233:14 255:21 264:4,22 268:18 270:8 274:10,21 275:24 276:10 279:11
attorney 6:4 11:7,8 75:16 169:22,23 191:6 240:2 280:9 281:4 291:13
attorneys 123:1 125:8 137:5
audio 5:9,9 155:4,13 156:1 156:9,15,21 157:3,6,21 158:4,18 159:2 159:5,13,14,16 159:18,23
august 24:20 95:12 133:21 134:1,21
authored 9:8 71:18
authors 158:2
automatically 16:2
automobile 83:3 93:12 111:21,24
automobiles 76:18,19 81:5 89:2 168:17
automotive 93:17,23 110:15,20 163:25 164:3 168:16,21 169:12,15,17 178:25 179:5 261:9 262:3,24
automotive's 178:18
available 19:11 25:17,21 84:11 150:8 158:8
award 161:1,5 161:8 162:25 163:25 167:4 168:16,19,21 168:22 169:15 169:17 170:6 170:25 171:4,7 171:16,23

172:3,23
178:17,19,22
178:25 179:12
179:20,24
awards 167:4
169:25 170:11
aware 9:4
62:13 71:17,21
71:24 72:13
73:5 78:9,12
78:18 79:1
94:21,25
126:10 156:9
156:11,12
158:2 159:22
191:17 277:4
awful 286:21

b

b 4:14 100:18
150:3,7 152:8
161:16 162:18
196:5 270:1
back 7:25 14:1
24:9 25:10
28:16 30:2
46:9,16,19
63:18 69:6,24
75:10 80:25
86:13,16 89:9
91:22,25 96:15
110:8 113:19
115:20 120:7
121:10 123:16
129:18 134:5
138:8 143:14
157:15 159:10
160:5 167:2
180:6 185:15
193:7,13
194:16 199:13
201:9 202:2
207:1 208:7
216:4 217:25
225:10 230:10
231:17 233:13
234:24 235:2
242:25 245:11
260:18 262:9
281:13
backdrop
182:8
background
29:14 37:7,12
38:1 47:23
48:25 65:4
69:12 78:20
80:9,10 81:1
81:17 88:11
90:2,16,17
98:23 99:1
100:13,17
108:22 116:16
143:8 153:18
159:11 184:3
204:22 219:17
236:10 260:6
backstopped
144:8
bad 68:20
91:16
balance 61:22
100:19
bandwidth
157:13 158:8
banks 279:9
bar 41:15
88:10,12 90:7
90:8 111:3
137:13 202:17
216:11 217:9
219:2 223:6,9
223:22 229:12
229:16,22
230:16 231:8
231:12,14,20
232:16 233:2,9
235:21 237:8
237:19 241:23
242:16 243:6
243:13 256:12
256:16,20,25
257:8,9,16,24
257:25 258:4,7
259:6,11,19
260:8,20 268:6
270:22 272:8
273:6,13,18
282:11
bars 231:25
based 44:19
69:9 76:4
97:19 98:2,12
98:12 119:9
127:11 144:21
152:5,10
158:10 161:12
184:16 201:21
214:17,22,23
231:9 259:9,13
269:7 270:14
basic 235:5
246:4
basically 69:18
164:21 165:4
222:12 248:9
basing 138:20
basis 128:12
bear 148:10
bearing 149:5
bears 285:15
beginning 6:3
23:24 63:14
83:20 129:15
193:3 194:18
234:10 245:8
behalf 6:6,11
10:6 73:23
96:8 97:8
164:8
behave 212:7
behavior
212:19 225:15
belabor 46:21
132:2 230:19
belaboring
234:8
believe 12:4
15:14 42:3
67:6 97:3
106:3 132:11

133:17 154:21 160:15 217:4 264:16 271:7 272:20 281:23
beneficial 83:5 268:12
benefit 171:12 236:19
benefits 236:2 236:7 265:4
berkeley 7:13
best 8:15,22,23 13:18 14:2 21:17 56:24 64:23 74:3 76:16 91:16 96:14 98:22 109:8 110:11 114:14 126:4 220:21 266:23 279:18,20
bestiary 34:6
better 14:20 76:23 77:2,5 77:15 78:14 83:4 113:18 181:11 217:7 223:1 271:19 281:5
beyond 22:1 35:14 36:3 41:22 45:5 65:3 66:16,20 73:23 75:25 92:5 107:20,23 125:4 128:17 134:13 142:18 153:10 161:7 172:3 185:21 190:24,25 287:14
bias 115:3
bidirectional 116:4
big 92:11 146:18 280:4
bigger 141:16
bit 27:6 71:12 89:9 133:15 151:12 188:6 234:9 243:10 244:21 251:17 272:4 285:2
bits 162:8 211:6
blackboard 74:20
blah 29:9,9,9 159:3,3,4 173:22,22,22
blanket 102:17
block 84:5 248:22 249:5,7 249:11,23 250:13 269:18 283:6
blocks 147:10 248:15 251:4,4
blown 146:25
blue 203:22 208:16 209:4 216:1 219:6 222:16
bmw 163:16,21
board 1:2 2:2 5:16 68:19 142:10 162:14
body 179:12
bohm 56:12,22 94:8,10
bookkeeping 118:16
books 58:4
bookstore 26:14
borrowed 133:7
bottom 173:2 209:5 216:10 216:18 218:15 223:8,12,13,19 223:20 226:22 227:8 228:16
bought 21:15
bound 42:3
bounds 195:13 197:17
box 135:15 136:7 137:13 141:19 142:9 146:18 149:18 149:19 189:9 189:17,21,22 190:7,17,23 191:10,24 192:15 202:11 202:19,23 203:22 204:2,5 205:9,25 206:3 209:3 210:22 211:9 216:1,5 219:6,8,8,11,24 220:9 221:9,10 221:13 222:9 222:16 224:1 242:13 269:11 269:15 270:11 281:24
boxes 190:6 191:17 192:8 204:17 205:10 205:18
boy 21:3 67:21 199:15 261:11
brackets 173:14,23 174:5 181:5,5 181:8,18,19,24
bramson 7:15 7:19 10:12,12 10:13,15,18,23 11:10 22:22 261:21
brand 23:10 261:19
brausa 3:9 4:4 6:5,5,16,20 7:2 7:11 10:1 13:4 13:20 16:3,9

16:13,15 17:22
18:5,22 19:15
20:7,22 27:1
28:4 29:11
30:21 31:4,16
31:25 32:14
34:9,23 38:17
39:1,6,13 41:1
42:20 44:22
50:4 53:12
54:2,11 55:14
55:22 56:2,10
60:9,15,24
63:2,17 70:19
71:16 78:3
80:13 89:10
91:4 92:24
95:1,8 96:21
96:25 97:6
107:13 108:4
108:14 109:22
112:16,18
113:4,6 114:12
115:19 118:5
118:15,21
122:21 125:6
125:14,23
128:15,16,25
129:6,9,18,20
131:1 132:19
134:11,17
138:7,19
141:21 145:9
145:14 147:22
147:25 148:1
149:8 151:17
154:15 155:10
155:22 156:3,8
157:5,14
159:21 160:4
163:14,22
165:14,22
166:4 168:24
171:21 173:17
175:20,24
176:9,20
177:21 179:3
179:11 180:5
180:18 184:2,9
185:1,5 187:9
187:17 190:4
190:12,16,21
191:2,5,19
192:13,19
193:6 197:4
199:1,8,18
201:23 202:1
203:10 205:23
206:11 207:14
209:1 210:5
214:5,7,9
215:24 216:16
218:11,14,22
221:6 222:6,13
225:23 226:1
227:7,12,14,16
227:19 228:20
232:7,15 233:1
235:25 236:4
237:6 238:5
239:1,17 240:1
240:18 241:19
244:20,25
245:11,14
247:1 252:14
252:16 253:8
254:5,11,20,22
258:9,19 259:7
260:12 263:1,5
266:7 270:13
270:23 271:14
276:25 282:8
282:13 283:7
284:7 285:8
286:13 287:7
287:15,23
288:3,20 289:2
break 63:7,18
118:16 129:1,3
192:21,23
193:8 212:20
244:21 245:1
245:15 263:8
breaking
211:14
breakout 189:9
189:16,21,22
190:5,7,17,23
191:10,17,23
192:8,15
bridge 59:11
83:8 109:13
111:12 116:7
130:23 143:15
143:22 144:24
146:14,19,22
147:1,17
148:19,22,25
149:3,6,15
150:8 153:2,3
153:15 156:2
172:10 176:23
176:24 202:25
204:2,5,8,20
205:17,20,22
206:7,7,9
207:8,12,23
208:1 209:10
212:3 219:7,11
220:8,11 221:9
221:13 222:8
222:17 225:17
233:20 235:8
235:22 246:6
248:10,24
249:16 250:1
250:18,25
257:3 258:1,8
277:12,12
285:23
bridges 59:13
134:9 206:8,10
bridging
150:12 283:13
283:15
brief 99:1
127:14 197:9
briefly 51:6
96:16 129:10

bring 48:15 88:8 90:2 189:18 210:21
bringing 211:3
brings 145:1 220:3,3
broad 109:1
broke 64:4 129:24
brother 10:13
brought 84:15 125:7,19
bucket 59:20 61:12
bucks 229:21
buffered 159:5
build 13:25 164:9 242:19
building 84:2,5
builds 69:22
built 27:17 41:17
bulk 157:17 159:7
bunch 14:24 23:7 30:19 79:7 92:2 105:7 231:24 243:21 261:24
bus 12:16,16 17:23 18:8,18 19:4,7,7 158:12 159:6 222:2 225:4 274:19
buses 18:1
business 12:5 20:2 23:15,19 291:16
busy 77:25 280:11
buy 26:2 30:12 185:24
bypass 147:24 148:2 211:1 213:11 246:5 250:19,23 282:25 283:1

c

c 3:13 5:1 185:23,24 188:5,7 196:5
c6a2 260:19
ca 3:4
cable 150:21 187:5
cables 100:5 142:14 152:22 205:3,11 226:17,20
california 1:10 2:13,15,16 3:13 5:19 7:13 291:3,4
call 53:15 81:11 139:19 202:17 206:25 209:4 211:22 238:9 248:14 286:2
called 71:19 72:11,22 79:7 92:6 106:17 113:23 135:20 139:7 141:2,23 141:24 146:17 149:2 150:13 150:13 151:12 152:2,3 161:22 163:16 169:12 194:3 199:25 204:13,14 206:1 207:2,4 207:13,16,20 210:22 212:19 246:6 261:18 269:24
calling 85:17 145:21 209:16
calls 148:25 207:23 208:2 208:21 215:3
camera 192:5,6
cameras 192:4
campus 26:14
capabilities 26:9 155:14 156:5 286:5
capability 134:13
captive 84:19 142:13
capture 47:22 95:4
car 76:25 77:20 154:23 165:9 165:19 173:5 178:14 261:6 262:10,15
cards 23:12
care 40:19 118:15
carefully 49:9 75:6 88:7 116:1
carplay 93:12 93:17,18,22 94:2,3,13 172:24 173:4,8 173:21 174:14 174:15 175:4,8 178:1,2,4,8,13 180:1
cars 77:19 111:17 164:16 169:5,6,8,9 261:12,13 262:2
cartoon 210:12 212:17 222:15
cartoons 203:12,19 204:3 209:15 209:16 219:5 220:12 226:22 238:19 239:19 240:7
case 5:16 28:8 32:22 37:21

38:15 40:5 42:4,25 49:16 54:23 56:23 70:10,11 77:6 79:22 80:3,9 88:9,25 93:10 95:13,15 96:8 96:19 98:10 101:9 103:7 107:22 108:16 109:17 121:9 122:13 127:6 133:2 134:19 137:24 143:5 145:17 163:24 164:2,5 166:6 166:9 169:15 177:5 192:3,11 194:6 201:20 206:2 209:10 224:3 242:11 244:4 257:20 268:9 272:10 272:11 278:24

cases 38:8 40:15,17 47:14 50:24 58:2,12 95:11 127:11 132:10 133:4 137:14,18 164:10 189:19 204:20 205:21 220:5,21 225:22

castelbury 55:23 87:23 88:3 253:12,15 254:6,13 263:23 264:2 265:18 266:5 266:12,18,20 266:21 267:14 268:10 271:15 271:16

catalog 30:7

categories 158:3 163:12

category 57:10 61:3

cause 25:18 212:21 237:8

caused 26:23 148:8

causes 283:13 283:19

causing 283:21

caveat 201:19

cd 154:24

cell 5:7

cellular 5:6

center 204:12

certain 33:20 45:12 46:9,23 52:23 56:7 58:15 89:24 106:14 133:9 161:20 190:9 192:5 195:9,14 196:17,22 197:18 252:6 267:23 271:8 271:13,24 283:23

certainly 17:17 19:10,14 23:3 27:23 34:1 40:4,9 48:25 53:16 58:22 71:6,21 82:18 98:10 123:18 134:8,12 135:21 136:19 137:3,10 153:11 154:22 167:1 170:5 184:7 186:20 271:16,16 273:22 286:19

certificate 291:1

certified 2:12 291:18

certify 291:5,13 291:17

cetera 46:1 128:19

cewell 3:16

challenge 65:25 234:16

challenged 194:7 214:25 215:8 246:1

challenges 38:3

chance 14:20

chang 40:6 53:15,16,22 54:7,24 55:2 57:7 61:6,18 64:22,22 65:10 65:10,20 66:9 66:9 76:4,4 83:7,9 84:25 85:1,5,17,22 86:2,2,23,23 87:2,2,6,6,11 87:16,19,23 88:2 89:16,16 91:5 92:13,18 92:18 102:25 103:10,20 106:18 110:8 110:19 130:5,7 130:14,24 133:15 134:21 134:25 135:14 135:25 137:10 137:12 138:3,4 138:9,11 139:19,20,25 140:3,6,12 141:4,23 142:25 143:14 143:21 144:2,5 144:14,20,23 145:2,6,10,15 145:21,21,22 145:25 146:14 146:14 147:5

148:21,25
149:7,9,14,20
149:24 150:20
151:18 153:24
162:5 172:9
174:20 175:9,9
176:24 177:1
177:12,13,19
177:20 180:7
182:3,7,25
183:5,13,23
184:6,11,21
185:15 186:10
186:15 202:3
202:11 203:20
204:6,13 207:9
207:10,23
208:2,16,21
209:3,13,22,24
210:3,4,8,21
211:1,6,7,13,21
212:1,1 213:6
213:14,19,21
213:23 214:11
214:13,17,18
215:7,21,22,22
216:5 218:17
218:23 219:1,6
219:10 220:8,9
221:12,16
222:8 223:20
223:21 226:23
228:16,16,23
228:23 229:8,9
229:10,11,18
229:19 230:6,7
230:20,23,24
231:4,13 233:3
233:13,18
235:9 236:25
237:9 238:20
239:21 240:10
241:5 242:3,9
243:14 244:2
245:22,24
246:2,3,3,7,9
247:5,13,13
248:3,8,9,10
250:1 251:6,10
252:24 253:4
256:2 257:7,8
257:9,13,14,18
257:18,18,19
257:21,22,22
258:11,16,20
258:21,21
259:4,4,6,9,14
259:18 260:24
260:25 264:11
264:12 265:10
266:16,17
268:18 269:4
273:25 275:5
275:14,19,24
276:3,6,13,14
276:21 277:16
277:17,19,19
277:25,25
281:13 282:6
284:9,20 285:3
285:5,10
286:16,18
chang's 103:20
140:11 153:13
237:18 239:4
246:4 247:20
265:8 286:20
change 26:22
121:17 122:1
127:10,16,18
205:20 214:10
226:18 230:11
251:22,24
252:3 272:3,5
changed 98:19
247:20 251:13
270:25
changes 33:9
128:17,18
187:11 242:8
244:18 286:5
changing 25:17
127:8 237:17
241:23 259:18
272:7
chapter 79:7
characteristics
243:2
characterizati...
100:9 178:23
characterize
116:14 208:16
286:20
characterized
52:14
characterizes
149:10
charging 262:4
chart 247:21
cheaper 186:7
186:9 187:10
188:13
checking
252:25
checks 251:6
chemical 29:15
chicken 45:3
chief 11:12
chip 13:15,25
142:8 146:15
146:17,23
147:1,4 148:16
148:18 149:17
152:13,15,24
156:22 270:12
270:16,20,21
279:6 284:10
286:25 287:10
287:11 288:12
chips 270:12,17
choice 144:25
217:7
choose 100:24
132:13 216:17
chose 71:10
chosen 287:5
chutorash 56:3
76:12,13,15
77:23 78:5
80:14,18 81:3

81:9 87:2
88:25 111:7,11
111:15 112:2
circuit 29:18
30:2,16 31:1,8
31:8,12,20,20
32:12,18,20
33:1,2,6,17,20
33:22,22,23
34:2,7,12,14,16
34:17,22,25
35:2,14,16,19
36:3,15,18
37:22 38:6,6
39:8,20,21,22
39:23 40:1,3,8
40:13,20,23
41:3,5,9,13,20
77:13 147:24
148:2,4 149:4
211:1,1 213:10
213:11 237:24
238:7,9 243:21
246:3 262:5
268:2,4,5,6,16
271:23,24
278:6,10,16,21
278:25 279:4,5
279:7,10
282:25 283:1
circuitry
131:24 147:6
149:10 152:24
224:4 242:15
243:6

circuits 29:3
30:3,8 34:4
38:11,12 40:6
40:21 84:10
244:13
circumstance
106:7
circumstances
124:7 169:14
195:9 217:5
267:23
cite 57:23 58:3
58:5,11,15,25
59:24,25 77:16
113:20
cited 57:20
232:1
claim 17:7 19:6
19:9,17,17
28:18 40:12
44:12 45:18
69:22 70:1,9
82:3,14 112:15
112:19,24
113:1,8,19
114:24 115:1,2
115:18,21
116:22,23
117:3,14,21,25
117:25 118:7
137:16 148:12
154:9,10,14
155:1,13
161:21 168:8
195:8,10,14,24

196:1,17,21
197:1,6,7,17
215:10,15,23
216:6,9,13,23
217:23 218:2,3
218:6 219:21
220:23,24
222:22 224:15
224:17,20,21
224:22 225:11
225:13,18,20
227:13,21,25
228:9,15
230:15 253:21
253:21,23,25
254:18,20,23
255:23,24
256:7,12,15,15
256:19 258:3
258:23 259:3,6
260:6,13 274:7
274:11,15,21
275:1,2,8,15,17
275:20 284:13
284:15,16
286:15,18,19
286:23 287:22
288:8,11,17
claimed 103:22
104:16 105:9
284:21 285:10
claims 10:3,9
12:22 17:1,3,4
20:16 37:11
40:7,20 53:6

65:1,8,16,25
69:7,21 70:2,3
70:22 71:1,7
71:14 85:10
89:2 96:18
108:19 114:6
114:17,19
142:22 154:2,3
155:8 161:21
162:1 167:20
167:25 169:9
171:9,10
173:10 175:5,6
194:7 196:10
197:21 214:25
215:8 217:5
246:1 280:2,5
280:6,7,9
287:3,6
clarification
69:2
clarified
137:18 198:19
clarify 8:20
39:2 44:14
49:20 90:17
137:17 252:22
clarifying
181:15
class 100:5
clean 8:24
clear 15:11
44:16 66:8
79:14 80:21
121:23 123:9

124:12 126:23 136:13 139:18 140:8 141:13 141:14 142:4 144:9,11 145:20 151:10 152:13 181:12 182:6 207:21 220:20 222:14 228:3 242:5 244:10 248:1 251:21

clearer 80:19

clearly 184:23

clever 168:20

clients 8:5

clint 6:8

clinton 3:15

clock 159:4

close 43:25 204:16,16

closed 216:2

closely 185:25

coaster 96:2,17 97:9

coaster's 103:22 105:9

code 291:17

coded 208:8 213:24 228:22 229:5

coding 216:1

cofounded 261:20

coincidently 247:22

colleague 6:16

colleagues 6:8

collectively 62:3

color 25:20 70:7 208:8 213:23 216:1 228:22 229:5 235:5

colored 203:11 203:18

colors 137:6 205:18

column 28:22 119:14 121:13 155:19,22,24

columns 119:13

combination 15:18 27:24 65:20 66:9 85:9 97:18 104:24 214:18 231:7 258:7 266:13

combinations 140:15 161:20

combine 82:6 82:17,17,24 85:5,13 89:16 90:15 91:3 102:24 103:8 103:20 104:4 104:15,20 105:2 106:4,8 106:14 107:10 108:17 203:9 217:8 231:19 232:5,10 243:1 254:8,14

combined 81:21 98:2 103:9 228:25

come 19:18 24:8 25:7 38:9 48:6 74:23 83:18 88:23 89:9 92:3 93:1 113:19 130:24 155:8 165:8 217:25 229:16 241:22 255:11 262:8

comes 123:24 128:22 133:16 142:5 145:4 172:22 178:17 229:9,10 231:3

coming 53:4 121:10 123:4 127:4 143:23 172:21 269:24 282:16

commencing 2:13

comment 74:25 117:24 157:25 236:20 265:18

comments 52:25 140:11 236:9

commercial 113:23 170:1

commit 27:6

common 12:19 67:17,24 68:17 68:23 69:10,11 69:16 70:2,7 91:12 176:12 232:3 252:1,3 265:4

commonality 68:15 70:4

communicate 15:5 83:22 117:5 118:9 276:8,23

communicating 144:16 249:20

communication 111:13 112:6 116:4,8,12,15 117:13,17,21 118:2 133:25 144:3 183:16 184:13 211:22 254:25 255:5,9 255:10 256:9 256:17 257:10 259:23 260:21

communicati... 19:3 74:18 117:10

companies 99:18 164:3 217:13
company 13:12 21:4,20 22:14 23:21 57:2 164:9,24 261:19
compare 48:21
compared 213:14 239:20 240:9 242:2
compatibility 14:25
compatible 16:7
compelling 236:21
compensation 10:22
competitor 190:22 191:8,9
competitor's 190:23 191:10 191:15
competitors 99:19
complete 80:19 105:18
completely 15:6 23:21 49:3 114:18
completeness 88:17 194:12 221:5
complex 188:5 241:3 243:10
complexity 175:2 239:5,14 239:19 240:7 240:14 241:21 242:1,24 243:15,20,21 244:7 272:15 273:2,6,15
compliance 291:16
compliant 131:23 132:17
complicated 20:2,23,24 21:3 100:11 102:12 131:21 132:3,18 136:15 174:18 196:6 241:9 242:23 243:25 244:5,13 268:6
complication 131:25
component 17:17,23 35:15 89:13 201:2 243:18 269:15
components 13:5,7 14:4 15:13,17,19,23 16:7 17:10 18:1,13 19:11 19:17,18 27:17 29:7 30:1,13 31:8,20 32:12 32:16 33:20 37:22 38:12 40:2 41:4,9 83:14 84:9 88:8,21 89:4 90:12 110:13 149:11 200:14 200:20 217:13 237:18 242:16 244:12 269:6 271:25 288:14 288:19
composed 31:8 33:19 34:2
composite 152:4
compound 84:13,13 270:23
compressed 158:17
comprises 79:19 225:6
comprising 225:5 274:20
computer 12:15 24:21 26:1,23 30:11 94:4 121:8 186:23
computerized 291:11
con 12:11
concept 108:25 114:17 238:22 260:8
concepts 194:19,21
conceptual 272:15 273:2
conceptually 234:20
concern 107:3
conclude 86:7 139:25 222:8 256:1 289:3
concluded 65:18 280:13 288:24
concludes 289:4,7
conclusively 59:21
conduct 136:25
conference 24:18 25:4
confess 29:14
confident 196:22
configuration 177:2 241:22 244:8 256:12
configured 15:12 19:2 115:23 254:1 254:24 256:8 259:22 279:3

confine 33:12
confirm 42:6 49:25 60:20 92:17 94:5 145:6 146:18 153:23 208:19 214:21 261:2 284:8
conflicted 123:5
confusing 172:16 182:21 225:7
confusingly 42:21
confusion 80:14 207:22
conjured 235:1
connect 115:24 116:11 131:9 146:10 150:1 150:15,23 224:6 248:19 261:24 265:11
connected 12:17 84:19 143:18,24 151:4 211:18 226:20 250:25 251:12 252:25 276:17,18,19
connecting 116:20 150:9 151:2 165:8 205:10 211:4
connection 84:19 116:6,25 133:2 146:5,10 147:8 149:25 150:6 205:20 211:11 215:18 274:7
connections 134:8 140:23 156:1 172:11 211:12 212:7 256:3,21 258:8 258:11 265:8
connectively 226:12
connectivity 12:20 256:23 285:4
connector 26:5 26:6,8 132:10 141:17 150:3,5 150:7 152:7,8 219:25 252:8
connectors 100:5 133:9 141:12,15,19 142:13 186:25 204:17 205:4 205:11 219:25 226:17,21 265:16 267:8
connects 146:7 232:18 256:25
connotation 48:10
consider 8:2 9:23 11:25 12:7 36:7 37:12,25 39:7 39:24 40:11,22 47:15 49:25 51:25 52:24 58:16 79:1 82:12 83:11 104:23 137:15 137:21,24 161:12 162:14 163:11 170:20 197:10,13 202:9 241:10
considerably 10:25
consideration 82:13 169:1 170:8
considerations 52:21 160:10 160:17 161:10 161:15,23 162:2,23 163:13 168:23 169:19 170:21 197:11
considered 20:17 38:10,16 40:17 49:8 57:19 61:6 79:1 109:19,19 136:5 162:6 169:25 194:6 198:20 241:16 244:3 281:8
considering 36:10 107:4 161:19 162:22 271:25
considers 39:8 170:13
consolidate 245:1
constitutes 37:25
construct 101:7 107:4 136:24 140:5 206:4 207:19 210:3 215:15
constructed 13:15 20:10 217:20
constructing 51:16
consultant 62:15 192:10 192:11
consulted 107:3 164:3
consulting 7:21 8:1 10:11,23 11:2 22:17,20 62:6 261:3,8,9
consume 243:22
consumer 116:9 176:15

265:10,13
consumers 265:6
contacts 101:8 101:10
contain 215:16
contained 200:21
content 100:1 137:16
contents 86:18 119:13
context 17:20 25:14 29:20 32:5 36:11 37:7 38:15 39:25 40:8 45:11 49:4,5 49:18 72:1 76:22 79:6 90:8 97:25 100:21 103:15 104:12,17 106:10 108:9 108:22 109:17 110:7 111:16 113:18 114:6 114:13 115:6 116:7,19 142:21 155:1 184:24 185:13 203:16 236:18 238:24 241:11 243:17 269:17 272:2 286:23
contexts 36:8 47:14 83:3 140:14
continue 5:10 117:10 188:2
contract 23:22
contrary 103:21 104:5 105:3 106:2 265:5
contributor 156:15
control 135:20 135:25 138:9 138:12,21 139:21 141:4,5 141:22 146:15 146:23 147:1,4 148:15,18 149:4,17 152:13,15,24 157:7,9,10,17 173:5 178:14 184:23 202:7 204:13 214:23 226:10 230:1 233:24 274:4,7 275:6,19 277:7 284:10
controlled 242:24
controller 11:24 12:14 13:6,11,12,23 13:25 14:9 17:8 18:17 20:15,19,21 27:16,19 200:9 200:13,19,19 201:2,8 283:3 283:14,16,17
controllers 12:11
controlling 165:2
convenience 204:19 221:20 222:9
convenient 176:8 220:2,13 224:6
convention 116:13,16 180:25 181:17 181:22 182:19 204:15
conventional 29:7 285:19 286:2,10
conventions 209:9
conversation 125:21 271:19
conversations 5:6 120:22 122:9 126:18
conversely 159:2
convey 136:19 181:24
conveys 183:25
convincing 121:23 123:10 124:12 126:23
cope 234:15
copies 44:23 64:21
copy 16:13 45:22 97:7 112:21 133:16 145:11 160:18 183:21 199:9 215:11 246:10 246:18 280:15
copying 188:19 188:22
cord 152:16
cords 151:1
corner 213:8 273:24
corporate 22:10
corporation 23:7 96:5
correct 8:12,13 9:11 10:4,10 11:9,20 17:15 18:15 19:1,5,9 29:4 39:15 41:21 43:10,21 43:22 52:15 53:24 59:8 61:9 62:1 65:2 65:6,7 66:1,2 74:10 76:9

80:16 85:14,15 85:21,25 86:4 87:7,12,13,17 87:25 93:4,8 96:5,6,9 103:11,24 107:6 110:25 117:6,7 121:15 121:18 122:3 124:15,24 125:9 126:2,15 127:16 130:12 130:14 135:2,3 135:12,16 143:20 144:16 144:18 145:18 146:3,6 147:2 147:3,6,9,22 150:16,18 152:25 156:22 160:22 161:5 164:1 169:22 170:25 172:2,4 173:25 194:8 195:1,11 198:2 198:17 206:16 207:24 214:12 218:7,21,25 219:11,12 221:11 227:7 228:19 229:4,6 229:15 230:22 235:18 246:2 247:16 248:6 248:16 250:10 250:16,17 251:5 253:2,19 256:11 257:17 266:4,22 268:23 271:9 275:2 276:4 277:2 280:21 282:7,21 284:14 288:8 288:14 290:3

correction 121:11,13 255:9

corrections 120:9

correctly 124:2 277:18

correspond 46:13 147:11 216:6

corresponding 142:17 223:11 265:9

cost 48:22 170:24,24 171:4,4,11,11 188:4 234:3 235:13,16,20 236:1,8,15,16 236:24 237:2,8 237:11,12 238:3,19 239:3 241:10,11,13 241:18 243:24 244:19 265:23 267:18,24 268:6,11,12,14 270:20 271:8 271:19 272:1 279:3 286:7

costly 244:15

costs 29:25 236:2,3,6,12 239:14 242:6 265:15,17 267:6,10 268:15 271:5 271:13,18

counsel 3:3,7 5:13,25 52:18 53:24 54:6,8 54:13 55:7,16 56:5 57:6 61:7 61:13,19,25 63:19 64:5 66:10,17,18,21 66:23 68:16 74:18 75:22 86:7 118:19 120:23 122:11 122:25 124:21 126:1 129:21 145:16 193:7 194:1 197:25 229:2 245:15 263:22 291:13

country 26:14

couple 16:25 21:20 47:17 59:12 74:16 75:19,19 77:13 83:16 90:5 114:16 119:5 120:13,17 137:11 165:5 181:12 211:2 245:21 278:7

coupled 18:7 18:17

course 9:15 11:3 17:1 39:3 47:9 48:15 58:17 67:20 69:7 72:19 77:15 79:9,10 103:4 128:24 165:6 177:12 225:19

court 5:21 6:23 7:1 8:23 62:17 93:15

cover 188:8 195:25 196:22 196:24 197:6

covered 219:17

covers 195:24 196:1 197:8

cpu 282:2,15 282:17 283:5 283:13,18,19 284:8

create 16:5 32:20 33:5 229:2 261:5

created 23:11 202:16 203:12 213:1 216:20 223:8 241:2 261:14,18
creating 23:10 38:11
creative 15:17 15:24 19:19 92:6 93:6
critical 49:5 236:13
critiqued 73:13
cross 41:15 88:10,12 90:7 90:8 111:3 127:24 137:13 180:20 202:17 216:11 217:9 219:2 223:6,9 223:22 229:12 229:16,22 230:16 231:8 231:12,14,20 231:25 232:16 233:2,9 235:21 237:8,19 241:23 242:16 243:6,13 256:12,16,20 256:25 257:8,9 257:16,24,25 258:4,7 259:6 259:11,19 260:8,20 268:6 268:23 270:22 271:5 272:8 273:6,13,18 282:11
crude 67:25 69:17
csr 1:15 291:4 291:24
cuff 49:1
curious 40:15
current 7:14 121:14 233:24 234:11
currently 7:12
custom 13:15 13:24 15:1,2 38:11 40:5 201:8 206:3,17 207:5 223:25 235:7
customer 261:18
cut 17:5 117:17
cv 11:19 35:11

d

d 4:1 5:1
d'etre 187:7
damages 94:18 94:19
data 66:22 84:11 90:9 146:19 156:1 156:23 157:17 158:4 186:2 269:23
database 96:16
date 9:24 36:10 46:4 62:3 67:6 118:24 119:1 133:20 134:21 134:23 181:3,4 279:22
dated 97:2 200:5
dates 8:10 134:22
day 22:12,13 26:13,15 46:8 128:23 231:18 245:19,20
days 74:16 75:19,23,25 119:6 120:13 120:17 125:20 126:13
dc 3:8
dealing 21:11 62:14 64:19 65:9 67:4 72:8 198:9
debate 121:1
debugging 190:10
decades 16:21 30:2 217:15 229:25
december 9:13 46:18 67:12,15 73:17 128:7
decent 217:14
decide 46:12 81:16 99:19 162:13
decided 68:12 68:13 220:7 251:23
deciding 78:17
decision 26:22 72:22 81:10 96:17 148:8 149:3 282:3
decisions 72:25 73:18,24 74:7
declaration 4:17 42:11,24 44:11 58:2 73:25 79:16 96:7,22 97:8 98:24 100:19 107:21 108:1 108:24 133:17 160:5 193:14 255:14,15 264:5
declarations 9:9 67:5,11 68:4,8 71:17 73:16 74:2,6 76:3 77:16 95:10,14 100:13 107:21 108:15 119:21 128:20

declare 290:1
decline 237:24 239:11
dedicated 135:4,7,9,11 185:11,16,17 185:18 186:9 186:14 187:10 187:12,19 188:2 214:14 265:8,9,15,24 267:6,19 277:12,13
define 29:18 226:8
defined 109:3
defining 48:4
definitely 20:13 39:25 281:10
definition 38:13,20 39:8 47:8 49:22 50:2 58:23 78:25 82:9 140:22 142:5 143:10 148:6 202:10 214:24 215:4,7 278:6
definitions 219:16
degree 111:19
deja 56:7
delay 285:16
delete 122:2
delivered 190:9
delivery 67:20 69:4 88:18
delphi 178:18
demonstrate 221:23
denied 73:6,11
denies 183:1
deny 174:16 179:19,20 182:12 183:15 184:12
denying 172:13 173:6 174:6,7 174:24 178:15 180:13 182:5 183:6
department 261:22
dependent 104:17 106:10
depending 143:24
depends 142:6 221:15
deponent 6:25 7:4 9:20 12:10 13:9 16:1,4 17:20 18:4,21 19:13,22 20:19 27:16 29:6,20 31:11 32:3 34:1,19 37:24 38:23 39:5,11 39:17 63:1,8 68:11 69:3 71:4 76:15 78:22 88:5 89:19 92:21 94:25 95:7 97:4 107:18 108:5,21 112:12,17 114:8,13 117:23 122:16 125:3,11,16,18 125:20 128:11 128:13 129:2 129:19 130:20 132:2 134:3,12 137:9 138:15 141:8 145:13 147:15,23 148:25 151:7 154:14 155:6 155:25 156:7 156:25 157:9 157:24 160:2 163:5,18 165:11,15 166:1 168:19 171:14 173:2 175:19,23 176:11,21 179:7,18 180:16 183:22 184:3,20 185:2 186:18 187:14 190:1,5,13,25 191:3,12 192:1 196:19 198:23 199:12 201:6 201:24 203:4 204:11 205:24 207:12 208:24 210:2 213:25 214:2,6,8 215:14 216:9 218:9,12,21 220:16 221:15 222:12 225:1 225:24 227:5 227:10,13,15 227:18,20 228:19 231:22 232:13,25 235:24 236:1 237:4,23 238:22 239:10 239:23 241:6,8 244:17,23 245:3,13 246:19,22 251:16 252:15 253:7 254:10 254:21 258:6 259:3 260:5 263:4,6,9 266:8 270:14 270:24 271:15 277:1 282:9 283:9 284:24 285:13 287:2 287:16 288:21

deposed 8:12 96:19
deposition 1:9 2:11 5:9,13,18 8:9 33:10 63:11,15 73:22 74:12,15,19 75:14 95:9 129:12,16 130:3 192:25 193:4 245:5,9 289:4
derek 1:14 2:11 5:22 291:4,24
derived 234:3 235:13
describe 30:4 110:10,12 130:10 153:25 182:3,25 197:16 220:1 226:13 251:10 269:14
described 53:4 76:21 92:15 111:11 140:9 146:1 206:20 207:5 214:13 226:19 234:17 238:20 252:15 284:25
describes 112:5 136:6 219:11 253:15 275:17 285:18
describing 89:12 234:7 248:10 252:11
description 4:15 121:22 123:9 124:11 153:15 256:14 286:16
descriptions 126:16
descriptors 158:10
deserved 179:21
design 15:16,20 15:22 16:6 27:18 84:12 94:23 237:24 238:2,7,9,10 242:1
designated 119:21
designator 270:16
designed 25:1 26:4 83:23 158:6
designer 279:7
designs 239:13
desirable 279:1
despite 196:10
destroy 262:7
detail 34:8,22 72:19 84:17,20 112:13 178:1 198:24 210:24 213:17 238:10 238:11 242:18
detailed 50:22 108:23 109:15 130:21 236:21 236:22 238:2 239:13,13
details 12:21 14:22 27:18 32:19 40:22 47:11 81:15 83:24 85:4 88:7 89:4,8 90:6 103:14 131:20 133:4 165:12 205:5 205:14 224:11 238:1,15 241:22 252:5
detect 41:16
detecting 133:6
detection 79:21 80:11 149:4 210:25 213:10 246:3 283:5,10 283:12,13,15 284:1,8
determination 249:7 250:8,22
determine 76:10 94:2 195:24 288:17
determines 248:10
develop 23:2
developed 23:3 24:1,6 64:14 103:12 105:6 105:15 228:25
developers 24:18 25:3 158:20
development 83:14,15 261:23
device 12:20,24 13:2,10 15:1,3 25:18 79:23 83:22 84:13,18 109:10,12 112:9 116:9,9 116:15,20 117:1,4,9,16 118:8 131:8,13 132:9 133:3 135:7 140:23 143:24 144:15 146:1,7,11,11 146:19,22 147:7,12 150:1 150:2,10,15,18 152:3 153:19 159:6 164:13 165:20,20,24 166:2,3,11,16 172:11,13 173:5 176:16 176:23 177:11 178:4,14

180:13 183:1 184:15 185:12 185:16 188:2 188:13 191:15 204:23 205:2,3 206:8,9 212:10 214:3 225:17 226:12 229:13 248:11,19,20 249:3,8,12,12 249:17,23,24 250:9,13,13,14 250:22,24,24 250:25 251:8 251:11,13,14 251:19,23 252:2,2,25 253:16 254:2 257:2 261:24 265:9,20 267:19 283:19

devices 13:2 28:11 41:16 76:19 83:16 84:15 90:11 93:17 100:5 110:4 115:6 155:25 158:9 158:12 167:16 167:16 168:1 172:14 173:6 174:7,8,16,25 178:15 180:14 182:5 183:2,6 183:8 187:18 187:20 215:19 215:19 256:3 258:12 276:7 276:18,19,22

devise 249:8

devolved 132:4

diagram 145:25 209:24 211:16 214:21 215:25 248:10 269:18,20 273:24 274:4

diagrams 218:1 269:9 272:15 273:2

difference 37:2 40:25 71:22 81:2,20 210:16 223:7,19 241:13 268:13 284:21 285:10 285:25 288:25

differences 98:7 126:11 205:14 224:10

different 12:12 13:2 20:21 22:16 23:20,21 24:1 25:24 30:17 32:6,8,8 40:12,18 43:24 44:3 46:8,22 48:10,10 51:5 66:4,4,6 69:7 69:25 70:4,6 77:24 78:1 79:2,12,20 80:5,11 82:1 89:4 92:2 95:11 98:20 100:23 102:16 103:7,7 114:15 126:21,22 130:22 131:3 132:6,7,13,14 132:23 136:17 136:17 137:12 138:3 140:14 140:15,18 141:20 142:10 142:13,20 143:2,3,22,23 144:23 145:22 145:22,22 147:17 149:5,6 151:1 157:16 158:3,22 162:19 163:12 165:5 169:11 169:13,14 188:9 190:15 194:15 201:7 205:8 206:6,23 211:4 212:11 212:12 213:18 219:10,15 220:12 222:3 224:7,9,14 227:2,5,9 228:4 234:12 252:11 255:14 261:14,15,25 265:14 270:20 273:17 275:18 277:10 278:23 282:21 284:14 285:19 286:9 286:11

differently 38:9 47:14 71:5 114:25 206:19

differentness 115:1

differs 44:19

difficult 91:9 273:9,11,12 286:7

digital 41:16 96:4

din 26:8

direct 28:16,18 97:1,14 103:17 113:7 193:13 194:24 200:8 233:14 254:17 255:14,21 264:4,22 268:18 274:10 274:21 275:24 276:10 279:11

directing 270:8

direction 123:16 190:10 291:11

directional 116:8
directly 57:20 225:18 226:19 257:2,22
disadvantage 265:15 267:7
disagree 103:9 181:2 206:1 288:1
disagreement 21:7,25
disclose 86:3 130:10 144:3 183:14 229:12 230:20 276:6
disclosed 186:10
discloses 112:3 183:17,24 185:3 251:6 282:7 285:5
disclosure 95:12 135:14 153:24 195:15 197:18 257:7,8 257:9,14 284:20 285:9
disclosures 65:14 153:13
disconnect 252:4 265:13
discrete 38:12 287:12 288:14 288:19
discuss 64:1 107:24 220:5 259:16 269:7 271:13
discussed 37:10 66:22 177:12 257:23 260:9 266:4,24 287:2
discusses 116:17
discussion 139:1 143:8,12 143:21 173:1 176:17 177:25 203:9 226:16 236:11 242:7 260:6,23 268:8 278:17 285:17 286:20
displayed 137:24
disrupt 115:16 212:9
distance 186:24
distinction 32:17 39:19,22 220:17
distinctions 219:18 221:25
district 62:17 93:15
divided 71:11
divider 80:2 88:14,25
dividers 77:12 78:25 79:5,20 80:7 89:24
division 11:15 11:16 21:21 23:6
dm 269:24
dock 164:24
document 17:2 20:1 29:21 31:23 59:15 68:22 100:23 103:13 105:5 108:10 113:21 118:22 119:2 121:11 123:15 198:25
documents 48:2 66:21 68:13 73:24 74:5 75:5 112:23 217:22
docusign 97:3 97:4
doing 7:24 14:15 21:16 22:14,20 24:13 69:11 83:13 91:12 92:9,10 141:14 174:25 192:14 203:6 211:3 236:17 252:1 272:2,9 278:23
door 26:18
downlink 138:23
downstream 110:24,24 112:8,9 115:24 116:25 117:1,4 117:4,9,10 118:8,8 135:5 135:9 143:19 144:4,10 146:9 147:13 153:20 166:15 172:12 173:11 174:20 175:13,17 177:8,17 178:4 180:12 182:4 183:1,5,14,15 184:11,13,14 184:14 200:20 205:2 211:18 211:23 218:7 219:25 232:18 232:20 248:11 248:20 249:3 250:24,25 251:11,12 255:1 256:3,17 257:11,15 258:12 276:7 276:18,22,23 277:9,11 283:19
downward 282:17

dozens 109:5 189:10 261:15
dp 269:24
drafted 280:6,9
drafting 127:5
dramatically 245:23
drawing 32:17 71:8 135:21 138:1,17 139:2 201:16 204:15 207:25 209:9 212:1 220:2 275:16
drawings 47:12 56:7 77:25 137:4 139:10 202:16 215:22 217:20 221:19 227:23 230:14 269:17
drawn 152:6 207:12 221:19 228:22 280:19 280:23 282:3 284:25
drew 213:23 218:16 281:3
drill 269:22
drilling 241:12
drinks 261:25
drive 106:23 107:5 151:4
driver 15:1,4
drivers 12:24 13:3 227:15
drives 107:4 188:14,14
driving 262:1
dual 83:2,5,10 85:14,20,25 86:3,8 110:4 110:10,24,25 111:8 112:3 115:7 130:10 130:13,16,21 131:2,22 132:20,21,23 133:1,4,23 134:7,14,20 166:19 177:15 178:18 185:9 185:18 186:11 186:15 187:12 187:20,21 188:3 213:24 214:2,4 216:12 218:7,19,23 224:1 229:20 230:8,20,25 231:13 235:21 236:16,25 237:9,18 257:19 259:8 265:3,4,7,14,23 267:6,18,23
due 94:23 195:8 197:11
duly 6:25 7:7
dynamically 253:15 254:1

e

e 4:1,14 5:1,1
e.g. 265:8
earlier 26:9 37:10 49:20 88:10 160:16 162:22 164:19 185:8 202:6 218:1 219:18 224:12 228:25 231:17 232:4 234:8 261:2 266:11 267:22 268:1 277:18 284:12 285:2 286:14
early 11:4 12:18 30:19 164:12,13
easier 57:23 58:1,6,15 205:19 220:5 227:16
easiest 127:3
easily 204:18 217:14 223:24
easy 77:22
economics 84:2 188:14
economies 29:23
editorial 174:10 175:2 180:25
effect 226:11 257:17 268:12 291:19
effective 170:24 171:11
effectively 43:20 127:11 205:13 249:23
effectiveness 171:4
efficiency 44:5
egregious 50:12
eight 50:16 67:13
eighty 280:5,6
either 55:3 56:19 58:3 110:20 111:14 112:7 128:3 138:5 153:20 177:10 213:1 214:3 219:2 221:18 227:23 246:5 250:21 250:22 257:2 257:15,16 278:15,19 287:4,8 288:17
electrical 79:13 90:6 256:23 269:5,8

electrically 204:23,24 205:3 219:19 224:11 252:4,6
electronics 30:11 77:10 154:23
element 33:23 148:5 198:20 198:20,21 255:24 268:4,5 274:22 275:2
elements 33:22 39:20,21 40:3 41:5,9,13,17 77:14 200:14 226:10,10 229:25 268:2 279:5,7 286:24
eliminating 25:17
embedded 7:22 84:16 155:2 168:13
embodiment 149:14 165:23
emphasis 48:10 51:14
employ 9:17
employed 10:5 65:5
employees 10:14
enabled 127:25
enablement 128:2
enclosure 84:15 235:3
encouraged 24:17 27:4 162:13 189:2
ended 132:15
endpoint 158:6 158:9
endpoints 157:4,7,9,11 159:8
ends 285:21
engineer 190:2 192:3,7 236:12
engineering 11:12 14:23 21:10 29:15 59:13 79:9,13 91:8,16 191:14 194:19 243:3 243:19 261:22 268:16 269:8 271:23
engineers 14:14 26:17 91:10,11 92:5 92:8
english 174:10
enrolled 22:2
entangled 201:10
entertainment 154:24
entire 52:3 100:23 108:10 135:15 202:11 206:21 219:5
entirely 8:25 10:20 109:18 122:2 227:22 242:8
entities 256:22
entitled 240:3
entity 22:10 136:23
enumerate 46:5
equal 186:18
equally 55:8 169:7 220:20 221:3,21
equipment 164:4
eric 1:9 2:11 3:13 4:3,17 5:13 6:8 7:4,6 25:11 42:24 63:11,15 96:22 122:14 129:12 129:16 192:25 193:4 245:5,9 289:4
errata 4:19 33:9 118:17 180:19
error 128:5 151:24 181:18
errors 128:18
especially 15:2 25:4 194:17 280:8
esq 3:5,9,13,15
essence 210:19
essentially 44:1 70:25 83:9 135:15 146:4 201:1 252:13 261:21 273:14
establishing 138:22
estimate 10:22 67:10
et 46:1 128:19
ethernet 12:20
evaluate 51:5 51:11
evaluating 170:1
events 24:7
eventually 52:20 68:16
everybody 24:9 24:20 26:1 78:24 101:14 185:23 236:19
evidence 81:25 121:23 123:10 124:12,16 134:3,16
ewell 3:15 6:8
ewiener 3:14
ex 97:19 98:3 130:9

exact 26:5 67:14 122:16 123:17 136:14 142:25 266:13
exactly 44:2 68:12 75:20 108:8 122:5 123:23 132:9 132:12,16,16 133:11 140:2 166:17,24 192:16 195:19 201:10 214:15 237:25 246:6 259:25 281:24
exam 129:7
examination 4:4,5 7:10 263:11 268:23 271:5 284:6 287:20
examined 7:8 291:6
example 10:25 14:17 16:4 40:6 47:2 52:20 53:6 57:22 76:13,16 77:8 78:23 79:21 81:18 87:15 88:3 101:5 111:22 132:8 133:8 137:2 158:4,5 195:13 197:15 261:16 268:17 269:18,23 271:12,22 272:3,5 273:13 279:8 287:22
examples 88:10 189:10 242:18
except 13:24 40:20 61:3 126:12 127:10 234:12
exception 58:7 153:21 182:18
exchange 29:24 268:15
exchanged 251:7
exclusively 138:20
excuse 113:9 176:1 208:13 264:5 285:14
executed 290:5
exercise 270:7
exhibit 4:15,16 4:17,17,19 16:10,12 20:16 28:16 42:19,22 43:4,8,11,14 44:6 45:23 53:11,14,20 54:1,4,7,10,12 54:25 55:2,6 55:13,15,21,23 56:1,3,9,11 57:7,7 60:8,14 60:16 72:3 85:17,22 86:21 87:10,20,24 88:3 96:22,23 96:24,25 98:25 102:23 106:12 110:9,19 111:7 112:3 113:2,4 113:9 118:17 118:20 119:22 130:6 133:14 133:17 140:19 143:15 145:10 154:12,13 155:20 160:7 167:2 176:9 188:17 193:13 199:8,11 202:3 214:14 215:12 215:13 224:18 227:19 233:14 241:5 245:23 245:24 246:8 247:3 248:2,9 252:24 253:11 253:21 254:17 255:17 269:1,3 275:25 279:11 280:16 281:9
exhibits 37:14 59:2,2 60:20 60:23 61:4,11 61:19,22 71:18
existed 82:22
existence 187:2
existing 12:10 165:4
exists 22:12 49:3 156:13
expand 85:6
expanded 146:16
expanding 92:10
expect 212:8
expensive 243:23
experience 9:22 35:12 83:13 92:9 111:20 158:20 164:18 164:25 194:13 268:12 269:9
experienced 280:11
experiments 192:15
expert 7:23 8:2 8:8 9:8,15,16 10:24 11:1,3 35:9 37:5,9 77:4,5 94:18 95:13 96:1,7 97:8 123:20,21 156:17,19 163:9 167:12 169:16 170:3 174:13 182:1

192:10
experts 62:19 62:23
explain 24:5 84:18 173:12 220:21 256:15 260:1 266:14 267:21 271:11
explained 161:19
explaining 79:5 103:23
explanation 79:25 80:21
explicit 76:11 285:9
explicitly 78:6 78:11 81:11 86:2 89:17 144:2,14 145:7 153:25 154:1 184:11 185:4 254:7
exposed 11:5,9
expression 228:24
expressly 282:7
extends 33:5
extension 243:13
extensive 269:9
extensively 262:1
extent 34:3 63:20 105:17 176:13 262:6
external 18:7 18:11,13 19:6 224:4 248:20 249:8,12,22 250:9,13 251:8
extra 187:3 234:23 244:7,7
extreme 80:8
extremely 14:12 23:16 37:6 188:4 230:3 268:11
eye 228:2

f

face 16:23 97:10 133:20 152:2 156:7 176:17 200:24 241:15 276:15
faced 179:23
facilitate 156:21
facing 153:20 176:15 205:2
fact 14:3 19:16 76:18 103:20 109:5 110:9 130:9 132:11 134:10 136:6 139:18 174:11 178:8 202:16 218:23 224:10 242:18 244:9 251:24
facts 66:22
fair 9:13 10:2 50:5 71:2 95:25 171:23 189:24 227:14 253:18 279:6
fairchild 59:25 90:10 217:18
fairly 84:1 238:10
fall 57:9 61:11 197:22
falls 195:15 197:18
familiar 181:22 229:24
familiarize 17:2
fanciful 235:3
far 12:13 24:16 26:15 34:6 110:18
fascinated 30:12
fashioned 25:25
fast 46:14 74:21 75:1
fault 86:15
february 200:5
feedback 14:16
feel 75:10 132:13 167:11
fellow 21:8
felt 71:11 76:23 89:1
female 150:3
fewer 70:12 83:3 236:20 268:13 271:18
figure 48:3 68:24 80:3 134:24 135:2,4 135:16 137:2,3 137:10 139:7 139:25 141:16 141:24 142:25 143:14 146:2 146:15,16,18 146:25 147:5 147:11,19,20 148:13 149:1,2 149:13,20 150:14,22,25 151:7,12,13 152:1,2,3,4,12 152:13,16,23 153:1,4,6 172:10 174:21 175:9 176:4,12 176:14,14 180:7 185:16 186:10 189:15 192:8 202:2,18 203:20 204:6 206:15 207:9 207:10 208:1,8 208:16 209:13 210:10 213:5

213:14 214:10 215:9 218:17 220:8 222:8 226:23 229:8 230:24 231:13 236:25 237:18 238:20 239:21 240:9 241:5 242:2 243:14 243:16 244:3 246:8 247:3,13 247:16 248:2,3 248:4,7 251:10 252:19,24 260:25 268:25 269:1,3,18,19 269:21 270:9 276:11,14,15 276:15,22 277:3 280:17 281:14,17 282:6 283:8 284:9
figured 107:18 283:18
figures 134:25 149:9,9 153:23 227:14 228:22 276:3 280:18 280:23
file 61:17 121:8 198:1,4,15,18 199:9
filed 67:11,15 71:18,24 72:11 121:14 128:6 130:14 199:8 279:13,21,23 281:7
filing 20:6 67:14 133:20 134:21 279:22 279:23
final 37:16 51:7 58:10 69:9,21 71:13 96:17 200:5 220:17 227:25
finalized 46:17 46:18
financial 236:18
financially 5:23 8:4 29:23
find 33:12 45:11 49:11 57:24 82:20 92:6 102:8 105:13 127:2 171:1 176:3 183:20 194:15 194:16 197:23 199:21 214:17 243:20,22
finding 82:11 196:4,4
fine 32:21 63:8 89:1 108:4 112:20 128:11 128:13,13,13 128:13 159:17 209:18,20 240:4 246:22
finish 245:2 270:4,6
firm 5:20,22 6:6,9,11,20 7:21 10:11 11:13 19:23 22:19
firmware 14:9 15:13,19 20:13 27:19 241:25
first 7:7 8:9 10:2 12:14 13:9,21 14:4 17:13 18:24 23:14,16 24:4 24:25 26:4 36:5 45:15 47:20 79:9 90:19 116:3 119:14,18 130:17 134:8 136:5 140:5 146:5,7 150:12 170:2 172:18 174:11,11 200:16 225:2 230:13,24 248:7,18,19 255:5,6 264:13 264:20 269:16 274:23,24 275:21 279:25 283:16
fit 81:3 102:4 223:1 235:2
five 8:13 9:9 42:7,9,9,17 43:20 44:1 64:8 65:6,19 67:4,11 68:4,8 72:7 73:1 105:21 107:21 119:20 121:20 122:3,22 124:20 133:18 192:23 198:12 245:1 289:5
fix 240:13
flash 106:23 107:3,4
flesh 89:9
flip 131:17,21
flow 8:14 247:21 248:9 260:24
fly 237:24
focus 9:21 42:14 46:25 71:10 202:22 219:4 223:13 248:7
focused 12:20 260:14
focusing 121:11 228:21 241:12

foerster 3:7,12 6:6,9,20
folksy 285:17 286:20
follow 24:3 102:20 120:1 126:12 263:21 267:2 287:17
following 6:21 42:6
follows 7:8
force 291:19
ford 164:7,16 165:3,7,9 261:4
foregoing 290:2 291:7
foreign 194:19
forever 230:3
forget 88:20 90:6 164:8 201:24 225:21 234:13 246:6 281:24
form 9:19 12:9 13:8 15:25 17:19 18:3,20 19:12,21 20:18 26:25 27:15 29:5,19 31:3 31:10,22 33:25 34:18 37:23 38:22 39:4,10 39:16,22 44:21 50:3 62:25 68:10 71:3 76:14 78:21 88:4 89:18 92:20 94:24 95:6 100:1 105:9 107:19 108:20 112:11 114:7 117:22 125:1 130:19 132:1 134:2 141:7 147:14 148:24 151:6 155:5 156:6,24 157:8,23 160:1 163:4,17 165:10,25 168:18 171:13 175:18,22 179:2,6,17 180:15 184:18 186:17 187:13 189:25 190:20 190:24 191:25 192:18 196:18 198:22 201:5 203:3 204:10 207:11 208:22 210:1 214:1 216:8 218:8,20 220:15 221:14 222:11 224:25 226:14 227:4 228:9,18 231:21 232:12 232:24 235:23 237:3,22 238:21 239:9 239:22 240:11 244:16 251:15 253:6 254:4,9 258:5,18 259:1 260:3,10 276:25 283:7 284:23 285:12 287:1,14
formed 36:8 266:22
forming 66:15 66:24 124:13
forms 228:4 286:17
formulated 37:6
formulating 10:19 66:20 160:16
forth 19:19 20:16 80:25 97:17 99:7,13 99:16 122:7,12 128:17 130:16 135:1 140:22 161:10 193:25 194:25 214:24 218:17 224:22 236:5 238:6
fortunately 149:21
forward 22:3
found 38:8 54:16,18 55:7 64:16,16 66:13 195:8 220:2
founded 22:10
four 8:13 36:8 44:1 52:9 64:19 65:9 67:15,15,22,24 68:1,3,4 84:10 105:22 157:16 157:20
fpga 142:8
francisco 3:13
frankly 21:16 22:14 23:5 120:22 127:8 173:25 179:7 182:1 281:5
free 115:14 132:13
freehand 281:3
frequently 57:24 101:3 116:14
friend 25:6
front 42:7,17 44:23 54:4 224:16 254:16 268:19
full 13:10 48:23 75:23,25 95:12 158:16 172:8 200:7 291:19

fullness 57:18
fully 36:8 285:1 288:18
function 20:12 32:13 33:20 41:18 49:11 136:7,10,20 140:7,10 150:12 192:5 219:24 226:24 272:3
functional 32:12,16 136:22 139:12 139:13 141:11 142:6,16 143:6 143:11 147:10 202:10 215:3 221:17 224:24 225:11,19 226:5,6,13 227:22 228:5 238:10 248:15 286:16
functionality 84:1 142:12 222:1 246:1
functionally 31:12 32:18 138:11,17 205:7 223:23 224:2,12
functioned 166:15
functioning 165:24
functions 204:16 270:22
fund 22:15
fundamental 49:11 79:12 83:14,17,20 84:5,6 85:7 90:20 187:2
fundamentally 58:9 77:3 167:14 261:13
fundamentals 79:7
funny 26:7 186:25
further 106:14 131:9 150:5 265:14 267:6 267:21 271:11 287:24 289:1 291:13
future 217:3

g

g 5:1
game 279:6
gather 36:5
gears 128:25 192:20 244:20 245:23
general 8:14 30:5 32:24 65:5 70:14,23 70:24,25 75:12 81:12 88:8 100:12 104:2 104:13 111:16 113:13 115:17 121:9 124:4 127:1 133:2 157:15 186:19 192:1 198:23 201:15,18 236:17 238:22
generalize 104:7,18 106:9 108:6,12 177:4 244:11
generally 32:25 33:17,18 41:23 53:7 69:23,23 70:17 100:20 102:2 114:19 114:23 115:3 116:23 120:16 156:11
geography 12:10
geometry 15:7
gesturing 177:23
getting 12:25 21:17 217:9 238:23,23
give 36:12 50:18,19 51:2 83:6 88:20,21 97:21 99:3 112:21 113:20 147:15 185:13 188:1 189:10 197:15 199:13 199:20 215:11 242:18 246:23
given 10:22 37:8,12 47:8 49:14 50:14,17 50:21 51:8 52:22 53:4,10 53:14,16 54:21 78:17 82:1,8 82:11 84:18,25 89:23 90:22 98:6,11,18 106:6 114:24 136:20 137:16 158:8 162:18 179:8,20 181:10 211:21 218:12
gives 83:4 246:3,7 256:23 258:22 260:22 260:23
giving 183:17
go 5:11 9:22,25 16:10 17:7 26:17 27:5 34:5 46:16,19 52:1 69:24 75:10 78:17 86:13,16 91:16 91:22,25 92:7 92:16 98:23

101:6 102:22 106:11 107:1 110:8 113:19 118:3 123:16 129:6,9 134:5 141:1 150:25 154:10 160:9 161:23 167:7 175:4 180:3 185:15 187:24 188:15 189:2 194:16 195:5 195:12 199:3 200:18 207:1 210:7,17 211:14 215:10 215:25 225:10 231:8 238:15 242:21 244:12 250:6 252:5 256:11 260:17 260:18 263:7 264:23 267:4 270:7 280:12

goal 103:21,23 104:5 105:3,9 105:14 106:2 127:1

goals 104:16 105:3,20 106:10 265:5

god 151:23 187:24 192:2

goes 29:21 30:2 31:14 34:7,7 36:14 40:23 46:21 103:23 128:23 149:24 212:11 242:25 250:23,24 277:12 283:2

going 5:3 16:25 17:4 22:3 32:22 34:19 44:5 46:8,9 50:16 54:5 63:5 68:19 69:23 80:25 96:21 98:14 104:18,22 108:6,7 111:25 112:24 118:17 128:25 129:6 148:10 152:11 159:5,6,7,7,10 172:18 180:2 189:15 190:3 191:3 192:20 192:21 200:7 205:16 210:17 211:13 220:5 225:12 231:11 231:14 234:19 239:11,23 240:21,21 244:14,20 255:13 260:18 260:20 269:24 272:1 282:17 282:20,24 286:6,7 287:23 288:3

good 5:3 7:2 25:19 26:2 54:3 76:15 79:16 91:11 92:8 106:7 119:8,12 137:5 159:20 199:5 208:14 217:18 221:3,4 263:13 263:14

googled 161:3

googling 167:3 172:3

governed 102:16

gradations 126:24

grant 59:17 243:10

graphics 137:5 229:2

grates 234:13

gratuitous 78:24

great 26:2 186:2 245:3 247:15

greatest 30:8

green 211:9

ground 45:17 127:20,22

grounds 66:4 76:4 78:6,11 78:19 79:19 80:12,23 81:1 81:4,11,14,18 81:22 127:19 162:10,11 266:22

guarantee 158:7

guess 7:24 67:21,25 80:14 121:12 128:8 128:14 152:12 165:18 180:6 182:16 196:14 203:17 221:7 259:13 281:1,3 281:6

guessed 283:1

guessing 283:9

guided 123:15

guy 22:19 40:15

guys 14:17 24:14 68:17 194:14

h

h 4:14

h&h 79:6 80:9

habit 63:24 75:1 288:22

half 263:17

hand 28:22 39:24 100:18 101:5 109:10 113:1 133:13

145:9 154:11 199:4,23 203:24 209:5 209:22 210:14 211:16 212:16 213:6,22 214:22 273:24 280:18,23 291:20
handed 118:18
handful 263:21
handsome 42:3
hang 114:8 205:7 270:5
happen 212:15
happened 60:1 64:17 96:12 122:17
happening 206:2
happens 92:7 118:3 204:13 251:19
hard 27:9 46:14 67:13 235:1
hardware 15:16,20,22 16:6 19:13 20:11 27:18
hay 102:24 103:10,20 106:17
head 111:12,12 123:18 262:11
header 189:19
heading 46:13 102:23
heard 62:18 163:15,25 267:22
held 5:18 7:17
help 37:1 152:13 158:25 188:24 189:7 280:10
helped 229:2
helpful 112:22 194:16
helps 189:23
hereto 291:14
herrington 2:14 3:3 6:11
hesitate 44:14 44:15,17 148:6
hesitating 31:11
hesse 54:20 55:15 87:19 90:6 232:1
hey 126:15
high 13:16,17 24:8 30:9 33:21 48:22 74:22,22 77:7 77:10 102:13 104:21 111:19 189:11,22 238:10
highest 127:2 127:12
highlighted 222:16
highly 104:17
hill 60:13 77:9 78:10,11,22 79:17 80:6 90:5
hiller 106:17,21
hindsight 82:19 97:19 98:2
hired 48:16 50:13 52:7 62:3 280:10
histories 61:18 198:1,4
history 61:14 188:4,7,11,14 198:15,19 199:9
hit 26:13
hitting 137:7
hmm 17:25 22:11 28:10,12 28:12,24 29:16 33:15 35:10,13 35:13 43:22 44:9,13 45:1 46:2 49:23 52:11 56:13,15 61:8,10,21 64:6,20 65:11 65:13,22,24 74:8 76:5,8 78:16 85:19,24 86:1,1,9,20,20 86:25 87:4 89:14 96:3 97:16 99:8,21 100:8 106:16 106:19 111:1,1 111:4 113:10 117:12,19 119:16,19 120:5,5,11 121:25,25 124:22 127:17 127:21 130:1,8 135:8,10,13,23 139:17 147:25 150:24 157:19 160:11,20,23 161:2 163:2 164:20 167:6 168:12 176:20 178:16,16,21 178:21,24,24 179:1 180:9,11 181:21 182:24 188:18,20,23 194:2,4 198:3 198:3,6,8,11,14 198:14 199:24 202:4,8,13,15 203:21,23 204:1,4,7 208:18 209:14 210:9,11,23 211:10 212:4

213:12 216:19
216:21 219:9,9
220:10 222:18
223:15 227:1
232:19,22,25
234:5 243:8
248:21,23
249:1,4,6,10,14
249:25 250:3,7
250:11,15,20
251:2 252:20
253:10,13,17
253:17 254:3
254:10 255:3
255:16,18
259:10,12
261:7 263:24
268:24 269:2
270:10 274:12
274:14,16
275:7 277:21
278:11 279:17
280:3,20
282:19,22,22
288:9
hoagland 1:14
2:12 5:22
291:4,24
hold 52:6 136:3
139:3 149:21
171:1 239:8,8
hopefully
127:14
horowitz 60:13
77:9 78:10,10
78:22 79:17
80:5 90:5
host 11:23,24
12:11,14,23
13:6,11 14:10
14:13 15:19
17:8 18:17
20:21 27:16,21
83:8,21 84:18
109:10 111:12
111:12 112:6,6
115:5 116:9,9
116:13,15,20
116:25,25
117:4,5,10,15
118:8,10 131:5
131:6,12,18,19
133:2,3,12,12
133:25,25
134:7,7 135:9
135:11 140:7,7
143:19 144:15
146:7,11 147:7
147:12 150:9
150:11,12,13
150:23 151:2
153:20 155:2
165:19,20
172:10,10,13
172:25 173:5
173:11,12,22
174:14,20
175:13,17
176:16,22
177:8,11,17
178:5,14
180:13 182:4,4
182:11 183:1,5
183:14 184:11
184:14 185:11
185:17 188:2
188:12 192:7
204:23,25
206:9 212:2,16
213:2 214:3,14
219:19 225:16
225:18 229:13
248:11,19
249:12,20,24
250:2,22,25
251:13,13
254:2 256:2,4
258:11,12
265:8,22,24
276:8,18,23,24
283:19
hosted 83:15
hosts 110:5
115:8 116:6
167:16,18
168:1,13 177:1
215:20 256:24
hour 63:5
129:21
hourly 62:6
hours 62:5 67:7
75:19 180:3
187:24 238:15
house 267:19
hub 46:4 83:7
83:18,19,25
84:7,16,17
85:2,6,7 86:8
116:11 135:15
135:19,20,24
135:25 136:1
136:10,16,16
136:18,20
137:17,19,21
137:25 138:9
138:10,12,12
138:21 139:12
139:13,19,21
140:7,23 141:4
141:5,22 142:5
142:11,12,16
142:20,24
143:3,5,11
149:11 153:6,8
153:10,16,17
153:17,20
172:10 175:10
176:18,25
177:13 178:18
180:10 183:9
183:18,25
184:23,25
185:22,24
200:9,13,14,19
200:21,21,22
201:2,3,3,7,8,8
201:8 202:7,10
202:12,20,23
203:1,2,22

204:12,13,20
204:25 205:6
205:21 206:3,4
206:6,6,8,15,17
206:20,22,25
207:3,3,5,5,5,7
207:9,23 208:2
208:17,20,21
209:4,4,22
211:4,21 212:1
212:12,12
213:23 214:23
214:24 215:3,7
215:16,16,18
215:20 218:3,3
218:4 219:23
219:24 222:17
223:20,21,25
224:4,23 225:4
225:6 228:16
228:17 233:8,8
233:20,24
234:11,12,21
235:7,7,17,20
238:19 239:4,5
239:20 240:8,9
241:5 242:2,10
243:15 253:25
257:2,3,4,19,25
258:7,22,22,23
260:25 273:25
274:4,6,19,23
275:1,2,5,6,9
275:10,14,15
275:17,17,19
275:19,20,21
277:7,7,13
284:13,14,15
284:18,19,21
284:22 285:6,6
285:7,10,11,19
286:2,10,24
287:11

hub's 141:1

hubs 76:20
83:16,17 84:9
140:1,13,20
143:4,9 144:10
153:10,18,25
183:9,12,25
215:19 241:1
242:2 256:25
260:8,24

huge 23:15
26:13

hundreds
110:2

hurt 123:6

hypothetical
157:10 244:17
268:16 271:22

hypothetically
185:19 201:9
219:23

i

i.e. 195:9

ic 141:18
225:21

ics 287:3

idea 14:18
30:12 31:14
47:12 68:16,20
79:4 82:8 83:5
114:11,24
115:5,8 119:8
128:5 158:6
161:25 166:20
168:22 170:15
174:18 177:3
186:22 187:3
196:20 199:5
205:19 234:21
235:3,5 237:7

ideal 111:20

ideas 56:25
112:12 158:15
158:21 196:21

identical
153:21 223:24
224:2

identification
16:12 96:24
118:20

identified
123:2 270:9
281:23

identifies
135:14

identify 35:15
120:3 121:13
121:17 128:23
131:9 231:18
232:9 269:7

if's 207:6

ignore 215:17

illustrate 217:7

illustrated
269:14 273:3
276:14

illustration
213:1

imac 24:19,25

image 234:25

imagine 185:19
190:5 223:24
234:21

immediately
74:24 91:21
93:2 167:3

implement 40:3
41:5 141:15
278:15,19
279:10

implementati...
85:4 99:20
142:7 152:23
191:22 202:22
202:25 204:19
205:4,13
211:20 213:4
213:17,23
215:4 216:11
217:6 222:21
224:11 228:2
240:16 241:1,4
243:9 256:16
261:5 287:9
288:11,13

Veritext Legal Solutions
Calendar-CA@veritext.com 866-299-5127

Aptiv Exhibit 2021 Page 328
Microchip v. Aptiv IPR2024-00230

implementati... 159:23 202:17 205:8 208:15 209:3,5 216:18 216:25 218:16 218:18 219:7 220:14 223:8 228:3,10 262:24
implemented 28:22 29:2 38:5 40:13 134:14 192:6,6 233:19 288:13
implementing 239:18 240:6 241:21 272:15 273:2 288:19
implication 144:21 178:2
implicit 284:24
implicitly 184:22 185:3 285:5,25 286:8
implied 102:7 144:5,11,13,18 144:19
importance 162:3
important 19:22 30:7 40:16 83:24 84:16,21 162:6 167:11 169:10 220:18 222:3 243:2 252:18
impossible 104:8
impractical 265:5
impressed 179:10
improve 85:3
improvement 83:19
inaccuracy 179:8,9
inaccurate 181:2
inappropriate 100:16 108:13 288:4
incentive 230:13
incident 79:22
inclined 127:13
include 30:16 34:4 50:1 59:7 78:10 88:1 99:18 194:10 197:12 204:15 217:2 221:4,8 235:8 237:18 237:19 268:5 278:10
included 32:12 33:22 35:2 36:2,17 78:5 123:15 172:10 173:13 222:4 254:7
includes 17:10 37:22 57:12 157:1,3 210:24 218:4 260:24
including 13:22 16:6 52:9 76:6 98:11 100:4 120:13 148:8 184:23 221:8 260:13 278:3 280:8 283:20
incompatible 132:8
inconvenient 265:12
incorporated 5:14 6:12 11:13 106:22
incorrect 124:19
increase 236:24 237:2,8,11 239:19 240:7 241:18,25 243:21 267:23
increased 239:3
increases 243:15 265:17 267:9
incredible 25:10
incredibly 25:5 279:4
indefinite 195:10 196:3,8 196:10,25
indefiniteness 195:1,23 196:9 196:25 197:12
independent 163:6
independently 184:1 257:5
indicate 181:18 181:19
indicated 35:6
indicates 106:21
indicative 170:7
indirectly 257:3
indistinguish... 153:22 252:7
individual 56:12 69:15,20 142:21
individually 241:12
individuals 10:17 145:21
industry 26:24 28:13 101:25 162:25 167:13 167:21,22 169:3 171:18 179:5,24 191:13 261:9

inform 58:22 124:3
information 37:14 58:12 93:18 94:3 95:3 98:13 154:23 161:13 162:9,18 170:20 175:4 184:22 189:6 271:8
infotainment 154:4,8,16,20 154:22 155:3 155:12 156:5 159:23 168:6 168:11
infrared 23:11
infringement 11:6
inherit 257:21 257:22
initial 69:22 121:4 257:20
initially 23:12 27:21 52:18,19
initiate 46:4
initiated 116:12
initiation 116:4 116:8
inner 34:21,24
innosys 11:13 11:15,16 21:21 22:6,8,10,13 23:1,6,7 24:1 261:20,21
innovate 102:1 109:2
innovation 99:20 100:4 102:3,18
innovative 15:9 15:11,17,24 16:6 19:19 93:6
input 53:3 126:3,6
inquire 249:2,9 250:9
inquiry 196:16
insert 283:21
inside 13:12 31:14 35:18 39:21,23 40:7 40:23 138:1 141:19 142:7 149:18 188:11 201:11 205:25 221:9 222:9 276:16 278:25 279:4,10,10
instance 12:14 45:25 71:19 78:10 91:6 119:17 226:2 233:10 255:13
instances 65:23 106:1
institution 72:22,24 73:6 73:11,18,24 74:6
instruct 128:9
instructions 4:8
instructs 240:2
instruments 30:6
integrated 29:3 29:18 30:1,3,8 30:16,25 31:7 31:12,19 32:12 32:18,20 33:1 33:2,6,17,22 34:2,4,7,12,14 34:22,25 35:2 35:16,18 36:3 36:14,18 38:6 38:6,11,11 39:21,23 40:8 40:13,20,21,23 84:10 278:6,10 278:16,20,25 279:4,10 288:12,18
integrating 93:12,17 233:20
integration 224:5
intellectual 12:6
intelligence 152:22
intended 136:19 157:11 157:21 158:17 181:24 190:8 225:12
intention 158:20
intentionally 104:10
inter 1:3 2:3
interconnected 78:1 198:21 200:22 201:3 201:12 203:1 204:8,20 205:22 206:1 207:9,17 208:2 208:5 274:23 275:21
interconnecti... 15:7 29:6
interest 21:17 59:16 221:4
interested 5:24 22:19 30:10 38:19 59:21 162:15 167:23 196:3,4 291:15
interesting 23:23 30:13 157:24 194:22 224:1 262:6,14

interface 17:14 18:18 19:4 83:8 146:5,10 147:8 150:1,6 164:22,23
interfaces 164:25
interfacing 165:1
interfere 5:8
interference 5:7
interject 64:10
internal 108:10 141:18 153:9
interoperate 15:5
interoperated 14:11
interoperation 102:16
interpersonal 21:3
interpret 139:16
interpretation 138:10,15 227:24
interpreted 220:25
interrogatory 52:22,23 53:5 66:25 67:1 93:19 160:19 161:3,7 170:19
interrupt 157:17
interrupting 114:20 255:5 260:21
interruption 256:4,9,18,23 257:12 258:3 258:13 259:24 260:14
invalidity 11:6 288:16
invent 188:9
invented 79:14 144:23
invention 12:1 12:18,22,25 14:5,8 20:4,17 27:12 28:21 101:12 103:22 104:6 105:4,10 106:3 107:9 140:11 195:23 233:19 234:11 235:6 281:8 286:11
inventions 11:21
inventive 12:7 27:14
inventor 11:18 19:24 21:14 221:20 222:10 234:20 235:10
inventors 46:23 145:23
inventory 22:15
investigation 93:21 134:19 172:1
invisible 205:5 219:18,19
invoiced 62:9 62:11
involve 47:13
involved 20:3 21:24 22:2 23:9,23,24 25:7 41:25 62:16 238:1
involvement 20:24 163:24 164:2
involves 76:19
involving 94:13
ipad 23:14 24:4 163:16 261:24 262:5,13
iphone 24:18 164:13 167:1 172:24 173:4 173:21 178:13 182:10
iphone's 178:3
ipod 163:16 164:14,22 165:8,23 166:2 166:8 261:5
ipods 164:17 165:1 166:13
ipr 4:18 42:25 43:5,9,15 64:9 71:19,25,25 96:4,23 160:6 188:17
ipr2024-00228 1:3 2:3 5:16
ipr2024-00229 1:4 2:4 5:16
ipr2024-00230 1:5 2:5 5:17
ipr2024-00495 1:4 2:4 5:17
ipr2024-495 255:19
iprs 32:11 50:15 62:3 95:15
iron 234:24
irony 23:18
irrelevant 221:17
isa 12:16
isochronous 156:23 157:1,4 157:18,20 158:6,8,9,13,17 158:23 159:13 159:14,16,24
isolated 268:2 268:9 271:22
issue 52:21 58:8 105:19

192:4 199:16
232:5 279:19
issued 12:3
21:18
issues 21:4
36:10 38:2
58:8 88:23
105:7,19,24
196:6 236:12
item 18:16
138:9 142:6
143:15 150:22
208:16 211:5
215:6
items 132:5
170:18

j

january 67:16
jensen 3:5 4:5
6:10,10,14,19
6:22 9:19 12:9
13:8 15:25
17:19 18:3,20
19:12,21 20:18
26:25 27:15
29:5,19 31:3
31:10,22 32:2
33:25 34:18
37:23 38:22
39:4,10,16
44:21 50:3
62:25 68:10
71:3 75:16
76:14 78:21
88:4 89:18
92:20 94:24
95:6 107:12,16
107:19 108:20
112:11 114:7
117:22 122:14
125:1,12,15,17
125:19 128:9
128:12 129:4,8
130:19 132:1
134:2 141:7
147:14 148:24
151:6 155:5,21
156:6,24 157:8
157:23 160:1
163:4,17
165:10,25
168:18 171:13
175:18,22
179:2,6,17
180:15 183:21
184:18 186:17
187:13 189:25
190:20,24
191:11,25
192:18 196:18
198:22 201:5
203:3 204:10
207:11 208:22
210:1 214:1
216:8 218:8,20
220:15 221:14
222:11 224:25
227:4 228:18
231:21 232:12
232:24 235:23
237:3,22
238:21 239:8
239:22 240:11
241:7 244:16
246:18,21
251:15 253:6
254:4,9,19
258:5,18 259:1
260:3 263:2,7
263:10,12
266:10 270:19
271:1 272:13
277:14,15
282:10,14
284:5,23
285:12 287:1
287:14,17,21
288:1,5 289:1
jeremy 10:13
jesus 166:22
job 7:14 21:10
49:14 51:23
52:5 68:23
98:20,20
126:12 163:5
190:2
jobs 24:8
jogging 57:14
joined 6:8 21:6
joins 6:17
joking 209:20
jones 6:17,18
judgment
101:17
juice 262:5
jump 217:9
june 73:21
justifiable
29:23
justification
236:6
justified 88:13
236:16
justify 236:3

k

keep 186:14
192:21 244:21
keeping 185:17
keeps 115:12
key 12:24 14:24
69:20 98:4
149:23 195:21
keyboard 25:1
keyboards
24:23 158:12
keyspan 11:15
11:16,17 12:4
21:21 22:6,8
23:4,6,9,17
24:1 25:9,12
26:22 84:13
164:9
kind 20:21 30:1
41:24 49:13
92:14 102:6
110:7 124:8
130:21,22
131:3 162:2
164:11 177:14

177:15 187:2
196:12 207:6
217:11 225:8
236:22 246:7
262:11
kinds 11:2
12:12 13:2
22:16 24:1,24
25:24 26:10
30:17 37:4,8
38:14 80:5
83:3 91:19
142:10,14
154:25 164:24
190:6 212:10
229:24 243:19
261:25 285:20
knew 24:10,12
24:15,16
165:15,18,19
179:18
know 8:15 9:24
12:3,13,16
14:14,20 15:6
21:18 22:18
23:20 26:13
27:5,25 30:6,7
30:25 31:7,12
33:3,17,19,21
34:1,11,13,16
35:1 36:10,23
37:3,7,13,18
38:5 40:12
42:1 44:20
48:12 49:4,10
49:14 50:18,19
50:23,24,25,25
51:2,3,11,19
52:3,3,3,24
56:16,18,19,21
58:13,15,23,24
59:17,20 62:22
63:1,4 64:16
67:16,23 68:18
70:11,16 73:13
74:22 77:6,8,9
77:11,11,13,18
77:20 79:2,6,7
79:8,10,13,23
79:23 81:19
84:8,13 89:9
89:24 90:17,18
90:23 91:13,13
91:22,23 92:2
96:12,15 98:5
98:8,13,19
100:14,24,25
101:2,17 102:4
104:7 105:20
105:21 106:5
108:8,10 109:6
109:11 111:19
112:5,9 113:14
113:16,17
116:18 123:6,8
123:12,13,21
123:21,23,23
123:24,24
124:6,23 126:9
127:4,5 128:8
129:1 133:23
134:14 136:9
136:11 137:22
140:6,13
141:17 142:9
142:22 151:15
153:18 155:7
156:14,16,17
156:20 157:2,6
157:10 158:14
158:19 159:11
162:9,17 163:6
163:7,11,20
165:21 166:8
170:13 171:16
171:17,22,24
173:8,9,25
175:7 177:3,18
178:2,10 179:4
179:9,15,18,21
180:1,2,4,4
182:15,18
184:24 186:6,8
187:1,5,6
188:9 189:9,14
190:14,17,19
191:24 192:16
194:12,13,18
194:20 196:6
196:12,21
197:10 200:3
201:20 202:5
203:20 205:9
205:17 209:8
215:4 217:4,10
217:14,17,19
222:1 224:5,6
224:8 225:6,21
226:16 227:25
228:14 230:1
234:9,12 235:1
236:10,13,15
237:25,25
239:18 240:4,6
240:21 242:9
242:22 243:20
243:24 244:25
246:13 260:9
263:15 265:11
268:19 272:11
277:8 278:3
279:6 280:10
283:22 285:6
286:6,9,21
knowing 33:5
knowledge
35:6 40:1 41:3
48:15,25 58:22
65:21 76:7,11
77:15 78:20
81:7,12 82:2
82:13,23 84:4
86:24 87:3,7
89:21 90:1,4
90:16 91:2,6
108:23 138:4
139:11 144:22
153:8 157:1
184:4,5,17
196:12 201:22

214:19,20 229:18 230:6 231:9 232:14 257:24 259:13 259:20 264:12 266:17 269:8 273:21 279:18 279:20 285:1
known 41:21 79:3 80:7,11 82:22,23 84:23 88:22 92:21 96:1 109:14 130:13 133:25 134:8,20 144:11 145:2,2 145:3 225:13 230:2 251:24
knows 40:23 90:20 226:17 250:18

l

l 1:14 2:12 3:8 291:4,24
label 151:13 270:14
labeled 121:14 135:5,15,22 136:1 140:1,1 146:19 150:22 151:5 152:14 202:7 223:20 223:21 228:22 269:11 273:25 281:24 283:6
lack 121:22 124:11
lane 75:17
language 9:21 20:20 31:25 37:11 71:1 81:4 82:3,14 89:2 98:15 116:5 117:25 117:25 149:23 152:9 171:1 174:10,23 179:10 208:19 220:23,25 225:13 234:9 234:16 246:4 251:20 252:9 252:10 277:4 284:15 286:8
laptops 185:23 188:11
large 48:1 93:19 171:18 191:13
largely 43:24 176:12 286:16
larger 136:15 142:8
latest 30:7
laughing 16:20
law 6:10 10:13 51:1 98:18 162:4 169:18
laws 290:2
lawyer 51:1 81:23 98:6 123:11,25 161:18 195:22
lawyers 50:25 98:19 119:7,9
laying 203:17
layman's 82:4 82:5
leading 23:8 266:7 270:13 271:14 276:25 282:8 283:8 288:20
leap 136:12
learn 77:4 79:11
learned 77:16
leave 22:8 31:14 106:6
leaves 99:13,17 226:16 238:14
left 22:6,13 28:22 101:25 102:18 128:15 152:6 208:15 209:22 210:14 210:16 211:16 212:16 213:6 213:22 214:22 223:3,4,19,25 245:2 248:3 273:24 276:16
legacy 28:11 166:12
legal 11:5,9 46:1 50:22 51:2,3 53:1,7 66:16 81:24 97:15 98:6,11 98:21 122:4,7 122:11,12,24 123:2,14 125:24 126:15 127:2 162:3 194:1,10 195:1 196:6
length 130:21 177:12
lengths 101:6
lengthy 113:11
lettering 281:2
letters 45:21
letting 124:3
level 33:21 34:22 41:19 101:13 104:21 169:9 189:11 189:23 238:10 238:11,14
levels 126:24
license 209:9 291:18
licenses 209:13
light 51:12 52:25
lights 190:7,8
likely 82:1
likes 77:24

limit 15:15 191:12
limitation 70:13 127:25 195:14,16 197:17,19
limitations 174:9
limited 6:7 13:16 31:14 74:6 75:8 177:5,13 266:15
line 4:9 24:10 28:22 85:11 89:1 108:3 138:1 150:9 155:23,24 282:16 287:18
lines 155:19,21 155:22 204:15 269:24
link 138:23 161:4
linux 27:23
list 15:19 57:15 59:18
listed 11:19 17:13 18:16 19:17,24 20:10 41:22 194:15
listing 54:4
literally 58:22
litigation 62:17 94:18 160:21
litigations 93:15
little 47:13,19 63:5 67:13 71:12 80:21 91:9 113:18 118:16 132:3 132:18 133:15 149:18 151:12 167:4 172:16 188:6 194:19 234:9 240:24 243:10 244:5 244:13,14,19 244:21 251:17 272:1,4 285:2
live 7:13
llc 22:24
llp 2:14 3:3,7 3:12
local 12:17 136:24 137:16 206:4 242:9,15 242:24
locally 244:5
locate 58:1
located 51:13 55:24 56:4 59:4,23 60:16 60:21 61:5,20 147:1 148:15 148:18 149:17 221:9 222:9 286:24
location 119:14 121:12 186:11 219:10 220:4 220:12 235:22
locations 282:21,23
logic 41:17,18 41:19 105:14 108:11 131:24 149:3 192:8 200:13,20 237:20 247:21
logical 200:19
long 7:17 8:7 23:13 74:14 75:18,21 138:6 139:5 225:24 259:8,21 266:2 266:2
longer 22:20 129:4,7,7 152:15
look 16:16,24 24:14 25:12 36:9 37:10,11 38:9 45:2 50:18 51:7 52:1 65:2,14 88:7 92:7,16 97:7 105:11 110:7 111:10 112:20 114:19 136:3,4 137:2 149:1 150:20 152:20 160:2 163:7,10 170:2 170:19 171:20 174:19,21 175:12 185:25 191:14 196:23 199:22 202:2 203:5,20 215:9 222:7 224:9,15 225:10 228:1 230:23 236:8 237:1,5,10,14 239:13 240:22 245:17 253:20 260:18 269:22 271:8 273:15 280:16 282:15 285:13
looked 26:2 53:8 65:9 73:4 92:1 94:1 96:15 109:5 161:8 168:8 231:23,25
looking 28:18 45:22 52:9 56:7 57:15 59:2 65:8 84:25 86:5 87:10 103:4 139:25 142:25 143:1 151:7 186:23 203:11 218:2 224:19 229:18 230:6 243:17 247:3,5

247:24 248:8 256:14 269:19 271:17 273:24 274:13 280:25 285:14
looks 57:15 122:18 127:18 136:23 149:16 151:12 152:4,6 152:8,11 206:7 206:9 227:8 282:20
lost 94:22 96:17
lot 7:22 14:22 14:23 29:24 30:16 32:23 37:14 46:16 50:23 57:14 58:20 67:24 68:11,14,21 69:5 77:25 83:24 84:17 90:9 97:13 100:14 101:15 102:14 109:1,2 109:19 111:24 132:12 142:12 143:2,2 145:1 176:16 187:3 187:18 190:2 190:14 194:20 194:21 206:23 218:4 228:6 245:2,22
261:23
lots 24:1 137:20 140:14 140:14,15,18 141:19 142:20 144:23 224:7
loud 264:24
love 212:21
low 111:18 157:12 234:3 235:14
lower 170:24 171:4,10 199:22 217:23 217:25 222:25 223:2 238:14 282:25
lucky 139:5
lunch 129:3,21
ly 206:24

m

m 229:22
mac 14:11
machine 262:7
machines 261:25
macintosh 25:22 27:21
made 14:8 20:11,17 26:10 27:24 31:20 65:15 70:25 82:24 119:10 120:10 121:11 127:11 128:5 151:16 158:21 182:6 208:8 217:20,24 220:5 242:22 244:18 249:7 250:8 282:4
magical 169:6
main 22:4,19 52:5
maintain 23:22
major 42:9 101:11
make 29:23 33:11 38:18 40:24 42:14 44:16 46:23 66:17 74:25 78:7 85:16 86:7,11 88:11 108:2 122:2 124:9 126:7 127:16 128:19 139:18 140:3,4 141:13,14 164:21 168:15 169:15 180:20 181:12 187:15 188:3 191:7 205:19 207:21 210:18 217:17 217:18 219:16 220:19 228:3 235:2,11 236:15,22 246:23 248:15 251:21 255:11 262:5 275:4 287:19 288:25
makes 77:19,22 79:14 80:18,19 80:20,21,21 91:9 109:13 111:24 152:20 216:12 220:13 241:9 249:15
making 39:19 84:21,22,23 127:19 164:3 175:3 188:25 230:24 231:12 232:2 236:24 237:9 238:17 239:3 250:21 251:22 283:15 286:5
male 150:7
managed 21:7
manufacturers 93:23
map 48:8 275:14,20 279:8
maps 275:8
margin 45:7 199:23
marginal 268:6 268:15 272:11 279:3
margins 217:14

mark 16:9 94:8 94:10 96:21 118:17
marked 4:15 16:12 28:20 42:21 47:17 72:2 96:24,25 118:20 133:14 145:10
market 3:12 12:13 95:4 100:2
marketplace 100:3
marks 63:10,14 129:11,15 192:24 193:3 245:4,8
marsh 2:15 3:4 5:18
martin 96:2 97:9
master 47:3,23
matches 238:11
material 35:7 36:5 37:10 38:1 53:4 58:5 67:19 260:7
materials 52:17 64:5 93:14 161:9 197:24
matter 5:14 9:6 33:4 35:17 36:9 37:7 75:9 95:16 100:18 101:5,23 104:2 104:11,18 107:9 108:18 108:21 109:9 197:5 221:25 288:22
matters 39:15 219:20
mean 14:4 20:9 20:19 21:2 32:15 41:8 48:19 50:23 51:23 66:4 67:13 74:21 78:24 104:22 114:23 123:6 128:8 136:17 136:19 148:4 163:8 177:25 179:25 180:23 183:2 185:22 187:14 188:5 189:13 195:20 204:17,22 205:13 213:16 223:2,10,10 226:6,12 227:6 227:6 243:18 261:14 267:21 271:11 273:14 283:24
meaning 108:9 147:17 183:8 278:6 283:18
means 47:6,24 49:12 92:9 112:10 114:5 114:11 119:20 150:2 159:17 204:21 205:1 249:12,23 270:16
meant 32:4 47:12 48:3 49:1,18 102:3 102:3 123:20 164:12 180:22 189:3 235:4 266:14,18 271:12 275:15 283:25
mechanism 83:21 116:7 131:5,8 147:6 212:24 229:9 231:2,3
mechanisms 110:12 131:10 132:11 133:6,7 133:10
media 5:12 63:9,10,15 129:11,16 192:24 193:4 245:4,9 289:5
meet 75:15,18 127:2 219:21 228:5
meets 177:19 177:20 227:23 259:6
memories 74:22
memory 9:14 13:19 14:2 24:8 25:21 30:9 47:18 56:24 57:14 64:23 74:3 76:17 96:14 106:22 110:11 111:15 266:23
menlo 1:10 2:15,15 3:4 5:18
ment 141:23
mental 120:21 234:25
mention 108:18 110:15,20 112:14 287:3
mentioned 8:1 30:17 41:10 61:4,20 66:25 85:12 104:19 108:25 129:24 140:2 163:20 164:5 169:10
mentions 93:18
merely 233:19
merge 233:4,10
met 14:14 24:13 75:16,21

168:22 258:3,6
meter 189:20
mic 137:7
mice 24:23 158:12
micro 13:11,23 13:25 14:9 27:19 90:10 132:9 133:9 265:20
microchip 1:3 2:3 5:14 6:12 9:5 10:6 52:7 52:18 56:5 57:1 62:4,9,16 62:20,22 67:8 72:4 73:23 75:22 93:10,15 93:16 94:6,9 94:20,21 160:22 162:24 170:10,13 171:25 188:24 190:17
microchip's 94:18 156:19
microchips 156:18
microcontroll... 188:12
microphones 5:5,8
microsoft 14:15,17 164:7 164:16 165:3,7 261:4
microsoft's 163:19
middle 113:25 149:24 267:4
million 94:22
mimic 251:18
mind 44:19 92:22 112:1 124:1 149:5 182:2 209:16 264:24 272:7
mine 25:6
mini 133:9
minute 134:5,5 147:15 218:1 245:1
minutes 36:4 136:11 192:23 197:22
minutiae 158:11
mischaracteri... 283:7
misheard 39:17 266:11
misleading 47:16 49:21 50:2
misplaced 280:15
misquote 151:14
misread 152:18
misspelling 181:3
misspoke 193:20
mistake 151:18 151:21 187:6
mistakenly 216:2
mistakes 151:16
mistaking 76:17
misunderstood 271:20
misuse 50:12
misusing 79:15
mitch 94:6,7
mm 17:25 22:11 28:10,12 28:12,24 29:16 33:15 35:10,13 35:13 43:22 44:9,13 45:1 46:2 49:23 52:11 56:13,15 61:8,10,21 64:6,20 65:11 65:13,22,24 74:8 76:5,8 78:16 85:19,24 86:1,1,9,20,20 86:25 87:4 89:14 96:3 97:16 99:8,21 100:8 106:16 106:19 111:1,1 111:4 113:10 117:12,19 119:16,19 120:5,5,11 121:25,25 124:22 127:17 127:21 130:1,8 135:8,10,13,23 139:17 147:25 150:24 157:19 160:11,20,23 161:2 163:2 164:20 167:6 168:12 176:20 178:16,16,21 178:21,24,24 179:1 180:9,11 181:21 182:24 188:18,20,23 194:2,4 198:3 198:3,6,8,11,14 198:14 199:24 202:4,8,13,15 203:21,23 204:1,4,7 208:18 209:14 210:9,11,23 211:10 212:4 213:12 216:19 216:21 219:9,9 220:10 222:18 223:15 227:1 232:19,22,25 234:5 243:8

248:21,23
249:1,4,6,10,14
249:25 250:3,7
250:11,15,20
251:2 252:20
253:10,13,17
253:17 254:3
254:10 255:3
255:16,18
259:10,12
261:7 263:24
268:24 269:2
270:10 274:12
274:14,16
275:7 277:21
278:11 279:17
280:3,20
282:19,22,22
288:9
mode 146:11
147:12,12
150:18 248:12
250:14 251:13
251:13,13,14
251:18 252:1,9
254:2,2
modems 24:23
modernized
28:14
modes 253:1
modest 217:10
modification
213:13 229:21
230:14 235:16
243:18 253:4
268:3
modifications
128:19 137:23
137:25 208:8
211:21 214:16
221:9 233:24
235:11,19
238:18 239:4
241:17
modified
115:17 203:11
206:3 218:16
226:23 229:19
230:7 233:3
235:8 238:18
241:1 242:1
248:5 251:20
252:19
modify 26:23
82:7 86:22,23
87:2,6,11,15,19
87:23 88:2
137:22 220:7
230:24 242:10
264:11,17
266:5,16,25
268:4
modifying
213:5 241:24
module 218:3
224:23 225:4
254:1 274:19
275:2,9,15,18
284:13,15,21
285:10 286:24
287:11
mofo.com 3:10
3:14,16
moment 16:16
27:4 33:8
35:25 36:6
97:1 215:17
280:16
moments 25:10
25:13
money 29:24
217:17
month 26:17
months 46:16
46:18 75:4
95:12
morning 5:3
7:2 118:18
119:11
morrison 3:7
3:12 6:6,9,20
motivated
102:24 103:19
104:14,20
106:8,14
216:14,17
motivation
81:21 82:6,7
82:17,25,25
83:11 85:13
86:23 87:1,5
87:11,15,19,23
88:2 89:15,21
89:25 90:14
91:3 103:8
104:3 106:4
203:9 217:8
231:19 232:5
232:10 242:25
254:8,14
264:11,16
266:5,16,24
motivational
88:23
mouse 25:1
mouthful
186:19
move 111:21
204:2 205:17
220:8 230:13
moved 209:10
219:7 222:16
moving 97:13
220:11 221:13
235:21 244:3
multifunction
257:19
multiple 83:5
83:10 86:3
110:24 211:23
218:7,13
229:20 230:8
230:20 242:5
265:16,16
267:8,8 270:12
270:17
multiplex
270:22
multiplexor
282:7

multiplexors 41:15 89:25
music 164:14
mux 111:2 202:17 210:22 211:9,17 212:11 213:10 217:1,9 218:18 222:19 230:15 231:8,11,14 242:17 243:7 246:7 257:21 259:18 268:4 272:8 273:7,10

n

n 4:1 5:1 229:22
name 5:20 7:3 7:4 16:19 25:11 36:6 41:12,14 59:6 76:17 94:6 96:2 139:19 163:18 254:14
named 11:18 145:22 279:16 291:6
naturally 84:12
nature 9:18 46:10 100:18
neat 281:2
necessarily 41:23 93:24 113:11 131:12 132:7 136:21 143:6 145:1 190:10 220:22 226:13,14 256:16 258:3 259:22 265:10 278:24
necessary 40:2 41:4 75:10 115:18 199:3 255:10 265:24 267:19 288:17
need 17:2 36:1 37:14 59:18 77:14 83:1 85:13 145:12 150:8 167:18 182:18,19 189:15 191:23 199:14 219:20 232:9 233:8 237:19 255:13 258:23 259:3,4 259:4,5 263:8 272:10
needed 27:2 74:25 81:6 99:7,13,17 120:9 126:7 178:4
needs 150:1
negotiate 131:11 158:10 188:10
negotiation 131:17
neither 86:2 92:18 228:21 277:19
net 226:10 243:24 260:7
network 11:24 12:17 17:13 18:18 19:3 25:24 29:7
never 8:5 21:18 56:22 92:22 111:25 131:18 135:25 138:9 138:11 149:10 162:24 163:25 182:11 208:21 219:20
nevertheless 40:14 102:10 234:18
new 13:6 21:8 24:10 26:23 279:12
newer 164:17
news 163:25
nice 77:1 90:7 102:21 105:23
nomenclature 151:23
non 104:24 141:18 160:17 160:18 161:15 162:4,10 170:8 192:10 201:21 225:15 256:23
nope 189:5,8
normal 150:9 270:14
normally 150:3
note 5:5 17:3 45:20 167:12 170:23 286:4
notebook 121:7 129:25 193:10 245:17
noted 53:5
notes 44:24 45:7,9,14,24 46:3,5,13 119:5,9 120:8 120:12,19,21 121:9 129:25 193:10
notice 124:16
noticing 6:4
notion 115:4 271:17
notwithstandi... 19:16 28:13 56:20
nuance 70:16
nuances 126:11
number 4:16 16:14 38:4 42:25 43:11 47:5 53:17 74:21 93:24,25 105:20 126:17 155:25 158:22 265:23 267:18

268:22 269:6
280:2,4,18
289:4 291:19
numbered
276:19 280:2
numbers 5:16
199:23 248:14
284:3
numerous
12:21
nw 3:8

o

o 5:1
o'clock 192:22
object 9:19
12:9 13:8
15:25 17:19
18:3,20 19:12
19:21 20:18
26:25 27:15
29:5,19 31:3
31:10,22 33:25
34:18 37:23
38:22 39:4,10
39:16 44:21
50:3 62:25
68:10,19 71:3
76:14 78:21
88:4 89:18
92:20 94:24
95:6 107:12,16
107:19,19
108:20 112:11
114:7 117:22
125:1 130:19
132:1 134:2
141:7 147:14
148:24 151:6
155:5 156:6,24
157:8,23 160:1
163:4,17
165:10,25
168:18 171:13
175:18,22
179:2,6,17
180:15 184:18
186:17 187:13
189:25 190:20
190:24 191:25
192:18 196:18
198:22 201:5
203:3 204:10
207:11,13
208:22 210:1
214:1 216:8
218:8,20
220:15 221:14
222:11 224:25
227:4 228:18
231:21 232:12
232:24 235:23
237:3,22
238:21 239:8,9
239:22,22
240:11 244:16
251:15 253:6
254:4,9 258:5
258:18 259:1
260:3 284:23
285:12 287:1
287:14,23
objecting
240:14
objection
107:16 108:3
240:12 266:7
270:13,23
271:14 276:25
282:8,13 283:7
288:4,20
objections 6:2
191:7,11
obolsky 94:6,7
observed 167:3
obtains 212:5
obvious 65:15
66:1 79:3 82:3
82:14 85:1,8
85:10 86:7
140:8 142:3
160:17 161:22
162:10 180:22
191:23 195:9
214:17 215:21
223:17 231:9
239:16
obviously
18:11 30:2
69:19 91:20
93:2 103:6
115:10 148:9
209:8 266:19
obviousness
38:8 40:18
50:20,24 52:4
53:24 76:4
81:24 82:9,10
97:15 138:5
160:18 161:15
162:4 170:8
194:17 196:11
196:15,16
197:11 222:22
241:2
occasion 11:18
23:2
occasionally
75:7 194:16
occupies
277:13
occur 28:2,3
236:24
occurs 77:2
october 1:11
2:14 5:4
118:25 126:14
291:20
offer 37:21
128:2
offered 39:14
offering 49:10
194:5,8
offhand 56:17
56:21 57:3
88:20 114:21
136:18 270:2
office 1:1 2:1
20:1,2 21:12
200:5

officer 11:13
oftentimes 153:9
oh 47:18 50:7 51:5,19 59:5 60:4 77:6 82:19 91:14 103:4 122:18 122:19 129:2 137:9 151:22 152:17 158:23 158:25 166:22 183:22 186:1 187:24 192:2 193:21,24 199:7 206:6 209:17,21 216:3 217:15 224:19 247:7,9 261:15 269:19 269:21
okay 6:19 7:19 7:24 8:7,12 9:1 9:8,15 10:2,5,8 10:11,14,17,21 11:3,10,25 12:7 13:21 14:3,17 15:8 15:11,21 16:1 16:9,23,24 17:6,7,10,23 19:10,16 20:8 20:15,23 22:5 22:13,22 24:7 27:5,8,11,14 28:5,8,16 30:22 32:2,15 32:17 33:8,23 34:10,15 35:8 35:21 36:1,16 36:22 37:1,12 38:18,21 39:2 39:14,17 40:19 41:2,8,13,20 42:2,8 43:18 44:4,7 45:5,13 45:16,19,22 46:7,12,15 48:18 49:12,14 49:19 50:10,13 51:10,14,17 53:13,19,21,22 54:3,12,14,15 54:17,23 55:5 55:11,19 56:11 56:22,25 57:16 57:16 58:19 59:1,7,10,10,19 59:24,24 60:3 60:4,6,18,20 61:2,4,13,17 62:2,6,9,13,19 62:22 63:3,8 64:12,15,18,24 65:5,8 66:3,15 66:20 67:4 68:1,6,12,17,22 68:23 69:5,12 69:22 70:11,20 71:17,23 72:1 72:7,10,16,18 72:21,24 73:2 73:5,8,22 74:4 74:9,17 75:11 75:14,18,21,24 76:2,15,25 78:4,9,13 80:14,22 81:8 81:19 82:5,16 84:25 85:1,11 85:16,22 86:5 86:12 87:9,14 88:1,5 89:6,11 91:5 92:17,25 93:14,21 94:5 94:8,11,15,17 94:21 95:2,9 95:18 96:7,10 96:12,19 97:7 97:12,22,24 98:17,20 99:5 99:12,25 101:13,20 102:19 103:6 104:1,19 105:1 105:11 106:11 106:20 107:1,8 108:5,15 109:23 110:1,8 110:19 111:10 112:2,16,24,24 113:1,10,13,16 113:22 114:4 114:10,13 115:20 116:1,5 116:10,21,23 117:3,8,15,20 117:23 118:6 118:12,15 119:2,4,12 120:14,19,21 120:24 121:6 121:10,20 122:6,11,16 123:1,8,14,23 124:9,19 125:7 125:10,24 126:3,8,20 127:14 128:2 128:13,22,25 129:24 130:5 130:13,16 131:2,7,14,16 132:20 133:13 133:19 134:7 134:18,24 135:4,19,22 136:5,10 138:20 139:8 139:23,24 141:4,22 143:7 143:14,18 144:2,6,13,18 144:20 145:6 145:25 146:4 146:13,18,22 147:4,10,16,19 147:23,25 148:11,15 149:9,13,17,21

149:21,23
150:17,20,25
151:7,11,15,23
151:25 152:10
152:12,18
153:2,7,11
154:7,14,16
155:3,11,17
156:9,14,17,21
156:25 157:6,9
157:15,20,24
158:19,23
159:17,22
160:5,8,15
161:7,14
162:12,21
163:15,23
164:6,11,12
165:23 166:5,9
166:18,21,23
167:11,13
168:3,8 169:4
169:13,20,24
170:6,10,16
171:1,3,6,22,25
172:5 173:20
175:11,15,23
176:2,9,11
177:2,22
178:11 179:12
180:19 181:6
181:10,16
182:3,14,17,22
183:7,11,19,22
183:23 184:2
184:10 185:1,6
185:11 186:5,9
186:13 187:10
187:18 188:4,8
188:16 189:4,9
189:22 190:8
190:12 191:2
191:20 192:14
193:18,18,18
193:21,24
194:10,13,24
195:3,7 197:15
197:24 198:18
199:2,7,12
200:2,3,4,6,12
200:18 201:1
201:19,23
202:24 203:4,6
203:14,15,17
205:23,24
206:5,17,19
207:8,15,17,21
208:1,4,7,19
209:2,21 210:6
210:13,15,15
210:19 211:8
211:16,20
212:15,24
213:4,20 214:5
214:7,16,20
215:6,10,25
216:4,5,25
217:25 218:6
218:11,15
219:1,4,14
221:7,12 222:7
222:14,24
223:2,5,23
224:15,19,20
224:20 225:11
225:23 226:6
226:22 227:12
227:21 228:8
228:14 229:1,7
229:11,16
230:5 231:15
231:23 232:8
232:16 233:9
233:18 234:19
235:9,19,25
236:5,20,23
237:2,7,11,15
237:23 238:13
239:2,6,23
240:24 241:6
241:20 242:4
244:14,20,23
245:3 246:8,10
246:14,16,19
246:22,23,25
247:6,12,18,24
247:24,25
248:1,7,14,17
251:3,6 252:14
252:21 253:3,9
254:6,16,21
255:13,25
256:1,7 257:14
258:10,23
259:8,21 260:1
260:17,22
261:2 262:1,10
262:12,17
263:1,4,10,20
264:9,11,15,22
265:2 266:1,3
266:24 267:2
267:25 268:25
271:3 272:21
272:23 273:5
274:17 275:4
275:13 276:1
276:10,12
278:18 281:12
281:15,23
283:4,9,12
284:2,17,20
285:9,16,18
286:14 287:8
288:3 289:1
old 25:25 30:10
186:24 230:1
older 164:22
166:13
once 51:18,18
79:15 105:18
105:18
ones 59:21 66:4
108:1 109:6
216:10,10,22
217:23 222:25
223:2,11,16
228:5 279:12
open 102:18
255:20

operate 20:12 172:12,24 173:4,11,22 174:14,23 178:13 180:13 180:23 183:6 226:19 257:5 265:21
operates 182:4 205:7 232:17
operating 14:13 22:24 150:18 183:1 250:14
operation 150:11 226:9 226:10,11 239:5,20 240:15 254:1 257:4 283:14
operations 240:8 252:11
opine 32:22 35:17 40:11 49:4 156:12 185:20
opined 118:7 196:9 205:6
opining 106:13
opinion 33:7,11 34:5,20 35:19 35:22,23,24,24 36:12,16,19,21 36:23,25 37:2 37:5,16,16,18 37:21 39:14 47:25 48:13,14 48:16,19,24 49:2 50:19 51:16,17,24 53:2 78:13 89:23 90:22 95:2,7 100:10 100:24 102:14 118:11,12 138:16 139:15 139:24 144:19 155:12,16,17 160:3 168:2 173:7 178:9 182:14 188:21 194:9 215:23 217:10 228:8 228:12 236:6 236:14 239:16 240:23,25 252:17 273:9
opinions 10:19 53:23 66:15,20 66:24 73:14,14 78:15 93:9 124:14 128:3 128:20 135:1 160:16 161:9 162:24 194:5
opportunity 27:5
opposite 256:22
order 36:1 37:16 77:4 102:21 191:16 217:21 219:25 220:25 221:23 249:2
ordered 26:14 26:16
ordinary 9:17 30:23,24 64:24 153:9
organization 100:2 101:25 170:7 178:22 178:25
original 9:24 16:24 17:21 20:4,6 46:24 47:2 50:17 66:9 144:11 158:15,20,21 159:10 173:13 173:20,24 174:22 186:22 187:8 205:18
originally 21:5 158:24
orrick 2:14 3:3 6:11
orrick.com 3:5
os 14:11
otg 130:17,22 130:24 131:3,5 131:8,10,15,16 131:22,23,24 132:4,6,8,8,11 132:13,16,23 133:8,10,11 265:19
ought 24:14 25:9 114:18 169:3 282:4
outcome 5:24 291:15
outer 195:13 197:17
outlined 12:12 38:2 139:14
output 233:5 233:11
outset 66:10
outside 31:13 62:13 137:24 155:9 156:25 157:25 169:8 175:7 187:25 209:10 219:7 220:8,11 221:10,13 222:17 240:22
outweighed 236:7
overall 149:14 241:11 268:11 268:14 271:18 272:2
overhead 265:17 267:9
overlap 8:6 194:21

oversimplified 104:10
oversimplify 116:2
overtoom 54:12 55:6 87:16 90:6 232:1
overview 80:10 161:24 266:19
overwhelming 108:22
own 9:22 22:17 30:14 31:25 48:11 49:22 71:7 77:14 82:23 119:6 120:17 130:11 167:23 170:3 170:14 189:1 206:21 208:20 214:19,20,24 251:23 258:20 258:21 285:11
owned 23:21
owner 1:7 2:7 3:7 5:14 22:13 72:12 96:1,8 97:9 261:20
owner's 263:22
owners 6:6
ownership 12:5 21:22

p

p 5:1
p.m. 129:13,17 193:1,5 245:6 245:10 289:5,7
pace 161:1,8 163:25 167:4,4 170:11 172:3 178:19 179:12
package 279:1
packaged 59:11 90:15
packed 25:11
page 4:2,9 28:19,19,23 42:15 97:2 98:24 102:22 103:3,4 106:12 113:8 141:1 160:12 161:16 173:3 180:7 193:14,18,20 194:24 199:23 199:25 200:2 203:12 204:3 208:9,13 209:6 209:15 210:12 211:17 212:1 213:8,22 214:22 216:3,6 217:1 218:17 219:5 220:13 227:8,9,19 228:11 233:4 238:7,19 240:8 241:3,23 247:4 247:8,23 248:1 267:4 272:16 272:18,21,22 273:3,23 274:12,13 275:6,16
pages 77:11 100:15,15 141:14 170:22
paper 137:8 199:14
paragraph 28:20 97:14,22 98:25 99:6 102:22 103:2,3 103:17 106:11 113:8,20,25 115:20,22 118:7 119:18 119:20 121:20 122:2,4,7,22 123:2 124:24 125:8 127:15 136:6 138:18 138:21,24,25 139:10 140:19 143:7 149:23 160:12,25 163:23 167:2 170:22 172:7 177:23 178:11 180:7 188:16 193:15 195:7 197:16 200:7 200:12 208:11 216:20 227:17 233:4,15 234:7 235:5,9 247:7 247:7 253:9,14 253:24 255:22 255:25 258:10 264:10,20,23 264:25 266:2 266:20 267:3 267:16 271:12 274:22 283:10 285:20,22
paragraphs 99:1 105:7 119:14 120:2 139:5 181:12 193:19,22,25 194:24 255:23 260:1 285:17
parallel 68:8 257:6
parentheses 150:3
parenthetical 119:17 120:2
park 1:10 2:15 2:15 3:4 5:18 261:19,19
part 12:24 18:16 22:12 29:25 34:16,16 35:15 37:20 38:3,16 39:18 40:16 44:4

56:23 71:12,24 78:6,11,19,19 79:17 80:6,7,9 80:11,22 81:4 81:16,18 83:7 83:17 89:21 90:15 91:1,1,3 91:6 105:15 116:10 122:24 134:18 140:10 143:4 145:16 148:21,23 152:14,15,24 153:2,3 160:16 165:12 180:1 198:20 201:2 201:13 203:1 204:9 207:12 207:18,23 208:4 221:22 222:3 232:9 242:8 247:20 256:24 262:4 266:12 271:16 281:8,25 283:11 284:9 284:18

participate 191:13

particular 12:8 23:18 25:19 27:18,20 33:2 36:13 37:18 38:15 48:8 50:7 58:14 80:9 89:16 102:9 127:4,6 133:16 142:23 177:1 192:11 232:20,21 275:6,9,19 279:3

particularly 68:24 161:25 165:1

parties 1:3 2:3 5:10 95:17 103:7 291:14

partly 215:2 220:16,17

partner 21:5 22:17

partners 21:5

parts 97:13 100:16 132:6 185:9 269:6 272:4 287:13

party 5:23 12:24 162:9

pass 263:5 284:5

passed 19:3

past 91:24,25 188:7

pasted 161:4

patent 1:1,2,7 2:1,2,7 3:7 4:16 5:13,15 6:6 9:17 11:5,6 11:18 12:3 16:13,17,24 19:20,23,25 20:2 21:12,12 21:18,23 22:2 28:17 32:7 43:2,5,9,12,15 44:8,12 45:24 47:8,10 49:10 56:11 57:23 58:3 65:1 69:6 69:8,20 70:9 70:22 71:6,15 72:12 88:17 96:1,8 97:8 103:7 112:14 112:19,21 134:9,10 139:1 140:6 148:12 154:2,11 155:13,20 160:6 161:25 162:14 167:15 168:4,5,10 176:6,8 198:5 198:16 199:10 202:12 206:4 215:11 216:7 218:2 224:15 228:9 253:21 254:17,20,23 256:7 263:21 264:5,6 274:8 274:11,15 275:8 277:4 279:13,15,19 279:24 280:8,9 284:13 285:11 287:22,25 288:7

patentable 12:1 15:10,12,23 16:2 27:25

patented 192:4

patents 9:21,25 10:3,9 12:5 20:10 31:24 33:4,14 37:8 39:25 46:22,25 47:4 48:11 49:8,21,25 50:1,18 51:7 51:12,24 52:9 53:6 57:17 61:5,16,17,18 64:19 65:9 67:17 68:3,4 75:7,9 81:4 101:4 105:12 134:23 154:3 167:15,20 168:4 175:16 175:21,25 176:13 178:5 198:2,9 206:22 215:8 219:15 238:11 278:4 280:12

path 91:16 143:24 212:3 212:11 246:5,6

250:19,23 255:6,9,10
paths 138:22 254:25 256:9 259:24
pathway 250:5
pause 201:6
pay 24:14 242:13
pc 12:15 77:21 80:20,22 111:21 151:3 152:14,25 153:2,3,8 276:17,24
pci 12:16
pcs 153:9
pd 68:25 69:3
pdr2024-11 133:16
penalty 290:1 291:17
penmanship 281:5
people 14:18 19:24 24:12 25:4,15 49:13 57:24 83:22 132:5,13 145:3 145:22 148:7 149:5 162:13 162:15 164:15 189:2 191:14 191:17 217:18 236:14 262:1
percent 11:1,2 21:9 261:22
percentage 10:22
perfect 102:17
perfectly 109:5
perform 20:12 32:13 33:20 41:17 98:12 196:15 226:24 270:21
performance 48:22
performed 288:16
periodically 6:21
peripheral 265:22
perjury 290:1 291:17
persistence 115:9 117:24
persistent 112:8,9 114:1 114:5,17 115:11 183:9
person 21:15 30:23 56:16 57:1 74:24 92:14 137:5 159:2,17
personal 30:14 92:19 119:6 277:20
personally 10:21 57:20
personnel 262:7
perspective 12:1 14:5 169:17 170:3,4 202:19 240:16 240:17
persuaded 168:21 179:24
pertains 253:22
pete 5:20
peter 3:19
petition 71:19 71:20 72:4,14
petitioner 1:4 2:4 3:3 6:12
pgr 71:20
pgr2024-00011 1:5 2:5 5:17
pgr2024-0011 43:11 127:16 145:11
pgr2024-11 127:22 128:3 199:9
pgrs 32:11 62:3
phones 5:7
phrase 98:4 106:19 112:8 112:13 113:24 116:13,18 195:21 240:14
physical 139:13 143:6 149:14 226:14 228:4,8 237:17 278:25 282:2 286:17 286:21
physicality 142:6 220:4
physically 8:4 142:13 147:24 252:7
pick 5:5 57:12 100:16 132:13 216:10,10,11
picture 52:3 105:18 140:3,4 141:16 143:20 153:7 183:17 183:24,24 203:7 246:25
pictures 105:23 203:7,8,25 205:17
piece 107:8
pieces 53:13 78:1 88:21,22 90:21 211:12 221:16 276:16
pin 133:8
pink 46:3,5
pins 141:18 265:16 267:8
pioneered 26:8
place 5:7,10 109:11 110:5

124:18 211:13 282:3 283:2 291:10
places 132:12 136:17 137:20 147:18 181:1 204:14 206:23 211:15 217:5 221:3 228:7
planning 24:10
plans 17:21
plastic 142:9
platforms 27:22
plausible 283:23
play 102:21 167:20,21,21
player 154:25 164:15
plays 167:20
please 5:5,7,25 6:2,24 36:9 42:16 44:14 50:18 97:1 128:23 268:25 281:14
plug 23:12 25:22 26:3 101:8,10 115:14 117:9 117:15 118:1 149:18 174:20 175:12 176:22 176:23 177:1 177:10,11,17 183:14 184:11 186:1,1 187:5 189:16 212:2,6 212:10 214:3 225:15,17 248:19 262:12
plugged 24:23 84:20 109:12 110:5 115:6 117:9 166:18 183:8 189:14 212:13,15 252:2 253:1
plugging 109:10 175:16 176:15 177:8 244:22
plugin 142:10
plural 83:2 85:14,18 139:10
plus 7:18 138:4 138:4 139:2 152:4
pocket 121:7 129:25 193:11 245:17,19,20
point 21:23 24:12,17 30:15 38:20 40:19 46:21 47:9 50:16,21 51:8 57:22 69:8,9 71:10 77:22 81:2,5 84:21 88:11,20 90:19 90:25 91:18 92:5 95:25 101:13 105:5 106:9 113:15 126:13 128:21 130:2 135:1 136:6 137:4,11 138:5 143:2 153:19 159:9 163:10 169:4 173:16 175:3 181:1 205:25 217:7 230:19 232:2 234:9
points 32:21 49:7 53:1 90:4 126:18 141:2 141:23 174:12 200:9
popular 25:22 164:15
populate 88:24
port 18:7 19:6 19:7 25:5 83:10 85:22 110:24 111:5,6 112:9 115:14 115:25 116:3,3 116:11 131:17 131:23 132:9 132:24 133:1,4 134:14 135:9 135:11 136:8 138:23,23 141:16 142:1 143:19,23,24 144:4,16 146:4 146:9 147:13 153:20 166:12 166:18,19 184:12,14,15 185:17,22 186:22 187:12 187:12 205:2 211:18,23 212:2,13,16 213:14,25 214:2,13,14 218:19,24 230:25 231:13 232:20,23 233:10 236:15 248:11,20 251:1,12 255:1 255:6,7 256:18 257:11,15,19 259:9 265:8,9 265:9,10,12 270:1,1,3 274:23,24,25 275:21,22 276:17,18,20 277:11,13
portable 265:19
portion 101:11 101:11 138:23 172:20 198:18

209:6,22
210:14 211:17
233:18 258:3
ports 18:11,13
19:10 24:21,22
24:24 25:17,23
25:25 26:5,23
28:11 83:2,4,4
83:5,8,10
84:10 85:14,18
86:3,8,8 110:4
110:10,25
111:8 112:3
115:24 117:16
117:17 130:10
130:13,16,21
131:2 132:21
132:22,23
133:23 134:20
135:5,7 136:7
136:8,8 141:2
141:5,10,15,23
141:24 142:11
143:19,22
144:4,10,14,15
176:15 177:14
177:14,16
183:15 184:1
184:13,15
185:12,16,18
185:18,24
186:10,11,14
186:16,20
187:3,4,10,19
187:20,20,21
188:2,3,12,12
189:17 204:17
206:6 211:5,23
212:14 213:2
213:24 216:12
218:7 220:4
224:1 229:21
230:9,20
231:12 232:18
232:18 235:8
235:21 236:20
236:24 237:9
237:19 241:24
255:1 256:18
257:5,11,21
265:3,14,14,15
265:23,24,24
265:25 267:6,7
267:18,19,20
267:23 268:13
271:18 277:9
posita 9:23
30:15,22,25
31:11,19,23,24
32:1,4,5,6,10
32:19 33:1,12
33:13,16,21
34:1,6,11,13,16
34:21 35:1,5,7
36:13,14 37:25
38:5,13,20
39:7 40:1,9,23
41:3,21,25
47:6,24 48:1
49:16 52:4,6
58:23,23,24
65:21 76:7,11
76:19,24 78:18
78:20,25 79:4
80:1 81:7 82:2
82:13,23 83:13
84:3 85:1,8
86:5,24 87:3,7
88:11,22 89:21
89:23 90:1,4
90:15,18,19
91:2,7 92:12
92:14 102:9,24
103:9,19
104:14,20
106:7,13 107:2
108:22 109:3
111:23 116:18
133:25 134:20
136:9,19,24
138:4,16
139:12,15,24
140:3,4,9
142:15,22,24
144:11 145:3
153:8,18
154:19,21
163:9,9 176:18
177:3 183:25
184:4,5,16,24
195:23 196:12
201:21 202:7
202:19 204:18
205:12,22
206:4,14 210:7
214:17 219:22
221:17,18,23
221:24 222:4,7
223:24 226:17
229:18,23
230:6,23
231:10 232:2
232:14 234:6
234:15,18
238:17 239:2
251:24 256:20
259:14,20
264:12 266:17
269:19 270:11
270:21 273:10
273:12,21
276:7,21 277:7
277:25 278:2
278:14,19
285:1,6
posita's 81:12
111:17 139:11
142:4,19
144:21 169:8
189:13 204:11
236:9 257:23
positas 225:7
position 7:17
positive 111:19
possession
120:20
possibility
185:21
possible 16:5
26:10 47:22

76:24 78:25 79:21 80:8 84:23 92:2 99:17 105:2 109:13 127:12 151:20,22 186:12,21 188:9 246:19 278:12 279:2 283:16
possibly 57:11 88:25 89:20 139:10 169:15 266:15
post 45:7,9 97:19 98:3
potential 53:1 57:21 58:21 170:20 179:8
potentially 47:16 106:1 109:24 225:6
power 67:20 69:4 88:18 186:1 190:9 262:4,15 279:9
practice 7:23 8:3,8 9:16,20 10:24 22:17 75:3 170:14 239:19 240:7 241:1
practices 100:2 270:15
practicing 175:5
praise 167:13 167:24,24 170:1 171:19 179:24
praised 169:3
pre 115:4 164:13
preamble 215:17 274:15 274:17 275:1
precise 40:22 85:4 218:9
precisely 139:13
predate 229:25
predated 167:1
predating 217:12
preface 114:14 178:7
prefer 57:23 186:3
preliminary 38:7 72:11,12
prep 75:24
preparation 29:3 72:1 75:13 95:22 120:14
prepare 74:19 75:14 119:4
prepared 36:6 119:2 280:23
preparing 67:11 74:11,14 93:9 95:9 108:15
preponderance 81:25 124:16 126:23
presence 124:1
present 3:18 5:25 22:18 32:5 80:4 233:19 236:11 252:18
presented 38:1 91:20
president 7:15 11:12 21:6,9 22:18
prestigious 170:14
presumably 162:14 165:8 172:23 179:4 237:4,13 269:16 282:17
pretend 126:25
pretty 58:7 92:11
prevent 9:1
previous 105:6 109:11 164:9 256:12 268:15 275:5
previously 275:13
primarily 111:15
primary 53:23 54:21 67:4,23 77:18 101:11 103:21 104:5 105:9,14,19 106:2,10 111:14 134:24 134:25 156:14 219:14
prime 151:23 152:2,21
principles 256:13
printed 183:23
printer 25:20
printers 24:23 25:24 26:11
prior 11:10 26:21 40:3,5 41:6 46:1 50:20 51:9,12 51:15,17,18,20 51:22,25 52:1 52:4,13 53:14 54:23 57:5,11 57:17,19 58:21 58:22 65:2 67:18 69:24 70:23 75:7,10 81:14 82:20 84:11 95:10 97:18,18 98:1 106:1 107:8,11

109:4,18 126:13 139:7 161:20 163:24 164:2 169:9 177:4 178:6 194:6 195:8,15 196:4,12,23 197:18 206:22 216:14 220:1 220:20 228:23 232:1 236:14 239:15 247:14 247:15 277:23 279:23 291:6
priori 92:13
priority 46:4 158:14
private 5:6
privilege 125:11 128:12
privileged 120:16,23 122:10
privileges 122:15
probably 45:20 48:6 77:11 110:3 114:18 125:14 174:12 177:8 182:11 199:5 207:3 241:18 242:16 268:7
probes 189:20
problem 14:23 25:9 26:4 27:2 27:3 83:1 89:5 91:12,17,20 92:1 93:7,11 93:16,25 94:2 94:13 142:1 167:17 174:19 175:12,16,19 176:14 177:7,7 178:3,12,23 179:16 201:14
problematic 201:21
problems 9:18 25:18 26:24 91:10 93:1,5 93:22 175:21 175:25 179:4 212:21
procedures 287:25
proceeded 162:19 197:2
proceeding 6:2 16:11 32:6 43:5,8,15 44:6 44:19 87:9 96:13 98:1,5 103:11 108:2 113:5 289:7 291:7,9
proceedings 9:9 10:6,19 42:22 43:20 45:23 53:15 62:14,15,20,23 64:8,9 65:6,19 65:19 72:3,8 72:25 86:19 119:24 120:3,4 133:18 193:14 198:12,13
process 19:3 69:18 83:17,19 85:7 91:8 280:10 285:18
processes 48:5 124:4
processor 18:17 19:2 243:23
processors 18:23
produce 29:24 249:2 283:12
produced 68:22
product 13:1 13:17 15:3 18:24 22:14 23:16,18 25:22 26:3,12,18 94:23 100:4 165:17 172:12 180:12 182:25 189:23 190:18 190:23 191:10 261:23 265:11 265:14,19 267:24
products 23:2,4 23:9 24:11 164:24 167:8 217:18 261:15 265:4,7
professional 236:12
professions 291:17
program 270:21 273:10 273:13
programming 237:20
prohibited 102:9 288:18
project 20:25 60:2 109:15 261:4
projects 14:25
promoter 99:18
promotes 100:3
promulgating 159:9
prong 150:22
properties 12:6
propose 238:18 253:4
proposed 186:16 221:8
proprietary 94:3 187:1
prosecution 20:25 22:2

61:13
prospect 271:19
prospective 51:9,12,15,15 51:22 52:13 53:14 54:22 57:5,10,17 65:2
protocol 12:23 131:17 224:13
proven 121:23 123:9 124:12
provide 8:16 50:25 90:3,17 99:1 113:18 137:5 161:9 184:16,22 194:14 246:2 254:25 255:22 255:23 256:9 256:21 259:23 262:12,13
provided 33:9 52:8,13,18,20 53:24 54:5,8 54:13 55:7,9 55:16,16 56:5 56:6 57:5,10 59:15,23,25 60:10,11 61:6 61:13,19,23,25 64:5,13,18,21 65:12 66:9,17 66:21,23 86:6 89:15 94:12 95:14 96:7 98:8,14,21 122:24,25 123:1 124:20 125:25 137:5 145:16 154:23 160:18 164:23 194:1 197:25 198:4
provides 76:21 138:4 140:23 179:13
providing 9:2 116:4 184:23
proviso 19:22
ptab 57:24 62:14,15 72:17 72:21 73:6,9 73:13 79:1 96:16 287:25
ptab's 73:18,23 74:6
publication 4:16 16:14 168:16 279:13 279:15
publications 58:4
published 30:6 34:3,5 130:17 159:15 278:2
pull 36:17,20 41:11,11 53:17 79:24,24 198:25 278:15 278:15
pulled 37:15
pulling 105:10 203:6,8 251:11 252:7
purchase 17:18 18:2,14 19:11
purchased 18:23 23:20
purely 224:23 225:19
purpose 23:7 23:10 24:5 27:21 29:22 30:5 77:12 90:1,24 100:22 138:2 157:11 186:21 235:24
purposes 44:6 132:7 241:2
put 32:12 46:12 47:12 51:7 52:2 59:8,20 66:6 70:5,24 81:13,14 84:4 101:18,18 120:18 132:14 144:24,25 173:23 174:18 181:4,5,5,23 189:20 222:2 224:13 225:13 234:23,24 235:2 238:6 246:21 257:20
putting 51:14 59:1 79:5 84:8 124:4 220:11

q

quadrant 213:22 214:22 223:20,21
qualifies 171:18
quality 25:19 48:7 77:7,10 102:13
quarter 244:24
quarters 67:22
question 9:22 15:9 23:25 25:8 31:17 32:25 34:25 35:5 36:8,13 37:6 38:23 39:5,12,15 40:10 47:7 49:20 54:3 68:7 74:23 80:25 82:3,14 82:17 86:14,16 90:13 91:9 97:23 99:5 100:20 101:12 112:1 113:14 113:16,24 114:11 121:4 122:14 124:8 125:13,15

126:20 127:5 138:6,8 141:9 144:13 147:19 147:20 148:4 151:9 155:8 161:19,24,25 162:1 172:18 173:14,19 179:7,23 181:15 183:13 184:10 185:7 185:14 191:6 192:4,12 194:23 196:14 203:16,19 205:16 209:12 225:10,25 231:17 232:4 236:18 239:14 240:4,5,19,20 242:4 244:1,11 252:12 263:23 264:13 271:21 275:11 277:16 283:10 287:18

questions 4:8 8:15 16:25 17:6 24:3 38:8 44:10,18 47:5 89:7,7 107:22 108:3 126:6 137:14 238:3 239:12 241:10 242:5 245:22 247:2 263:2,21 268:2,22 271:4 272:14 273:1,6 274:3,6 276:2 276:5 278:5 281:16,19 285:5 287:18 288:6,10 289:1

quick 152:10

quickly 63:22 197:21 288:24

quite 12:19 15:15 50:21 64:10 82:16 86:15 106:5 224:9 258:15 275:18

quote 121:21 152:21 172:12 172:14,22 173:14 174:11 178:12 180:24 181:1 182:17 208:20,21 267:7,9,9

quoted 172:20 173:21

quoting 173:2 173:23

r

r 3:9 5:1

radio 154:24 173:5 178:14

raison 187:7

ran 14:9 27:19 46:6

rash 27:6

raster 25:20

rate 62:7

rather 77:25 84:19 88:23 91:12 185:18 200:14 213:21 221:1 230:12 232:6 268:3 283:9

read 10:3,3 45:3 49:9,17 50:7 58:16,17 73:7 77:22 97:22 99:5 114:8 116:22 119:10 123:22 123:22 135:17 136:5 138:5 139:25 145:3 170:4 205:19 221:15,16 225:2,11 253:14 260:23 266:9 267:3,5 267:16 274:17 283:18 288:11 288:13

readily 29:8 229:19 230:7 269:7

reading 17:5 48:1 58:2 76:22 116:18 136:11 152:10 152:19 160:25 200:3 225:1 230:10 264:24 269:9

real 181:4 243:3,18

reality 219:17

realized 25:4 122:6

really 21:9 22:16 24:14,17 27:25 30:10 40:19 48:16,17 51:17 69:13 70:8 71:10 75:2 77:13 79:17,18 91:11 97:11 104:24 105:23 123:13 126:25 162:23 168:21,22 173:8 180:1 221:25 225:9 233:16 235:4 238:16 241:14 266:18 277:2

realm 40:9 185:21

realtime 6:17 6:18,21

reason 47:17 58:11,25 86:9 86:10 104:3 105:2 107:2,10 109:20 141:9

170:25 171:3,6 171:16 191:8,9 191:17 196:9 219:14 222:4 224:5 229:22 234:25 238:12 276:16 285:24
reasonable 8:25
reasonably 195:14 196:17 197:17
reasoning 97:20 98:3
reasons 20:3,23 20:24 21:19 102:11 103:12 104:13,19 106:7 159:20 179:25 186:14 187:15 188:1 205:14
recall 50:6 53:13 54:24 59:3 66:19 67:3 75:21 154:4,6 198:18 263:25 271:4 273:1,5 274:3 276:2 277:18 277:22 278:5 280:6,24,25 281:16,21
receivables 22:15
received 171:23
recent 8:10
receptacle 265:20
receptacles 265:21
recess 63:13 129:14 193:2 245:7
recited 275:9
recites 274:18 275:1,2
recognize 38:3 117:2 118:22 232:3 238:17 239:2
recognizes 115:15
reconnect 265:13
reconstruction 97:19 98:2
record 5:4,11 6:1 7:3 44:16 53:19 56:20 63:12,16 129:9 129:13,17 173:1 176:5 193:1,5 227:17 245:6,10 289:6
recorded 5:12
recording 5:9
red 261:19,19
redirect 263:2 287:24
redo 69:25
reduce 101:3 265:23 267:18
reduced 69:11 151:8
refer 45:25 127:15 130:2 132:21,22 154:22 160:24 161:16,17 173:10 189:12 193:10 253:11 254:13
reference 53:11 53:15,16,22,23 54:8,13,25 55:2 58:15 60:10 65:23 72:20 76:6,12 76:16 77:3,14 78:14,18,23 79:4 80:20 81:21 82:10 83:6 87:20,24 88:3,15 89:12 90:3 103:10 106:17 107:3 109:23 110:2 127:24 130:6 133:15 134:21 134:22 139:20 145:10,15 151:19 154:4 176:3 178:11 202:3 231:19 232:9 247:16 253:3 254:6,24 263:23 264:2 265:18 266:5 267:14 268:19 268:23 270:15 271:15 275:14 275:25 276:3,6 281:14
reference's 104:4 105:3
referenced 146:1 148:12 161:1 162:5 185:8 283:24
references 57:4 57:8,22 65:10 65:20 77:7,20 81:16,17 82:2 85:13 86:6 88:6,8 89:1 90:3,22,24,25 92:2 97:18 98:1 103:10 104:4,21 105:2 106:15 108:17 109:4,18 236:14 254:7 260:5 266:21 277:17,19 278:3
referencing 42:19 54:1,10

55:13,21 56:1 56:9 60:8,14 60:23 113:3,4 154:13 199:11 215:13 285:24
referred 30:22 32:1 114:13 130:7 139:21 142:11
referring 33:13 44:11 45:9 68:2 72:21 82:6 99:9 113:17 116:24 117:21 132:23 151:11 156:4 221:8 225:13 228:9 271:20
refers 17:7 29:21 84:14 119:14 120:2 133:20 135:25 136:22 138:9 146:14,14 154:16 201:17 202:11 204:19 253:25
regard 230:3
regarding 43:2 160:6 161:9 188:22
regards 81:18
regret 21:16
regular 194:19 234:21
reiterate 245:25 256:11
relate 107:9 203:19 262:21
related 5:22 10:23 36:11 58:5 68:25 93:22 94:1,20 106:22 109:7 196:11 262:22 271:4 281:9 291:14
relating 43:5,9 43:12,15 45:23 145:5 167:14 197:7 261:4,10
relation 137:16
relative 265:24 267:19 273:7
relatively 234:3 235:13
released 24:4 24:11
relevance 110:3 156:12
relevant 9:23 51:22,23 84:3 100:17 109:24 110:1 189:17 238:16 261:17
relied 66:23 218:15 223:17
reluctant 21:13
reluctantly 21:11
rely 76:10 80:15,17 134:24,25 159:24 161:8 216:18 222:21 285:1
relying 81:12 242:12 246:2
remaining 253:1
remark 201:16
remarks 199:25 242:9
remember 47:18,19 50:11 50:12 52:19 53:17 54:14,19 55:3,8,10,17,18 55:24,25 56:4 57:5 59:10,12 59:14 61:3,12 61:23 67:14 75:20 102:3 105:23 108:7 110:17,18 111:9,11,14 112:2,4,7 113:10 114:21 125:17 126:17 130:25 139:1 144:17 149:12 165:11 166:24 184:6 199:15 199:16,17 201:16 218:10 231:22 261:11 266:12 272:14 275:13 276:9 278:17 284:16
remind 45:11 46:19 62:6 75:11 79:11 147:16 195:4 234:14,15
reminded 225:1
reminder 76:1
reminding 63:20 75:6
remiss 42:2
remote 6:15
remotes 23:11
removed 26:6
render 40:17 48:19,24 49:2 51:24 53:2 65:25 161:21 173:7 239:15
rendered 37:17 48:13,13 82:14 201:20 215:21
renders 85:10
repeat 241:15
repeated 70:3
replaced 15:7
reply 200:4,5
report 43:18 72:5 86:18 87:9,15,18,22 89:17 119:15

128:6 133:5 137:20 143:7 145:19 146:1 160:9 161:11 161:16 163:23 167:12 170:4 177:24 188:6 188:17 194:11 203:13 211:17 218:17 233:4 236:5 238:7 240:9 241:3 242:18 247:4 247:23 248:2 252:19 253:9 255:8 260:2 264:5 266:6,22 271:13,16 273:3,23 274:10
reported 1:14
reportedly 175:5
reporter 2:12 5:21 6:23 7:1 8:24 63:7 69:2 113:2 137:7 145:12 176:10 291:18
reporter's 291:1
reports 42:4,7 42:9 43:19 72:2 119:15 120:4 121:21 122:3,23 124:20 125:25 132:22 272:16
represent 53:19
representative 41:24
reprogramming 270:25 272:4
require 114:17 118:8 155:3 182:12 228:15 233:23 244:7 258:8 265:6
required 14:23 70:16 150:6 220:23 246:1 259:23 288:18 288:22
requirement 260:15
requirements 51:3 99:7,13 99:17 224:23 228:15 286:15
requires 81:24 115:23 117:3 155:13 182:7,9 256:8,19 265:16 267:7
reread 69:7 136:2 194:17
rereading 75:6 75:7,7 122:17 139:22 195:4
reside 7:12
resides 147:6
resistor 33:24 36:17,20 79:25 80:3,4 278:15 278:19,25
resistors 41:11 41:11,14
respect 32:7,10 33:13 35:7 38:1 39:22 44:8 55:5,15 81:9 141:24 162:23 170:18 228:10 232:16 244:2 275:9 284:12
respectfully 34:24 86:10 200:9 238:6 240:2
respective 42:22 51:16 72:3 119:24
responded 20:1
responding 116:12
response 52:22 52:23 53:5 67:1 72:14 93:19 161:3,7 170:19 249:8,9 249:19,22
responses 72:12 160:19
rest 45:17
restrict 32:3
restrictive 127:9,9
result 131:16 161:4 219:1 256:2 258:11
results 37:5
retail 23:10
retained 9:5 64:8 67:5 92:18 96:18 198:1
retention 37:21 54:23
rethink 69:25
retrospect 21:16
reused 142:2 206:23
reverences 81:11
reverse 191:14 192:3,7
review 1:3 2:3 72:4 95:10,22 97:1 113:15 119:6,6 120:17 127:5
reviewed 72:16 72:17,19,24 73:17,25 74:1 74:5 75:5 93:14 94:11,16 94:17,19 95:20

198:15
reviewing 46:9
99:9
reword 69:25
right 11:16
14:2,18 15:24
17:8,11,16,18
18:9,10,14,25
19:4,8,11,20
20:17 25:18
26:24 28:15
29:6,12 31:1,2
31:9,21 32:3
33:17,18,20
34:12 35:25
42:12 44:17
52:16 53:25
59:22 60:17,22
64:19 65:3,17
65:17 66:2,7
66:12,14 68:5
72:15,23 85:20
86:3,9,15
87:10 92:19
93:3,7,9 97:20
98:3 99:10
104:6 105:4
106:18,24
107:14 110:10
110:14,16,22
111:3,8 113:20
114:20 115:22
115:25 117:1
117:11,18,21
118:10,24
119:1,10,25
120:4,5 121:16
121:18,19
122:5,16,19
123:7 126:13
127:20,22,23
127:25 128:1,3
128:4 130:11
130:18 131:20
131:22,22
135:5,6,13,18
135:20,22
138:8,10,25
139:6,20
140:16,24
141:2,3,6
143:16,17,19
143:25 144:4
145:7,8,17,23
146:2,5,8,12,14
146:20,21,23
146:24 148:17
148:19,20,22
149:11,15,18
150:15,19,23
151:5,11,15,24
152:7,15,17,17
152:18,18,23
153:4,5,25
154:2,17,18
155:15 156:4,5
157:18,22
160:23 161:6
166:14,17
167:6,9,10
168:6,14 170:9
171:4,5 174:9
174:9 178:20
178:23 179:5,9
180:14 181:16
185:15 187:19
191:24 192:16
192:17,20
194:3,7 195:10
195:19 196:7
198:13,16
199:12,23
200:2,6,6,15,17
200:23 201:4
202:14,15,20
202:21 203:2
203:15,15,24
204:9 207:18
208:2,3,17,18
208:21 209:2,5
209:6,11,11,22
209:23,23,25
210:16,19
211:18,19,24
213:2,3,11,24
214:14,15,18
216:1 218:4,19
218:24 219:4,6
219:8 220:2,12
222:15,19,20
223:3,4,15,18
223:18,18,20
224:2 226:25
227:1 228:23
229:9,10,14
230:10,17,21
231:1,5,11,13
232:23 233:11
233:20,25
234:1 235:11
235:14,15,20
235:22 237:2
237:12,21
238:8,20 239:5
243:7,12,16
244:15 245:11
245:19,21
246:20,22
247:8,10,12,22
247:25 248:4
248:12,13,22
249:3,5,9,13,14
249:17,18,20
249:21,24
250:4 251:1,2
251:4,8,9,14
252:19,20
253:1,5,12,16
253:22,23,24
253:25 254:2,8
254:13 255:2,7
256:5,6,10
257:12,16
258:14,15
259:14 260:16
261:6 262:23
262:25,25
263:1,15
264:18 267:1
267:25 269:13

270:6 271:10 274:9,16 275:3 275:23 277:23 278:11 279:14 280:22 284:4 284:10 286:6 286:17,25 287:24 288:15
rigorous 13:1
risk 76:17 234:8
road 2:15 3:4 5:18
role 83:2,5,10 85:14,20,25 86:3,8 110:4 110:10,24,25 111:8 112:3 115:7 130:10 130:13,16,21 131:2,22 132:20,21,23 133:1,4,23 134:7,14,20 141:12 166:19 177:15 178:18 185:9,18 186:11,15 187:12,20,21 187:21 188:3 213:24 214:2,4 216:12 218:7 218:19,23 224:1 229:20 230:8,20,25 231:13 235:21 236:16,25 237:9,18 241:24 257:19 259:8 265:3,4 265:7,14,23 267:6,18,23
roles 251:24
rolls 188:7
room 5:25
root 153:8,10
rough 67:21
roughly 67:9
round 149:13
route 225:16,18 232:20
routed 256:12
routes 176:22 176:24
routing 143:23 148:11,13,14 148:21 149:7 226:3 245:25 254:24 256:8 259:22 260:22 281:20,25
row 119:18 127:15
rows 120:1
rule 35:5 46:14 50:6 104:9 157:12 228:1 261:11
rules 102:20,20 169:13
ruling 72:17,21
run 22:1 262:5
running 115:9 172:24 173:4 173:21 178:13

s

s 4:14 5:1 22:25 26:22 49:14
s601 248:22
s603 248:24 249:5
s605 249:7,23
s607 249:11
s613 251:4
s615 250:2
s617 250:8
s619 250:13
s625 251:4
safety 111:19 212:21
sales 94:23
san 3:13
sandisk 96:5
satisfies 214:24 215:2
satisfy 215:7
satisfying 202:9
save 265:15 267:6
saw 225:2
saying 16:19 25:8 37:2 70:21 76:24 80:7 92:12,13 93:16 100:23 103:9 107:14 108:6 124:5 127:19,20 132:16 142:23 150:21 174:20 177:16 178:7 183:5 196:7 200:13 201:1 207:7 211:25 213:17 215:1,2 231:8 235:10 236:17 242:23 244:6 253:14 282:6,9 285:21 286:8
says 18:6 29:2 35:11 46:1,3,4 46:4 51:19 69:22 85:9 91:13 99:11,12 99:15,25 105:1 117:14 118:1 132:8 136:4 138:11 150:2 159:13 168:9 174:6,7 188:8 217:8 225:4 233:18,21,22 234:2 242:9 255:4,12 267:5 271:17 275:21 286:1
scale 29:23 151:8 259:4,5

scaling 257:23 259:15,18
scenario 116:24 117:8 123:8 131:18 250:21
schematic 146:17 147:1 269:5,9 270:14
schematics 270:1
scheme 79:21
schemes 80:11
scope 107:20 107:23 155:9 156:25 157:25 175:7 187:25 189:20 190:24 191:1 195:15 196:17 197:19 201:15 287:14 288:7
scour 102:8
scratch 45:3
search 161:4
sec 99:3 136:3 171:1 270:5
second 13:14 13:16,23 17:23 25:1 47:7 79:10 97:21 106:20 116:3 116:19 127:15 145:15 146:10 146:11 147:7 149:21,25 150:6,13 172:7 231:7 249:12 250:5 255:6,9 255:15 265:3 274:24,24 275:22 283:2 283:14,16
secondary 52:21 53:1 160:10,17 161:10,15,22 162:2,22 163:13 168:23 169:1,5,19 170:8,21 197:11
section 43:23 43:23 47:23 53:2 69:16 80:10 86:22 87:1,5,14,18,22 90:2 97:15 98:24 100:13 100:22 106:13 116:16 125:24 146:9 160:9,24 188:19 199:25 203:8 231:19 247:14,17 264:14,20 266:5,16,19,25 291:16
sections 43:19 43:25 45:25 68:18 69:13 70:3 87:11 88:2 90:1 260:19
see 17:24 18:19 28:25 29:13 44:23 45:1 51:24 56:14 59:3 63:23 65:15 69:16 70:20 76:20 87:8 91:23,25 97:4 100:7 103:1,4,12,25 106:19 114:2,3 114:10 121:24 133:8,19 139:3 139:12 145:25 146:16 149:17 150:21 151:1 151:22 152:6 152:17 168:20 172:15,17 174:13 183:20 195:18 199:3,6 200:10,11 204:3,24,25 221:19 224:14 229:20 230:1,8 232:4 233:17 234:4,10 251:7 251:12 252:25 254:24 255:8 255:12 260:19 267:11,25 269:12,23,25 270:2 274:1 280:17 282:18
seeing 55:3
seem 100:17 101:19 280:15
seemed 101:12 123:5 124:17 126:18 217:6 222:25
seems 8:25 101:4 107:24 136:12 149:23 150:20
seen 16:20 54:24 55:9 56:8 182:20 266:19
selection 216:15
self 48:4 76:1 100:3
sell 29:25 217:13
selling 217:16
send 283:5
sense 8:5 47:19 56:7 70:15 77:19 78:7 82:24 111:24 114:14 124:2 136:10,15 141:11,16 165:18 168:15 168:15 169:5

169:16 171:19 177:10,13 188:3 198:23 217:24 227:23 236:23 244:17 249:15 252:2 252:11 255:11 262:3 265:4
sensitive 5:5 158:4
sentence 28:21 29:21 30:18 99:15,25 101:6 103:25 104:12 104:16 105:6 105:10 106:20 155:23 172:8 172:17,20 174:6,11 180:22 184:8 200:16 207:19 267:5,16
separate 8:2,4 49:3 67:20 68:12,22 107:20 141:5 200:14 201:13 205:10 256:21 277:10
separately 30:1 210:15
september 62:12 95:13 279:22
sequence 16:10 24:7 68:9
serial 19:7 23:11,14,17 24:4 25:5,23 25:25 26:5,7 164:18,22,23 164:25 165:17 225:4 274:19
series 50:15 115:5 203:7
served 9:12 121:13
service 262:7
session 25:3,11
set 19:19 20:16 22:22 23:6,9 122:7,12 128:17 130:16 135:1 140:22 148:5 161:10 161:21 171:19 193:25 214:24 218:17 224:22 233:3 236:5 271:2 277:14 281:11 282:4 289:2
sets 99:7,12,16 194:25
setting 101:25
seven 10:16 84:10
several 9:8 11:18 12:12 17:10 23:20 42:2 43:19 54:16,18 77:19 82:11 88:9 112:12 137:4 138:22 172:11 184:19 265:4 278:23
shade 203:22 208:16
shaded 209:4 219:6
shaking 24:9
shalt 102:5
share 95:4
sheet 4:19 118:18
sheets 90:10
shelf 13:6,11,19 13:22,24 14:4 15:13,18,23 17:17 18:1,13 18:24 19:11,14 19:18 20:11,14 27:17 30:18 38:10 59:11 84:9 90:12 219:23 224:3 231:24
shift 128:25 245:23
shippable 13:1
shipped 23:15
shipping 23:19 26:14,17 30:19
short 42:10 69:3 149:22 194:22 199:15 212:23 215:14 217:19
shorthand 2:12 105:9 108:24 181:13 291:18
show 70:7 77:24 80:15 81:20 82:20 89:19,20 90:14 138:2 153:17 190:8 196:11 212:12
showed 230:14
showing 77:25 90:11
shown 82:11,21 140:1 141:23 143:15,19 146:2,13 147:4 147:11 151:3,3 152:14,24 153:6 162:1 209:15 210:12 211:20 212:17 212:24 213:13 213:19 216:6 217:1 219:5,11 220:9 228:10 233:2 236:25 240:8 241:3,5 243:16 269:3 270:11

shows 112:17 146:25
shuffle 48:2
sic 181:4
side 44:25 59:2 59:9 131:12,13 152:6,8 165:17 189:18 224:2 248:18
sides 131:10 256:22
signal 143:23 233:10 249:2,9 250:9,12 282:23 283:5 283:13,15
signals 41:16 41:18 101:16 189:16,18 233:5
signature 97:3 97:5 118:23,24 290:12 291:23
signed 108:11 119:10 128:6
significant 236:2
silent 101:23 101:24
silly 234:14
similar 71:10 92:1
similarly 115:13 117:15
simple 77:13 84:1 88:5 103:20 109:20 196:5 204:15 229:13,21 230:4 231:9 235:7 242:17 246:7 259:15
simplified 210:22
simply 187:5
simultan 118:9
simultaneity 144:10 212:9
simultaneous 116:25 117:13 117:20 138:14 144:3 172:11 183:10,16 211:22 256:17 256:21 257:10 277:10,11 285:3
simultaneously 115:24 116:11 116:20 117:5 118:2,9 144:15 184:13 254:25 256:8 257:5 259:23 260:8 276:8,23
single 48:12 58:14 82:10 83:9,21 233:5 233:11 243:23 265:20 270:12 286:25
singular 85:23
sir 145:12
sitting 20:15 35:8,20 50:10 50:11 74:24 99:23 114:4 118:12 128:20 155:11 159:22
situation 197:16 201:10
six 42:3
size 199:6
skill 30:23,24 273:21
skilled 29:8
skimmed 96:16
skipping 251:17
slave 47:3,23 146:11 150:1 150:10,11,15 248:25 250:13
slightly 32:7,8 70:12 71:4 77:1 100:11 136:17 142:18 147:17 151:25 217:6 247:21
sloppiness 234:10
small 230:15 233:16 268:7 272:12 279:5
smart 164:24
socs 188:11
software 14:10 15:14,19 20:13 27:21 242:6 244:7 281:9
sold 12:5 21:21 28:5,7
soldering 234:24
sole 83:21 172:13,16,25 173:5,13,22,23 174:14,23 178:13 180:13 180:16,20,23 181:23 182:4 182:11,23
solid 151:4
solution 26:21 94:13 163:15 164:17 165:7 165:13,16 168:17 170:24 171:11 288:18 288:19
solve 26:4 27:2 27:4 89:5 91:10,14 93:6 93:11 167:17
solved 83:1 91:21 93:2 166:6,7 174:19 175:12,16 176:14 177:7,7

solving 14:23
somebody 12:6 21:23 51:13 57:10 58:1 76:22 90:19 91:13 119:9 134:14 224:8
someplace 105:12,13 270:3
somewhat 42:21 131:21 285:1,17
sophisticated 14:9,10,12 102:13
sorry 11:24 18:12 22:9 23:5 24:19 50:8 60:4 68:3 69:3 72:11 80:24 82:16 103:2 111:12 114:10,20 119:25 125:13 132:21 135:24 137:9,9 140:5 150:10 152:10 155:22 173:18 173:18 182:6 183:21 193:20 206:13 208:11 209:21 210:20 215:19 216:2,3 223:13 224:20 225:9 239:10 246:25 254:12 254:19 274:24 283:11,25,25 285:16
sort 23:17 24:7 24:16 38:7 45:17 46:10,19 48:3,4 53:7 58:5,6 67:18 68:11,14 69:10 69:15,17 77:17 77:23 78:1 79:9 80:25 88:22 90:11 91:15,18 100:17 105:5 108:11,24 109:6 121:8 124:1,3 126:24 136:25 137:16 141:25 148:7 151:8 152:5 155:9 158:7 162:11 163:6 165:21 166:7 169:6 173:14 174:10,11 175:2 178:1 192:2 194:15 204:16 205:4 221:23 224:10 229:8 232:5 234:16,20 235:22 236:10 237:25 242:6 246:4 250:5 260:23 262:12 268:14 269:22 282:2 283:21 286:8
sorts 14:16 36:10 37:13 79:12 158:11 261:15 279:7
sound 200:24
sounded 25:14
sounds 13:21 34:10 37:20 52:8 61:11 64:24 73:17 92:25 119:12 286:21
source 170:20
space 100:4
spans 170:22
speak 63:21
speakers 138:14
speaking 10:21 32:25 114:19 116:23 219:22
spec 46:24 47:25 83:25 84:14 90:5 102:8 114:22 132:4,6,8 136:23 144:11 144:22 145:5 174:13 206:21 212:19
special 26:9 27:20 47:11,19 50:2 185:22 186:21 279:8
specialized 14:10 127:11 217:13
specific 29:3,22 30:4 39:12,15 40:10 44:12 53:6 59:25 70:25 71:1 75:8 81:10 100:6 107:9 108:18 115:18 120:3,3 132:25 134:3,16 142:17 170:18 184:10 197:15 220:23,24 224:22 225:14 226:3 228:2 231:18 232:9 240:24 244:2 244:12 269:10 285:14
specifically 47:22 49:8 59:3 71:14 81:6 185:20 205:25 254:15 262:24 287:3
specification 47:2 48:9

67:17 84:17,22 101:15 102:7 143:5,10 144:9 150:4,7 159:15 168:4
specifications 12:12 47:11 57:19 59:1,8 68:24,25 71:7 71:9 94:3 142:22 176:12 265:6 278:4
specifics 104:2
specified 121:12 286:18
specifies 19:6 157:16
specify 101:7 150:2
specs 26:3 58:20,24 75:11 132:4
spectacular 77:23
spectacularly 77:10 243:1 262:7
speculate 34:19 104:22 108:7 130:15 155:7 180:2 187:16 191:3 239:6
speculation 190:14
speed 13:10,16 13:17 48:23,23 158:16
spend 21:9 29:24 32:23 44:5 74:14 141:13 152:19
spent 62:2 67:6 67:11,22 74:11
spoke 89:2,4 195:22
squint 151:9
ss 291:3
stack 246:21
stacks 12:23
staff 10:16
stand 17:8 18:17 39:20 68:15 108:11 268:5,16
standard 15:17 16:7 30:18 53:8 57:25 81:24 98:6,13 99:2,7,10,12,16 101:7,25 102:4 102:11 122:4,7 122:13 123:3 123:17 124:13 124:19 125:24 126:4,15 127:3 127:12 141:11 152:21,22 156:10,13,15 157:3 158:1,2 159:12,12,16 171:19 194:1 194:11 195:1 205:11 257:4 269:25
standards 11:5 11:9 46:1 50:22 51:3 58:10 66:16 97:15 98:11,21 99:23 100:1 101:23,24 102:12 122:12 122:24 123:14 123:19 124:23 126:23 127:6,8 136:20 141:10 159:10 197:13
standing 108:3 115:4 285:11 288:3
standpoint 162:16 163:8 163:11 182:15 207:4 222:1 241:4
start 9:21 16:19 64:25 65:1 69:15 74:23 76:24 77:18 91:11 99:14 110:3 112:23 114:24 155:23 209:21 217:16 230:5 263:22 285:18 286:1,9
started 10:8 22:24 26:13 69:11 70:22 71:6 85:11 194:12
starting 23:8 91:18 124:3 135:1 137:3,10 210:8 253:24 280:17
starts 28:21 98:24 160:12 200:8
state 2:13 6:1,2 7:3 43:18 45:11 122:3 127:2 143:9 151:4 167:3 188:21 240:11 248:25 250:2 291:3,4
stated 9:24 105:3 121:21 122:4 143:9 291:10
statement 77:2 102:17 103:14 103:17 105:15 173:20,21,24 175:9 179:8 180:6 182:9 267:13

statements 104:9
states 1:1 2:1 97:17
stenotype 291:9
step 157:15 230:4,13,15,15 231:7 235:6,6
steps 210:7
steve 24:8
stick 171:14
sticking 273:23
sticky 44:24,24 45:14,20,24 46:3,5,13
stood 25:10
stopped 40:18
stops 115:10
story 22:20 23:13 27:10 30:14
straightforward 243:1 259:16
streaming 155:4,13 156:1 156:1,21 157:6 157:21 159:18 159:23
street 3:8,12
strictly 251:16
strike 180:16 278:13 281:7
strive 141:13
structural 37:22 46:10 224:22
structure 36:17 39:9 100:18 142:17 226:3,5 226:7 228:16
structured 68:13,14
structures 31:8 31:20 34:12,15 35:1 36:2 41:20 147:11 227:2,5
struggling 221:7
student 79:9
studied 35:4,5
study 35:23 36:1,7,11
stuff 30:11 34:7 37:15 46:15 49:3,5 64:13 64:14 67:25 69:19 79:8 89:22 92:7 100:24 122:25 123:22 124:1 127:1 142:2,14 144:8 145:1,2 159:5 162:3,13 162:17 163:11 169:7,18 171:18 182:8 187:2 194:14 196:13 197:2 201:7 205:18 218:4 221:24 222:2 226:18 232:3,6 234:17 238:14 243:23 244:5,8,11 277:3
subchapter 22:25
subheading 113:23
subject 33:4 37:7 61:16,18 95:16 101:22 107:9 108:18 134:23 195:16 197:19 198:13 238:23 263:1
submitted 72:4 73:16 74:1 97:8
submitting 73:25 74:5
subsection 161:16 193:22
substance 64:1 74:18
substantially 71:13
substantively 70:10
subsume 243:20
subtle 14:12 243:25
subtlety 141:8
subtracting 182:21
success 113:24 163:1 170:1
successful 23:16 163:3
sudden 24:24 26:1
sufficient 65:25
suggest 84:4 220:19 244:25
suggested 81:5 133:5
suggesting 25:7
suggests 114:16 153:8 221:13
suite 3:8
summarize 70:20 108:6
summarized 105:8 176:13
summary 22:21 58:16 247:5,13 247:15
superficially 241:9,16
supplementary 42:11
supplied 52:1 59:12 81:15
suppliers 99:18

supply 49:22 184:7 205:18
support 25:2 27:22 37:16 158:18 177:2,9 211:22 213:2 258:16
supported 13:10,15,17 24:25 26:11 155:25
supporting 78:14
supports 144:20 156:22 256:2 258:11 258:20,21
supposed 102:15 216:13
sure 16:3,22 25:14 26:19 31:17 33:11 38:18 42:15 44:16 45:2 55:6 59:5 61:15,17 66:5 66:8 67:2 73:20 85:16 86:11,14 99:4 99:6 103:16 105:25 111:25 119:10 124:9 126:7 134:11 135:17 136:2 139:18 151:14 153:23 154:10 165:14 171:10 172:19 173:24 185:15 190:4 195:5 196:19 196:24 197:5 199:4,19 203:11 210:18 215:10 219:16 230:11 246:23 248:15 262:5 263:9 275:4 287:19
surname 56:12
surprise 134:15 173:25 174:13 174:15
surprised 24:20
surrounding 20:24 105:19
sutcliffe 2:14 3:3 6:11
swear 6:24 56:8 139:22
switch 59:25 60:2 63:9 88:12 110:13 111:2,3 115:23 147:11,21,24 148:6,12,13,14 148:21 149:4,7 152:14 153:3 176:22,23 192:20 216:11 217:10,16 219:2 223:22 226:3,11 229:12,13,16 232:17 233:2,9 235:21 237:9 237:19 241:23 242:16 243:6 243:13,14 244:20 245:25 246:4,7 248:11 250:18 252:9 254:1,24 256:8 257:8,9,16 258:4,7 259:5 259:8,11,15,19 259:22 260:20 265:7 273:6 281:20,25 282:2,4 283:22
switched 22:25 148:9 252:25
switches 41:15 41:15 88:10 89:24 189:19 217:14,15 223:9 231:24 231:25 248:24 250:1 260:9,22
switching 110:12 143:22 147:5,6 148:7 186:15 200:13 200:20,21,22 226:9 229:9,24 231:2,3 235:20 251:18 252:1 253:15
sworn 6:25 7:7 291:7
sync 163:19
system 115:11 115:15 154:4,8 154:17,20,22 155:3,12 156:5 159:5,24 163:19 164:12 165:19 166:16 224:5 229:19 229:20 230:7,8 241:11 242:6 242:22 262:4 262:15 268:11 271:18
systems 7:22 14:13 83:14 84:4 158:21 168:5,6,11 230:1

t

t 4:14
tabbed 160:10
table 45:11 86:18 128:18
taiwan 13:13
take 5:10 8:24 16:16 17:1 37:9 39:23 45:2 53:21 63:6,7 74:11

80:8 81:2 85:4 85:5 97:1,10 98:21 100:21 118:15 129:1 132:6 136:3,3 182:18,23 189:1 192:21 197:22 199:13 242:4 244:21 245:1 263:8 268:3 271:23 272:1 275:16 286:17,21
taken 2:11 5:13 15:6 103:15 122:20 133:7 142:21 209:8 209:13 217:15 246:18 291:9
takes 188:7 226:15 251:3 269:16
talk 8:23 9:10 40:7,21 47:23 63:19 74:20 76:1 94:5,8 111:16 112:13 116:5,14 120:6 127:7 129:21 131:5 140:13 140:20 141:12 148:7 153:17 167:16,18 177:6 185:10 188:6 193:7 198:24 210:15 220:13 245:15 245:24 260:20 286:3
talked 14:15 56:22 62:19 93:10,13 94:7 94:10,14 110:9 110:23 119:7 130:9 137:23 142:23 171:17 205:15 208:20 229:7,11 250:23 285:2
talking 16:18 31:23 39:18 52:10 64:4 74:23,25 75:1 75:2 77:12 80:10 86:17 105:8 108:24 111:7 115:4 120:15 126:9 130:5,23 131:4 132:20 133:14 133:24 142:12 142:24 148:11 153:15 168:1 171:2 178:19 179:15,19 199:16 201:11 215:22 217:23 224:20 234:20 235:19 236:9 241:17 245:22 251:21,22 253:20 261:3 268:9,10,14,15 270:24 271:21 285:22,25
talks 116:16 168:5 184:21 277:5 285:20
tangle 200:24
target 219:15
targeted 265:22
task 50:14 52:8 65:14
taught 65:15
teach 47:10
teaching 137:12 210:21 211:6 229:19 230:7 231:20 246:2 247:20
teachings 85:3 85:5 103:21 104:5 106:8,22 210:4 257:18
technical 21:15 37:9,15 38:2,3 123:21 194:20 238:1,2 240:15 240:25 241:4 242:1 243:15
technologies 1:6 2:6 5:15 6:7,7
technology 1:3 2:3 5:14 6:12 7:21 8:6 11:13 23:22 24:17 41:25 46:22 111:18 165:4 165:21 167:5,9 167:14 230:2
tell 26:15 36:2 44:2,4 71:22 74:17 102:14 122:11 186:23 212:22
tempered 102:19
ten 46:18 75:4
tend 188:11,12 279:9
tends 286:2
term 30:2 47:3 47:8 79:15 81:25 84:14 114:21,25 116:17 137:1 142:16 143:10 143:11 167:13 215:7 246:6 269:25
terminology 46:23,25 47:15 189:11
terms 32:24 47:1,3,13 48:5 49:21 50:1 81:20 189:1

219:21 220:1
236:17 241:21
testability
243:2
testified 7:8
41:2 49:24
67:6 93:1
124:13 162:21
175:11 206:14
223:16 227:22
229:1 244:15
271:7 277:18
284:12 286:14
testify 243:5
291:7
testifying
192:10 206:24
testimony 9:2
33:16 64:1
85:12 86:17
89:12 91:5
94:12,16,17,19
105:25 122:6
141:22 142:15
175:15 181:23
202:6 220:7
226:24 230:10
258:2 268:1
275:5 287:19
testing 13:1
texas 30:6
text 113:7
121:14,14
124:11
textbook 77:10
textbooks
278:4
thank 6:5,13,22
129:19 145:13
193:17 245:13
263:6 264:19
266:1 275:23
287:15,16
thereof 161:21
thing 10:2
24:15,20 37:19
42:10 46:21
50:7 51:8
57:25 70:4
75:5 76:22
77:24 85:2,3
88:15 91:12
102:9 108:8
109:14 116:19
122:17 127:4
132:15 134:6
137:22 140:6
140:11 149:2
152:3 158:22
159:11 168:20
169:10 170:18
176:17 177:16
181:8 204:24
205:1,13 206:7
207:2,4 215:18
215:21 217:11
226:16 227:13
235:22 241:13
243:12 244:2
248:18 252:13
269:20 272:7
281:1 285:24
286:11,21
things 9:18
12:21 14:24
15:4 19:13
20:3,5 21:7
22:1,16 23:8
23:12 24:9
25:2,25 26:10
27:23,24 30:13
30:17,18,20
32:5 33:4,24
34:4 37:8,13
38:2,4,14,16
40:7,9 41:10
41:12,19,22,24
45:12 46:9,15
46:17 47:18,22
48:17 49:4,17
50:8 52:24
53:3,8,25 54:5
57:9,11,21
64:16,16 66:6
68:18,25 71:22
72:20 74:21
75:8 79:12
80:2,5 81:3
82:12,19,21
83:11,17 84:2
84:6,8,11,12
85:9 88:20,24
89:3,19,20,24
90:5,9,14,18,23
91:1,19,21
92:6,16 93:3
93:24 98:5,10
98:11 101:2,15
102:6,16
105:21 109:6
115:5,7,8,10
118:1 124:3
126:10 127:2
132:14 136:18
136:22 137:6
137:12,13
139:11 140:12
140:13,15
141:17,20
142:10,13
144:8,24
148:10 154:25
155:1 158:18
162:5,11,15,16
162:19 165:5
171:15,17
174:10 176:21
177:9 185:2
186:18,25
189:14 190:6
190:15 192:9
194:15 196:2
201:11,12,12
201:12 204:14
205:9,12 206:5
207:2 211:2
212:10,13
215:17 217:3,8
217:20 219:16

220:18,24
222:5 223:23
224:6,7,9
225:5,5,13,21
226:18 228:1
229:7 234:17
234:23 236:1
236:15 237:20
238:2 239:15
240:23 241:12
241:14 243:19
243:24 244:4,6
252:6 257:1
260:7 261:12
262:8 268:7
269:7,22
271:24 277:8
278:9 280:11
283:20 284:25
285:7,20,21
286:1,9,22
288:23

think 6:16
13:13 14:20
16:5 21:17
24:14,19 25:8
27:11 30:15
32:19 33:9
35:11 36:4
41:2 42:3
43:23 44:2,3
47:24 49:24
50:16 51:22
55:5 58:6
59:24 67:14
70:14,21 73:21
78:18 79:24
80:18,19 81:3
81:3,25 82:21
83:12 85:11
88:9 89:22
90:11,13 91:14
93:1 96:14
105:13 106:10
107:23 108:1
109:17 110:9
110:14,23
111:22 113:11
115:4 120:23
124:2,15,25
125:3,4,18,21
125:22 129:4
135:17 138:18
139:12 140:4
142:21 143:10
144:18 145:19
147:19,19,20
151:18,21
159:2 162:21
163:12 168:25
170:7,16
171:18 175:11
179:12 181:17
182:9 184:21
185:6 187:11
187:25 190:22
190:25 191:9
202:6 203:18
204:11 205:21
206:14 207:8
210:7 214:17
220:21 221:17
222:7 223:16
226:2,24 227:2
229:1 232:17
234:6 236:3
241:14 243:5
244:15 246:12
246:20 247:3
252:18 253:23
255:10 260:7
260:17 261:1
262:22 263:7
267:3,22
274:12 277:2
278:7 279:12
280:4 282:1
283:10,24
284:12 285:15
286:14 287:24
288:4,21,22,22
289:2

thinking 14:1
28:1 77:18
202:19

thinks 162:9

thir 193:19

third 12:24
43:8 255:10

thorough
114:18

thou 102:5

thought 19:18
27:4 40:15
109:8 122:18
158:23 163:5
169:2 170:11
170:17 189:3
208:10 216:22
220:18 221:3
225:3,3 246:10

thousand
100:15

thousands
101:2 110:2

three 11:1 21:5
26:16 67:22
87:8 113:20
119:13 135:4
188:1 236:24
276:22

thursday 1:11
2:13 125:22

ti 30:18

till 199:6

time 6:3 11:17
17:1 21:4,10
23:1 25:19
27:25 30:10
32:23 44:5
50:21 51:6
59:16 62:2,10
63:11,15 64:17
67:10,22 74:1
74:11 92:8,10
101:17 107:25
129:2,12,16
130:14 131:19
134:9 152:19
158:4 180:3

192:2,22,25 193:4 196:24 200:22 212:6 212:10,13 225:2 244:23 245:5,9 263:3 287:15 289:5 291:10
timeframe 32:9 64:7 84:3 109:15
times 8:13 23:20 50:23 74:20 136:23 140:14 184:19 260:9,11 265:21,22 278:7
tiny 268:8
tired 22:14
title 266:16
titled 102:23 140:9 146:19 193:23
tjensen 3:5
today 9:3,10 20:15 23:19 28:5,7 35:8 50:10,11 52:10 62:14 64:19 73:22 74:12 95:9,23 99:23 100:10 114:4 118:13 125:22 128:20 130:2 155:11,17 159:22 185:23 186:4 187:18 202:6 245:2 260:18
today's 118:24 119:1 289:4
together 32:13 36:5 41:17 47:12 52:2 66:6 69:19 70:24 81:13,14 82:12 84:5,8 84:15 124:4 132:14 164:7 189:15 204:16 211:3 224:7 225:14 234:23 234:24 257:20 263:16
toggle 147:7,12
told 52:22 63:21 164:19
tolerance 142:19
took 10:9 21:10 88:6 120:22 126:4 167:13 234:22
tool 88:19 89:16 109:3 190:10,11
toolbox 84:6,7 88:14,19,24 89:13 91:1,6 91:18,21 92:5 92:9,11,13,14 92:19,23 93:3 108:25 109:1,4 132:5 158:22 232:6,8 277:20 277:25
tools 84:6
top 28:19 71:22 123:18 200:4 209:5,22 210:14 211:16 213:6 216:10 216:25 218:18 223:11 228:16
topic 58:14 129:6
topics 263:21
torn 213:16
total 67:7 75:21
touched 278:7
touches 33:10
touching 109:24
touts 170:23
towards 228:2
track 174:22
trademark 1:1 2:1
tradeoff 238:3
tradeoffs 48:22
traditional 133:3,3 176:18
traffic 144:10 158:13
transactions 251:18
transceiver 33:24
transcribed 291:11
transcript 8:24
transcription 291:12
transfer 156:23 159:25
transfers 157:17
transform 150:5
transistor 279:2
transistors 34:2,11,13 35:3,14 36:3 41:11,14 272:9 272:10 278:10 278:20 279:4,6 279:8
transmission 138:22 140:7 146:19 150:9
transpires 63:13 129:14 193:2 245:7
travis 3:5 6:10
tremendous 48:15 107:24
trial 1:2 2:2 5:15 94:12

tricky 149:1
tried 14:18 47:21 136:24 163:7
trivial 268:3 273:16
trivially 136:9
trouble 181:10 206:5 244:8,9
truck 165:9 262:4
trucks 262:1,2
true 17:21 18:4 20:11 40:6 50:22 54:20 72:7 102:2 130:20 158:1 168:7 171:24 187:22 208:24 214:8 215:2 229:22 235:24 242:15 251:16 286:19 290:3
truth 291:8,8,8
truthful 9:2
try 48:12 51:6 52:2 76:22 89:6 141:14 151:9 174:17 191:18 206:12 240:24 245:2
trying 31:18 91:11,17 174:17,18,22 181:13 201:14 207:1 231:22
tuesday 125:22
turn 5:7 86:18 110:19 115:20 140:18 155:19 160:5 188:16 246:8 264:10 268:25 281:13 281:14
turning 54:7 143:14 167:2 180:6 208:7 233:13 283:20
turns 81:21 109:13 169:5 221:2
two 26:5,15,16 26:16,16 38:8 47:4 53:3 54:21 57:21 71:22 75:23,25 83:6,11 84:10 84:14 86:6 93:24 95:14,14 99:1 103:10 104:4 105:2 115:24 116:6 118:1 124:23 125:20 126:13 137:15 140:1 151:1 167:18 174:12 177:1 188:1 189:14 202:18 208:15 209:2,4 211:4 211:5,6,12,14 212:14 216:18 216:25 218:10 218:12,16,18 219:4 220:12 220:18 223:7 223:14,23 226:22 228:10 229:13,21,22 233:5 238:18 242:17 254:25 255:1 256:17 257:10,21 259:23 263:23 276:7 282:20 282:23
type 12:15 132:23 133:24 150:3,5,7 233:16
types 33:24 93:5 131:2 157:16 238:17
typically 150:23

u

u1 146:17 270:16
u2 270:17
u3 270:18
ubs 58:20 100:4 205:21 207:2 217:12 225:15 226:17
ultimately 57:11 65:18 96:12 142:5
uncertain 8:19
uncertainty 195:16 197:20
unclear 8:19 44:11 188:22
uncommon 91:19 132:5 186:7
uncompressed 158:18
under 25:21 97:15 102:23 102:23 103:16 106:12 124:6 195:22 287:25 290:1,2 291:11 291:17
underlying 111:18 222:1 251:24
understand 29:17 30:16 31:18,19 32:11 33:1,11 34:6 34:21 36:14 37:1 38:19,21 47:6,7 49:15 66:16 70:21 73:7 76:23,25 78:8 80:1 82:11 85:16 86:11 88:12

91:12,17 97:25 101:14 102:10 104:2 105:25 114:20 116:18 119:12 121:21 121:22 123:13 123:19 126:22 126:25 138:16 140:10 142:16 154:20 168:22 189:7,23 191:16,18 195:7 196:8 201:14,18 206:15 219:22 221:20 224:9 225:12 232:17 234:6,18 236:11 240:19 240:20 244:11 256:20 265:7 270:11 275:4 276:21 278:1 287:19

understanding 11:6 32:18,19 32:24 72:10 73:8 78:4,13 81:23 82:4,5 82:15 97:17 98:22 102:19 108:16 114:5 114:23 115:17 124:10 145:24 147:23 154:7 154:19 157:1 157:16 161:14 162:12 165:7 169:24 171:8 188:25 194:25 197:1,3 206:5 215:6 218:5,6 232:11 248:16 252:17 277:24 278:18,22 283:4 284:11

understandings 92:15

understands 49:16 78:24 236:20

understood 42:14 47:25 63:25 83:23 89:11 98:23 103:16 126:7 139:15 154:22 204:18 205:12 216:13 217:11 241:20 243:5

unfair 217:17

unfortunately 181:14

unique 14:24

unit 135:20,25 138:10,12,12 138:22 139:21 141:4,6 147:24 148:3 184:23 201:8 202:7 204:13 207:3 214:23 233:24 262:11 274:4,7 275:6,19 277:7 283:5,11,12,21 284:1,8

united 1:1 2:1

units 94:22 148:8

universal 19:7 225:4 274:19

universally 270:16

universe 74:4 104:24 143:4

unmodified 172:9 174:21 180:10 202:2 203:20 207:8 207:10 213:14 239:20 240:9 241:4 242:2 252:23

unpack 206:12 207:1

unpatentability 197:10

unpatentable 195:8

unplug 115:10 117:16 118:3

unplugged 84:20

unplugging 253:16

unplugs 251:19

unquote 152:21

untangling 201:14

unusual 168:1 194:14

unusually 102:13

update 122:8

upper 212:16 213:22 214:22 222:14 273:24

upshot 21:8

upstream 115:25 116:24 117:5 118:9 135:11 144:3 144:16 146:4 153:19 173:12 184:15 211:12 211:23 219:24 222:2 224:13 232:23 248:18 249:16 255:1 256:2,18 257:11 258:11 270:3 276:8,17 276:24

url 161:4

usb 7:22 11:22 12:11,14 13:10 13:11,16,17 19:7,8,10,10 20:21 24:15,21 24:25 25:1

33:4 46:22
47:1 48:5,14
48:15,19,22,23
49:2,6,11,13,15
49:16 57:19,22
57:25 58:4,8
59:1,7,11,13,25
75:11 76:18,18
76:25 77:18
80:15 81:5
83:14,18,19,23
84:4,14,22
89:1 90:4,5,8
90:19,20,20
99:2,9,12,16,22
100:1,2,14
101:7,23,24
102:4,19
106:22 107:3,4
108:22 109:1,6
109:9,12,21,24
110:1,16,20
111:16,18,23
114:1,5,17
115:8 116:3,8
117:10,15
132:3 134:8
136:10,16,18
136:20,20,23
139:14 140:10
140:20,22,23
140:24 141:10
141:18 142:5
142:11 143:5,8
143:10 144:9
144:22,25
145:1,5 150:2
150:4,7,8
152:22 153:19
153:22 155:2
156:2,9,15
157:1,3,3,15
158:11,16,20
159:9,16
164:17 165:16
165:18,19,20
165:24 166:2,3
166:12 167:5,9
167:16,18,22
167:25 168:5
168:10,20
169:3,4,5,11,12
169:12,16,18
170:3,6 172:12
176:16,16,18
178:4 180:12
182:8,15,25
184:24,25
185:23,24
186:2,19,20,22
187:2,8,20
188:2,5,7,12
200:20,22
204:12,22
205:11 206:3
206:15,20,21
207:3,5,6,7
215:3,20
217:12,16
218:3 219:23
221:2 224:9,23
225:4,6 226:2
229:25 233:20
234:11,11
238:15 242:12
251:17 252:5,6
254:24 255:6,6
256:3,3 258:12
258:12 261:10
261:13 262:3,8
262:10,13,22
265:6,21,22,22
269:23 274:19
274:23,24,24
275:1,2,9,10,14
275:17,17,20
275:21 276:7
277:7 283:2,14
283:16,16
284:18,19
use 28:8 46:23
49:21 51:4
54:19 58:18
69:18 76:13,25
80:2 84:12
88:13 93:11
109:11 114:25
123:17 124:7
131:10 132:6
133:10 136:13
137:3 147:16
150:12 157:3
158:21,25,25
159:5,7,7,12,14
159:16 164:10
164:15 166:6,9
168:5,10
176:25 181:18
181:19 191:23
209:17,19
217:21 226:20
246:4 262:3
265:6 279:2
used 12:19 13:5
13:10 24:16
48:5,7 54:18
59:12 60:1
62:20 79:22
80:15 88:12
89:5 90:8
109:14 111:15
111:16 116:5
116:13 123:19
123:20 124:2,2
124:6,13,15
132:12,15
134:10,22,22
136:16 141:10
141:15 142:20
143:3,4 147:12
149:5 150:14
157:2,12
168:17 169:6
189:13 190:6
192:8 201:9,15
206:23 215:8
225:7 230:3
261:12 262:1
262:13 266:13
289:5

useful 78:1 81:17 89:3 92:3,4
user 111:20 150:8 190:11 212:8,22 240:17 244:8,9 251:7,19,22 268:12
uses 47:15 114:25 246:6 265:20
using 14:3 15:13,16,22 16:7 26:5 31:25 38:5,6 38:10,12 47:13 62:22 78:22 81:14 111:23 111:23 157:7 191:17 192:15 205:11 209:9 258:4 259:20 278:20 288:14
usually 76:19 77:5

v

vacuum 271:23
vague 188:22
validate 97:11
validity 197:6
value 76:21 80:4 177:15 185:8,11,17 186:6,6,7,13
vanishingly 272:11
variants 233:3
variations 110:6
varied 20:6
varies 10:25
various 14:16 26:10 37:15 40:2 41:4,8 44:24 90:22 92:15 98:11 110:6 137:13 154:25 161:20 176:13 198:1 202:16 208:7 213:5 217:8 225:5 236:14 260:19 276:3 285:19 286:17
variously 276:19
vary 215:5
vastly 217:12
vehicle 156:2 159:24 168:6 236:19
vehicles 80:15 168:13
vending 261:25 262:6
vendor 12:23 100:5 229:2
verilog 142:7
veritext 5:21,22
version 13:9,14 13:17,22,23 14:4 18:24 24:25 25:1 26:4 69:9,17 83:25 130:17 164:21 169:11 172:9 218:13 222:15 252:19 252:23 266:15
versions 26:7 152:1 225:20 226:23 229:5
versus 5:15 10:24 40:14 81:11 187:12 194:17
vertical 282:16
vexing 93:22 93:25 178:3,12 178:23 179:5 179:16
vice 11:12 22:17
video 5:9,12 155:4,14 156:2 157:21 158:5 158:16,16 192:3
videographer 5:3,21 6:13,23 63:9,14 129:11 129:15 192:24 193:3 245:4,8 289:3
videotaped 1:9 2:11
view 50:1 52:5 52:6 66:1 71:1 77:24 86:5,23 87:2,6,16,19,23 88:2 98:20 99:22 111:17 111:23 142:4 142:19,24,25 144:22 153:19 162:25,25 163:3,6,9 167:23 169:8 175:8,15 176:19 189:13 189:21 196:16 202:7 204:11 206:18,21 207:2 214:23 221:23,24 222:4 224:24 225:7 226:22 236:9 258:24 264:12 266:17 271:12 276:21 284:14 286:15 287:4
viewpoint 9:23 49:9
views 116:17 143:2
virtual 248:25 249:16,19

250:2
virtue 83:8 178:5
visible 204:24 205:3
visualize 201:19
voices 22:18
volt 189:20
voltage 77:12 78:24 79:5,20 80:2,7 88:14 88:24 89:24 111:18
voltages 41:19
volumes 42:3
vs 1:5 2:5
vu 56:7

w

w 3:15
wait 60:4 122:18 134:5,5 199:6
waive 122:15
walk 116:1 209:12 210:6
want 14:25 33:10 38:18,20 44:16 45:1 46:20 49:24 51:20 59:7 63:6,7 74:17 85:16 86:11,13 86:16 112:13 113:7 116:2 120:6 121:18 122:1 124:9 127:16 128:19 129:1 131:11 139:18 159:3 159:14 160:9 161:23 163:10 180:19 181:1 182:11,17 186:14 187:4 187:14,15 192:21 198:24 202:22 203:19 209:12 210:18 217:25 230:24 244:10,21 248:7,15 255:21 263:20 269:10 275:4 277:16 287:17
wanted 15:4 21:9 22:16 26:1 28:18 29:17 90:16 103:16 131:23 137:14,17,18 159:19 164:15 172:24 173:4 173:21 174:14 174:15,16 219:16 220:19 228:2 245:21 245:23 247:2 261:2
wanting 39:2 159:18 178:13
washington 3:8
waste 107:25 180:3
wasting 192:2
wave 125:11
way 10:18 12:23,23 13:16 14:19 15:12,15 21:15 23:23 37:24 48:8 53:9 57:21 69:24 71:12 76:21 77:7 78:23 79:20 89:22 90:14 104:8 106:5 108:24 111:15 114:15 120:18 123:19 126:18 126:21 128:5 132:15 134:4 136:8 138:5 141:24 143:4 148:5,5,9,9 158:7 159:3,18 161:24 170:5 177:19 180:22 183:9 188:13 190:9 191:22 196:7 204:22 212:22 215:18 220:21 221:1 221:18,22,22 224:6 225:14 226:19 229:13 229:22 241:8 241:14 243:4 243:20 251:3 251:25 252:1,3 252:4,5 256:24 256:24 262:15 272:9 273:15 278:1 279:3 280:14 284:25 286:6,21 287:4 287:5,8,12 291:15
ways 14:12 49:21 52:5 66:7 77:3 89:2 89:20 109:2 111:20 132:14 132:25 137:15 137:19,20 141:12 142:2 142:20 143:3 149:6 158:22 159:19,20 168:1 175:6 188:9 201:7 242:11 278:23 288:23
we've 63:5 66:22 82:19 85:17 111:7 133:14 178:19 205:8,15 245:22 247:10

247:10 262:2 263:16 266:19 278:7
website 161:8
welch 1:9 2:11 4:3,17 5:13 7:2 7:4,6,15,19 10:12,15,18,23 11:10 16:16 22:23 25:11 36:9 40:11 42:24 48:21 51:11 63:11,15 63:18 96:22 118:22 129:12 129:16,18 192:25 193:4 245:5,9,12 261:21 263:13 279:13 287:19 288:7 289:4
welcome 63:18 107:22 129:18 193:7 245:11
went 12:6 21:23 25:3 27:22 66:13 69:6 70:23 71:8 96:14
western 96:4
wheelhouse 229:23
wheels 77:21 80:20,22 111:22
whichever 287:5
whispering 5:6
widely 24:16 34:3,5
wiener 3:13 6:8
wifi 12:18
willing 106:9
wilson 22:22
win 168:16
windows 14:11 27:22
winners 161:5 167:8
wire 190:3
wires 142:13 205:10 226:20 242:16 243:6
wiring 26:9 269:20
wise 260:21
wish 28:2
witness 4:2 6:24 7:23 8:2,8 9:16,16 10:24 11:4 77:4 263:5 284:5 290:12 291:6 291:20
won 178:18
wonder 128:15
word 53:21 58:10,14 136:16 139:23 142:16,20 143:3 147:17 172:16 173:13 173:23 174:4 180:16,20 181:7,20 182:23 183:3 201:15 206:22 209:17,19 230:11 266:13
wording 284:16 285:14
words 48:3,11 69:14,20 70:6 70:6,12,16 71:11 104:11 123:22 133:10 136:14,21 139:16 140:14 140:19 162:8 184:7 220:22
work 7:22 8:1 8:10 9:15 10:23 12:8,23 12:24,25 14:19 19:25 24:12 25:12 26:17 27:9 37:4 50:15 56:18 57:21 58:9 59:13 66:16 67:7 69:10,11 69:16 71:11 73:23 79:10 84:24 95:20,23 102:15 163:18 165:6 166:8 183:9 187:8 194:20 206:10 212:8,18,20,23 256:25 261:3,4 261:8,9
worked 19:25 19:25 23:14 25:6 70:18 91:14,23 95:14 165:13 192:4,7 192:16 220:20 261:12 263:16
working 11:10 23:17 69:15 90:18 115:10 115:12,13 189:23
workings 34:21 34:25
works 49:15,16 51:21 57:1 75:12 90:20 98:16 102:15 118:2 131:15 133:5 153:22 157:2 158:11 169:7 173:9 176:17 182:15 191:23 197:2 204:22 221:2 221:21 252:5,6 277:8 278:1
world 49:6 92:7 102:20

186:19 190:1 206:21 243:3 243:18
worry 48:1 159:4
worth 45:4 120:17 203:17
wow 16:24 57:13 199:7,7
writ 191:13
write 51:21 100:14,15 119:9 281:5
writing 69:15 119:8 180:22 281:1
written 17:9 45:6 47:5 68:8 68:9 106:25 108:9 121:22 123:9,14 124:11 125:25 126:16 138:21 158:1 181:12 218:10 219:21 225:19 227:21
wrong 122:7,18 123:2 124:25 134:6 174:12 182:10 212:23 283:11 284:3
wrote 46:16,17 47:20 49:13 69:9 74:20 105:22 108:1 118:6 122:22 162:3 171:14

x

x 4:1,14 77:6 91:13 101:1 102:5 158:25 196:1

y

y 77:6 91:14 101:1 102:5 196:1
yaroschuk 3:19 5:20
ye 20:9
yeah 14:1 25:16 26:21 31:15 42:8,8 42:18 45:6 47:18 53:25 54:20 55:12,20 60:7 61:16,24 66:6 73:21 91:14 95:21 103:25 106:19 113:10 114:3 120:25 121:3 122:19 125:3 125:12,16 127:23,23 129:3 130:24 135:21 139:6 139:23 144:7 145:4 153:1,14 155:6 156:7 160:23 166:14 173:12 183:23 186:12 187:15 188:14 190:25 192:23 195:6 195:19 200:16 207:25 208:24 211:19 212:25 218:12,21 222:12 227:15 227:18 231:16 239:11,23 241:7 243:3,12 244:5 245:20 247:7,12 253:7 259:17 260:25 270:8 272:23 280:5,22 283:25 287:12
year 10:23 46:17 96:15 263:16
years 7:18 11:1 14:1 21:20 23:24 26:8 28:15 30:10 35:11 92:11 105:21,22
yellow 45:24 46:6
yep 43:3,7 64:20 107:7 119:1 140:21 149:19,19 154:14 203:14 208:14 213:7,7 213:9 227:14 228:19 233:17 249:10 250:7 255:20 267:12

z

z 77:6 91:15 102:5 196:1
zero 268:8
zillion 102:5