

-----  
ZTE (USA), INC., SAMSUNG ELECTRONICS  
CO., LTD., AND SAMSUNG ELECTRONICS  
AMERICA, INC.,  
Petitioner,

v.

FUNDAMENTAL INNOVATION SYSTEMS  
INTERNATIONAL, LLC,  
Patent Owner.

-----  
CASE NO. IPR2018-00111

DEPOSITION OF KENNETH FERNALD, PH.D.  
LOS ANGELES, CALIFORNIA  
THURSDAY, OCTOBER 25, 2018

CHERYL ASADA, CSR 13496

2 (Pages 2 to 5)

Page 2	<p>1 UNITED STATES PATENT AND TRADEMARK OFFICE</p> <p>2 BEFORE THE PATENT TRIAL AND APPEAL BOARD</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7 DEPOSITION OF KENNETH FERNALD, PH.D., taken on behalf</p> <p>8 of PETITIONER at the offices of Irell &amp; Manella,</p> <p>9 1800 Avenue of the Stars, Suite 900, Los Angeles,</p> <p>10 California, commencing at 9:31 a.m. and concluding at</p> <p>11 1:32 p.m., Thursday, October 25, 2018, before CHERYL</p> <p>12 ASADA, Certified Shorthand Reporter No. 13496.</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	Page 4	
Page 3	<p>1 A P P E A R A N C E S :</p> <p>2</p> <p>3 Attorneys for the Petitioner:</p> <p>4 McDERMOTT WILL &amp; EMERY</p> <p>5 By: JIAXIAO ZHANG, Attorney at Law</p> <p>6 4 Park Plaza, Suite 1700</p> <p>7 Irvine, California 92614</p> <p>8 949-851-0633</p> <p>9 jiazhang@mwe.com</p> <p>10</p> <p>11 -and-</p> <p>12</p> <p>13 McDERMOTT WILL &amp; EMERY</p> <p>14 By: CHARLES M. McMAHON, Attorney at Law</p> <p>15 444 West Lake Street</p> <p>16 Chicago, IL 60606</p> <p>17 312-372-2000</p> <p>18 cmcmahon@mwe.com</p> <p>19</p> <p>20 Attorneys for the Patent Owner:</p> <p>21 IRELL &amp; MANELLA, LLP</p> <p>22 By: HONG (ANNITA) ZHONG, Attorney at Law</p> <p>23 1800 Avenue of the Stars, Suite 900</p> <p>24 Los Angeles, California 90067</p> <p>25 310-203-7183</p> <p>hzhong@irell.com</p>	<p>1 I N D E X</p> <p>2</p> <p>3 W I T N E S S :</p> <p>4 KENNETH FERNALD, PH.D., PAGE</p> <p>5 EXAMINATION BY MS. ZHANG 6</p> <p>6 EXAMINATION BY MS. ZHONG 89</p> <p>7</p> <p>8 I N F O R M A T I O N R E Q U E S T E D :</p> <p>9 (NONE)</p> <p>10</p> <p>11 Q U E S T I O N S I N S T R U C T E D N O T T O A N S W E R :</p> <p>12 (NONE)</p> <p>13</p> <p>14</p> <p>15</p> <p>16 E X H I B I T S</p> <p>17 NUMBER DESCRIPTION PAGE</p> <p>18 Exhibit 1 U.S. Patent and Trademark Office, 36</p> <p>19 Before the Patent Trial and Appeal</p> <p>20 Board, ZTE (USA) Inc., et al., v.</p> <p>21 Fundamental Innovation Systems</p> <p>22 International LLC. Case IPR</p> <p>23 2018-00111, Patent No. 8,624,550,</p> <p>24 Patent Owner's Response</p> <p>25 Exhibit 1001 U.S. Patent No. 8,624,550 (Bates 72</p> <p>Numbers: ZTE/SAMSUNG 1001-0001 to</p> <p>ZTE/SAMSUNG 1001-0012)</p> <p>26 Exhibit 1006 U.S. Patent No. 6,625,738 (Bates 78</p> <p>Numbers: ZTE/SAMSUNG 1006-0001 to</p> <p>ZTE/SAMSUNG 1006-0011)</p>	Page 5
Page 5	<p>1 E X H I B I T S</p> <p>2 (CONTINUED)</p> <p>3</p> <p>4 NUMBER DESCRIPTION PAGE</p> <p>5 Exhibit 2011 U.S. Patent and Trademark Office, 6</p> <p>6 Before the Patent Trial and Appeal</p> <p>7 Board, ZTE (USA) Inc., et al., v.</p> <p>8 Fundamental Innovation Systems</p> <p>9 International LLC. Case IPR</p> <p>10 2018-00111, Patent No. 8,624,550,</p> <p>11 Declaration of Kenneth Fernald</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	Page 5	

Page 6

1 LOS ANGELES, CALIFORNIA; THURSDAY, OCTOBER 25, 2018  
 2 9:31 A.M. - 1:32 P.M.  
 3 -0o0-  
 4  
 5 KENNETH FERNALD, PH.D.,  
 6 having been duly administered an oath  
 7 in accordance with CCP 2094, was  
 8 examined and testified as follows:  
 9  
 10 EXAMINATION  
 11 BY MS. ZHANG:  
 12 Q. Good morning, Dr. Fernald. How are you?  
 13 A. Good morning. Thank you. I'm very well.  
 14 Thank you for asking me.  
 15 Q. Great. Thanks for meeting us today.  
 16 A. My pleasure.  
 17 MS. ZHANG: I am just going to go ahead and  
 18 give you a copy of your declaration to have on hand for  
 19 reference.  
 20 THE WITNESS: Thank you.  
 21 MS. ZHANG: And here's one for you as well.  
 22 (Exhibit 2011 was marked for  
 23 identification by the shorthand  
 24 reporter.)  
 25 ///

Page 7

1 BY MS. ZHANG:  
 2 Q. So that's marked as Exhibit 2011. I won't be  
 3 using it right now, but just so you have it on hand just  
 4 in case you need it.  
 5 A. Understood.  
 6 Q. Just to get the standard question out of the  
 7 way.  
 8 Is there anything that you're under the control  
 9 of this morning that would affect your ability to  
 10 competently testify in this proceeding?  
 11 A. Nothing that I'm aware of.  
 12 Q. Okay. Thank you.  
 13 So I'm handing to you what's been --  
 14 U.S. Patent No. 6,556,564 to Rogers titled, "Scheduled  
 15 Internet Protocol Telephone Instrument System." It's  
 16 already Exhibit of Record 1005.  
 17 MS. ZHANG: Oh, do you need a copy, Annita?  
 18 MS. ZHONG: No, I have a copy.  
 19 MR. McMAHON: You can just give her a copy.  
 20 MS. ZHANG: Okay.  
 21 BY MS. ZHANG:  
 22 Q. The '564 patent is directed to a LAN telephone.  
 23 Right?  
 24 A. Effectively, yes.  
 25 Q. Okay. Is an example of the LAN telephone shown

Page 8

1 in Figure 1, for example?  
 2 A. Yes. At least in part.  
 3 Q. Okay. The LAN telephone receives power over  
 4 Ethernet through LAN cabling. Right?  
 5 A. That is my understanding, yes.  
 6 Q. The LAN telephone attaches peripheral devices  
 7 through an electronic interface system. Right?  
 8 A. He calls them accessories, I believe is what  
 9 you're referring to. Effectively, yes. I don't know if  
 10 that's the language that Rogers uses in his -- of course  
 11 he refers to it as USB-interfaced.  
 12 Q. So the LAN telephone attaches accessories  
 13 through an interface system -- electronic interface  
 14 system. Right?  
 15 A. That's a fair description, yes.  
 16 Q. Turning to the embodiment shown on Figure 6 of  
 17 the '564 patent, the Rogers patent, how does the LAN  
 18 cabling provide power to the LAN telephone instrument of  
 19 Figure 6?  
 20 A. It receives two pairs of power from the LAN  
 21 cable is what's disclosed. Each one is disclosed at  
 22 being, I believe, at 48 volts and a maximum of  
 23 500 milliamps, so that provides of the input side,  
 24 effectively, 48 watts, 48 volts and 1 amp total. And  
 25 then, of course, there is conversion that happens along

Page 9

1 the way before it actually powers the various components  
 2 that need power.  
 3 Q. So I think what you're referring to in Figure 6  
 4 is the twisted pairs 3 and 4, for example. Is that  
 5 right?  
 6 A. Yes. That is what I was referring to on the  
 7 left of that figure.  
 8 Q. Okay. And that feeds in through Pins 4, 5 or 7  
 9 and 8 through the LAN Connector 80. Is that right?  
 10 A. Yes. That's correct.  
 11 Q. And then how much current then does the  
 12 '564 patent disclose that the LAN cable can handle?  
 13 A. It discloses that it's 24-gauge American wire  
 14 gauge, which is specified, in fact, to carry for power  
 15 purposes, he says, 500 milliamps -- up to 500 milliamps.  
 16 Q. Okay.  
 17 A. The standard says actually slightly above that,  
 18 but, you know, he's being conservative.  
 19 Q. And this is at 48 VDC?  
 20 A. It is delivered at 48 VDC. The current  
 21 carrying capability of the wire, though, is independent  
 22 of the voltage.  
 23 Q. And what voltages are contemplated by the  
 24 '564 patent?  
 25 A. Where in the system --

4 (Pages 10 to 13)

<p style="text-align: right;">Page 10</p> <p>1 MS. ZHONG: Objection to form.  2 THE WITNESS: Excuse me.  3 Where in the system are you asking about? Are  4 we still talking about on the LAN cable?  5 BY MS. ZHANG:  6 Q. In terms of once you get into the system  7 itself, what voltages are contemplated in terms of supply  8 or other aspects?  9 MS. ZHONG: Objection, form.  10 THE WITNESS: Well, I can list you the  11 voltages. For instance, here he converts the 48 volts to  12 5 volts in the phone itself. And then there are later  13 figures that show it being converted further to  14 3.3 volts, if that answers your question.  15 BY MS. ZHANG:  16 Q. Yes. Thank you.  17 And unlike most LAN -- unlike most telephones,  18 the Rogers LAN telephone is capable of supporting a  19 variety of accessories. Right?  20 MS. ZHONG: Objection, form.  21 THE WITNESS: I don't know that it's unlike  22 other telephones, but he does support at least two  23 accessories that he mentions explicitly.  24 BY MS. ZHANG:  25 Q. If I could direct your attention to Column 10</p>	<p style="text-align: right;">Page 12</p> <p>1 other telephones, I don't know the answer to that.  2 Q. Understood.  3 The disclosed LAN telephone uses a modified USB  4 for interconnection of telephone accessories. Right?  5 A. Yes. That's almost exactly the language Rogers  6 uses, in fact, is modified USB interface.  7 Q. Right. I think at Column 10, Lines 64 to 67,  8 (reading):  9 "In contrast, the disclosed LAN  10 telephone uses a modified USB for  11 interconnection of telephone accessories  12 to the disclosed LAN telephone."  13 A. I see that, yes.  14 Q. If we could continue on to Column 10, please,  15 of the patent.  16 A. You say -- you say Column 10.  17 Q. Or, sorry, Column 11.  18 A. Oh. I'm there.  19 Q. Okay. It says -- or I'm sorry.  20 This starts at the bottom of Column 10,  21 line 671, (reading):  22 "One difficulty with the existing  23 USB" -- continuing on to Column 11, line  24 1 -- "is that it has only a limited  25 capability to provide power to a</p>
<p style="text-align: right;">Page 11</p> <p>1 of Rogers.  2 A. I'm there.  3 Q. And Line 56. Can you read that part, please?  4 A. How far do you think I need to go?  5 Q. Just a few lines.  6 A. Okay.  7 Q. So this part starting at line 56, (reading):  8 "The disclosed LAN telephone, unlike  9 most other telephones, is capable of  10 supporting a variety of accessories."  11 A. I see that, yes.  12 Q. This is '564 patent, Column 10, Lines 56 to 57,  13 (reading):  14 "These accessories include an operator  15 console and an external speakerphone  16 unit."  17 That's Lines 58 to 59.  18 Would you agree, then, that unlike most other  19 telephones, Rogers' LAN telephone is capable of  20 supporting a variety of accessories?  21 A. I can only take this at face value. I'm not  22 investigating whether that is, in fact, correct or not.  23 Q. But this is what the --  24 A. I mean, the "unlike" part. I agree that he can  25 take a variety of accessories. Whether it's unlike most</p>	<p style="text-align: right;">Page 13</p> <p>1 connected device."  2 Is that right?  3 A. I see that, yes.  4 Q. And this is too little for many potential  5 devices. Is that right?  6 A. Yes. He says something to that effect a little  7 later on in this paragraph. Let me find it here.  8 At Line 7, he goes through the fact that -- or  9 up until then he goes through the fact that USB  10 unmodified can provide half an amp at 5 volts, which is  11 two-and-a-half watts, and he also discusses the fact that  12 a certain class of devices -- and I suspect we'll talk  13 about later -- are limited to a hundred milliamps, in  14 fact, and then he says, "this is too little for many  15 practical devices."  16 I'm sorry. I misspoke. It says, "this is too  17 little for many potential devices."  18 Q. Potential devices.  19 That would be expected to be connected to the  20 LAN telephone of Rogers?  21 MS. ZHONG: Objection, form.  22 THE WITNESS: Yeah. It's -- this looks like a  23 more general statement to me, but, apparently, that's  24 what -- you know, in the context of Rogers, that's at  25 least his primary concern is what his own accessories</p>

<p style="text-align: right;">Page 14</p> <p>1 would be able to pull for power. 2 BY MS. ZHANG: 3 Q. And according to the Rogers patent, how much 4 current does a typical LED indicator use? 5 A. That's just a bit further down in the section. 6 Actually, the very next sentence from where I was 7 reading. "For instance, a typical LED indicator uses 8 20 milliamps," obviously when it's on, compared to off. 9 Q. And in the context of the Rogers patent, if a 10 USB-compliant cable has two wires supplying 5 volts DC 11 current -- 5 volts DC, and then the current is limited to 12 .5 amps as the '564 patent sets out, what would be the 13 maximum power available? 14 A. When you say "two wires," you mean one for VBUS 15 and one for ground? 16 Q. Uh-huh. 17 A. In terms of what is available, that would be 18 two-and-a-half watts assuming that the host device 19 authorized to use that much power, under your 20 assumptions, of course. There are scenarios where that 21 much power is not even available on a USB port. 22 Q. Okay. So maximum 2.5 watts then? 23 A. In the right scenario, under the right 24 conditions and, again, if the host allows it. Because 25 that level of power has to be negotiated, basically,</p>	<p style="text-align: right;">Page 16</p> <p>1 Q. Okay. So under such constraints, how many 2 typical LEDs could be supported using this, 3 quote-unquote, existing USB that Rogers sets out? 4 A. Let's see. The operator unit would be allowed 5 the full 500 milliamps since it is connected straight to 6 the base unit. So whatever 500 divided by 20 is, 7 assuming that each LED is on and is also using 8 20 milliamps, of course. 9 So, what, that's 25-ish? I think it is 25. 10 So 25 LEDs could be on simultaneously with that 11 500 milliamps, neglecting any other power that, of 12 course, is required in the operator unit. 13 Q. Doesn't Rogers say on Column 11, Line 9 through 14 11 that "an accessory using the existing USB could have 15 five LEDs, and nothing else"? 16 A. You'll have to direct me -- I'm sorry. What 17 were those line numbers again? I apologize. 18 Q. That's okay. Column 11, Lines 9 through 11. 19 A. He states that. He appears, though, to be 20 referring to an accessory that's downstream of the 21 operator unit as in it's restricted to the 22 hundred-milliamp number, so like LEDs on a speakerphone, 23 for example, if they have them. 24 Q. So a downstream device that had LEDs, how many 25 LEDs could that downstream device have supported using</p>
<p style="text-align: right;">Page 15</p> <p>1 between the device and the host. 2 Q. And then, if devices were chained together, it 3 would still only be a maximum of 2.5 watts. Isn't that 4 right? 5 A. At the originating port, yes, assuming nothing 6 along the way is -- or assuming everything is bus-powered 7 along the way. 8 Q. With no external supply of power? 9 A. No external supply. No batteries. And, again, 10 using the numbers from the USB specification of 5 volts 11 and half a milliamp -- excuse me, half an amp. 12 Q. And then under the Rogers construct, any given 13 device can only use .1 amps. Is that right? 14 A. He makes that statement. He's -- if you take 15 it in context, he's referring to a certain class of 16 devices within his system -- or within USB, I should say, 17 and that would be in particular devices operating from a 18 bus-powered hub. 19 Q. So with .1 amps, that would be a maximum 20 of .5 watts per device under a 5 volt DC supply. Right? 21 A. I'll -- I'll paraphrase to make sure we're 22 clear. 23 If the device is receiving 5 volts and .1 amps, 24 it would be receiving half a watt. And actually, Rogers 25 states as much at Lines 6 and 7 of Column 11.</p>	<p style="text-align: right;">Page 17</p> <p>1 only .1 amps? 2 A. Again, if it's downstream of the -- of a bus -- 3 bus-powered hub, which is limited to a hundred milliamps, 4 then it would be five LEDs, as Rogers states in those 5 lines that you cited. 6 Q. Okay. 7 A. Again, that's -- it could have more LEDs, but 8 five could be on at a time neglecting other power 9 consumption. 10 Q. And if more than five need to be on at a time? 11 A. Then they would have to provide external power 12 or find another solution. 13 Q. Okay. 14 A. Not plug it in to a bus-powered hub, for 15 example. Actually, a really other common technique is 16 you timeshare them. You, basically, flash them on and 17 off in sequence so fast that the human eye thinks they're 18 all on at the same time, but they really aren't. And 19 that way you take that current and you divide it by the 20 duty cycle of each LED. That's a very common technique. 21 Q. And the operator console shown in Figure 1, if 22 we can go back to that, that shows more than five LEDs. 23 Right? 24 A. You know, just from this picture, I can't tell 25 what is an LED and what is a button. We'd have to go to</p>

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.