**PUBLIC VERSION**

**In the Matter of**

**CERTAIN MOBILE DEVICES WITH MULTIFUNCTION EMULATORS**

**Investigation No. 337-TA-1170**

# COMMISSION OPINION

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## I. INTRODUCTION

On May 17, 2021, the Commission determined to review in part the final initial determination ("ID") issued by the presiding administrative law judge ("ALJ") on March 16, 2021. 86 Fed. Reg. 27651-53 (May 21, 2021). On review, the Commission has determined to affirm, with modifications, the ID's finding that there has been no violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337. This opinion sets forth the Commission's reasoning in support of that determination. In addition, the Commission adopts the remainder of the ID that is not inconsistent with this opinion.

## II. BACKGROUND

### A. Procedural History

On August 16, 2019, the Commission instituted this investigation based on a complaint filed by Dynamics Inc. ("Dynamics") of Cheswick, Pennsylvania. 84 Fed. Reg. 42009-10 (Aug. 16, 2019). The complaint, as supplemented, alleges violations of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain mobile devices with multifunction emulators by reason of infringement of one or more of claims 1 and 5-8 of U.S. Patent No. 8,827,153 ("the '153 patent"); claims 1-20 of U.S. Patent No. 10,032,100 ("the '100 patent"); claims 1-7, 9-13, 19, 21, and 22 of U.S. Patent No. 10,223,631 ("the '631 patent"); and claims 1-16 of U.S. Patent No. 10,255,545 ("the '545 patent"). *Id.* at 42010. The Commission's notice of investigation named two respondents, Samsung Electronics Co., Ltd of Gyeonggi, Republic of Korea, and Samsung Electronics America, Inc. of Ridgefield Park, New Jersey (collectively, "Samsung").[1] *Id.*

[1] The Office of Unfair Import Investigations did not participate in this investigation.

On November 26, 2019, the ALJ held a *Markman* hearing, and on January 31, 2020, he issued Order No. 7, which construed several claim terms of the asserted patents. On May 20, 2020, the ALJ issued an initial determination terminating the investigation as to claims 5, 6, and 8 of the '153 patent, claims 2, 3, 5, 7, 9-11, 13-17, 19, and 20 of the '100 patent, claims 2, 3, 5, 7, 9-13, 19, and 21 of the '631 patent, and claims 2, 4, and 6-16 of the '545 patent. Order No. 15 (May 20, 2020), *unreviewed by* Notice (June 15, 2020).

Due to the COVID-19 pandemic, the ALJ amended the procedural schedule several times. The ALJ held a virtual hearing from November 16-20, 2020. Order No. 24 (Aug. 11, 2020), *unreviewed by* Notice (Sept. 8, 2020).

On March 16, 2021, the ALJ issued the final ID, which found no violation of section 337. The ID found that Samsung infringes claims 1 and 7 of the '153 patent and that Samsung failed to establish that those claims are invalid. ID at 45-58, 64-69. The ID also found that Samsung infringes claims 1, 4, 6, 12, and 18 of the '100 patent (except for claim 6 as to certain modified products), but that the asserted claims, except for claim 4, are anticipated or obvious. *Id.* at 83-88, 96-115. The ID further found that Samsung directly infringes claims 1, 4, 6, and 22 of the '631 patent, but that those claims are anticipated or obvious. *Id.* at 121-127, 131-140. The ID also found that Samsung directly infringes claims 1, 3, and 5 of the '545 patent, but that those claims are anticipated and therefore invalid.

With respect to the domestic industry requirement, the ID found that Dynamics had satisfied the domestic industry requirement for the '100 patent, but not the '153, '631, and '545 patents. ID at 183-84. For the '153 patent, the ID found that Dynamics failed to show it practiced any claim of the patent, but had shown it made significant investments under section 337(a)(3)(A) and (B), 19 U.S.C. § 1337(a)(3)(A)-(B). *Id.* at 60-64, 158-79. Likewise, as to the

'631 patent, the ID found that Dynamics failed to show it practiced any claim of the patent, but had made significant investments for purposes of subsections (a)(3)(A) and (B). *Id.* at 127-31, 158-79. For the '545 patent, the ID found that Dynamics had shown it was "in the process" of practicing claim 1, but had not shown it was "in the process" of establishing a U.S. industry. *Id.* at 148-52, 180-83; *see also* 19 U.S.C. § 1337(a)(2).

Accordingly, the ID found no violation as to all asserted patents. The ALJ recommended that the Commission issue a limited exclusion order and cease and desist orders if it finds a violation. ID at 186-91.

On March 29, 2021, Dynamics petitioned for review of the ID, and Samsung contingently petitioned for review.[2] On April 8, 2021, Dynamics and Samsung responded to each other's petitions.[3]

On May 17, 2021, the Commission determined to review the ID in part.[4] 86 Fed. Reg. 27651-53 (May 21, 2021). Specifically, the Commission determined to review the ID with respect to the following: (1) for the '153 patent, claim construction of the term "analog waveform" as well as the related infringement and technical prong findings, and the ID's finding that the combination of U.S. Patent No. 6,206,293 ("Gutman") (RX-877) and U.S. Patent No.

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[2] *See* Complainant's Petition for Commission Review of Initial Determination on Violation of Section 337 and Recommended Determination on Remedy and Bonding ("Dynamics Pet."); Respondents' Contingent Petition for Review ("Samsung Pet.").

[3] *See* Complainant's Response to Respondents' Petition for Review ("Dynamics Resp."); Respondents' Response to Dynamics' Petition for Review ("Samsung Resp.").

[4] Dynamics did not petition for review of the ALJ's finding of no violation of section 337 with respect to the '631 patent, and the Commission determined not to review that finding, thereby affirming that there is no violation as to the '631 patent. Thus, the '631 patent is no longer at issue in this investigation.

7,690,580 ("Shoemaker") (RX-884) fails to render the asserted claims obvious; (2) for the '100 patent, whether U.S. Patent Publication No. 2006/0161789 ("Doughty") (RX-283) in combination with U.S. Patent No. 7,114,652 ("VivoTech") (RX-881) would have rendered obvious claim 4 and whether Samsung waived this issue, whether claims 4 and 6 are infringed, and whether the domestic industry requirement is satisfied; and (3) for the '545 patent, the ID's domestic industry findings. *Id.* at 27652. The Commission determined not to review the remainder of the ID. In connection with its review, the Commission requested briefing from the parties. *Id.* at 27652-3. On June 2, 2021, the parties submitted opening briefs.[5] On June 9, 2021, the parties filed reply briefs.[6]

### B. Overview of the Technology

The technology at issue relates to making payments through point-of-sale ("POS") systems without the use of traditional credit or debit cards bearing magnetic stripes. ID at 4. The magnetic stripe on the back of a traditional payment card contains data that is communicated to a magnetic card reader when the card is swiped at the POS System. *Id.* at 6. The stripe and the embedded data are standardized by various organizations, including the International Organization for Standardization and the International Electrotechnical Commission. *Id.* These standards require card manufacturers to encode payment data in the frequency/double frequency (F2F) encoding format. *Id.* The standards further require that the data be organized into "tracks"

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[5] *See* Complainant's Submission Pursuant to Commission's Notice of Determination to Review ("Dynamics Sub."); Respondents' Response to the Commission's Notice and Request for Written Submissions ("Samsung Sub.").

[6] *See* Complainant's Reply to Respondents' Response to the Commission's Notice and Request for Written Submission ("Dynamics Reply"); Respondents' Reply to the Commission's Notice and Request for Written Submissions ("Samsung Reply").

and, more specifically, between one to three tracks, referred to as Track 1, Track 2, and Track 3. *Id.*

"In traditional point-of-sale systems, the data contained in each track (*i.e.*, contained in the magnetic stripe) is read by swiping or sliding the stripe against a fixed magnetic read head in a magnetic card reader" so that "the read head reads each bit of data as it moves by." *Id.* at 6-7. "In order to communicate this same information to the same type of read head, the inventions of the asserted patents create magnetic fields similar to those created by the magnetic stripe of the traditional payment card." *Id.* at 7.

### C. The Asserted Patents

The '153 patent, entitled, "Systems and Methods for Waveform Generation for Dynamic Magnetic Stripe Communication Devices," issued on September 9, 2014. '153 patent (CX-667; RX-48). The patent describes "powered cards and devices and related systems" that "may include a dynamic magnetic communications device, which may take the form of a magnetic encoder or a magnetic emulator." '153 patent at 1:17-18, 22-24. Dynamics asserts independent claim 1 and dependent claim 7. ID at 4.

The '100 patent, entitled, "Cards and Devices with Multifunction Magnetic Emulators and Methods for Using Same," issued on July 24, 2018. '100 patent (CX-669; RX-47). The patent describes a payment card with a magnetic emulator that can communicate information to a magnetic stripe reader. *Id.* at abstract. The "information used in validating a financial transaction is encrypted based on time such that a validating server requires receipt of the appropriate encrypted information for a period of time to validate a transaction for that period of time." *Id.* Dynamics asserts independent claims 1 and 12 and dependent claims 4, 6, 8, and 18, though claim 8 is asserted only for domestic industry purposes. ID at 5.

The '545 patent, entitled, "Cards and Devices with Multifunction Magnetic Emulators and Methods for Using Same," issued on April 9, 2019. '545 patent (CX-673; RX-50). This patent shares a specification with the '100 and '631 patents, and it describes a payment card with a magnetic emulator that can communicate information to a magnetic stripe reader. *Id.* at abstract. Dynamics asserts independent claims 1 and dependent claims 3 and 5. ID at 5.

### D. The Accused Products

The accused products are Samsung smartphones and smart watches that incorporate the Samsung Pay application and utilize so-called Magnetic Secure Transmission ("MST") in order to complete payment transactions in POS systems. ID at 7. Dynamics specifically accuses the following devices of infringement: Samsung Galaxy S10, Galaxy S8, Galaxy S8+, Galaxy S9, Galaxy S9+, Galaxy S10e, Galaxy S10+, Galaxy S10 5G, Note 7, Note 8, Note 9, Note 10, Galaxy S20, Galaxy Fold, Galaxy A50, Galaxy A51, Samsung Gear S3, and Gear S3 Frontier. [7] *Id.*

### E. Domestic Industry Products

The domestic industry products in this investigation are payment cards which include a microprocessor, coil, battery, and other electrical components, and are dimensioned so as to meet the form factor (*e.g.*, shape) of traditional payment cards with magnetic stripes. ID at 7. Dynamics asserts its products are '"intended for use in the traditional manner – *i.e.*, to be swiped through a trough in the magnetic stripe reader' in a point-of-sale device." *Id.* "The specific

[7] The ALJ found that certain Samsung products bearing the same model numbers as some of the Accused Products including the Galaxy S10, Galaxy A50, and Galaxy A70 do not infringe the asserted claims in light of hardware and/or software modifications removing the MST functionality. ID at 8-16. Dynamics did not petition for review of these findings, and the Commission did not review them.

models include the IndusInd device, the CIBC device, the SMCC device, and the Emirates NBD device (also referred to as the Connected Wallet Card) (collectively, the "DI Products")." *Id.*

## III. ANALYSIS OF ISSUES UNDER REVIEW

### A. The '153 Patent[8]

#### *1. Claim Construction of the Term "Analog Waveform"*

##### *a) Legal Standard*

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Claim construction focuses on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *Phillips*, 415 F.3d at 1314; *Markman v. Westview Instr., Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), *aff'd,* 517 U.S. 370 (1996). The Federal Circuit explained in *Phillips* that courts must analyze each of these components to determine the "ordinary and customary meaning of a claim term" as understood by a person of ordinary skill in art at the time of the invention. 415 F.3d at 1313. "Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001).

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[8] Vice Chair Stayin does not join the Commission Opinion as to the '153 patent, but joins the finding of no violation of section 337. As set forth in the Vice Chair's Separate Views, the Vice Chair would find (1) the accused products do not infringe the claims of the '153 patent properly construed; (2) Dynamics satisfied the technical prong of the domestic industry requirement; and (3) Samsung did not show the '153 patent is invalid as obvious over Gutman in combination with Shoemaker.

"Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claims terms." *Phillips*, 415 F.3d at 1314; *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point [ ] out and distinctly claim [ ] the subject matter which the patentee regards as his invention.").

"[T]he specification 'is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Id.* at 1316.

In addition to the claims and the specification, the prosecution history should be examined if in evidence. *Phillips*, 415 F.3d at 1317. The prosecution history can "often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Phillips*, 415 F.3d at 1317; *see Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) ("The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution."). When the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence (*i.e.*, all evidence external to the patent and the prosecution history, including

dictionaries, inventor testimony, expert testimony, and learned treatises) may be considered. *Phillips*, 415 F.3d at 1317.

### *b) Analysis: "Analog Waveform"*

Claim 1, with the disputed claim term emphasized, recites:

> A device comprising:
>
> a magnetic stripe emulator operable to communicate an **analog waveform** encoded with at least one track of magnetic stripe data to a magnetic stripe reader; and
>
> a waveform generator operable to generate said **analog waveform** from a digital representation of said at least one track of magnetic stripe data,
>
> wherein said device is operable to retrieve said digital representation from a plurality of digital representations of said at least one track of magnetic stripe data.

'153 patent at 15:14-23.

Claim 7 recites:

> The device of claim 1, wherein said **analog waveform** is encoded with two tracks of magnetic stripe data.

*Id.* at 15:43-44.

The Commission determined to review the construction of the claim term "analog waveform" and asked the parties to comment on the following issue:

> If the Commission construes "analog waveform" to mean "a wave shape whose amplitude changes in a continuous fashion" that includes so-called real-world square waves, please cite record evidence and explain whether the accused products and DI products meet the relevant claim limitations.

On review, and for the reasons that follow, the Commission has determined to adopt Samsung's proposed construction of "a wave shape whose amplitude changes in a continuous fashion," with the clarification that the construction includes so-called real-world square waves.

The ID noted that, although the parties disputed the meaning of the term "analog waveform," the term was not presented for construction during the *Markman* hearing and the parties did not treat the disagreement as a claim construction dispute in their pre-hearing briefs. ID at 34. Given these circumstances, the ALJ prudently asked the parties to propose constructions for the term in their post-hearing briefs. *Id.* The parties proposed the following constructions:

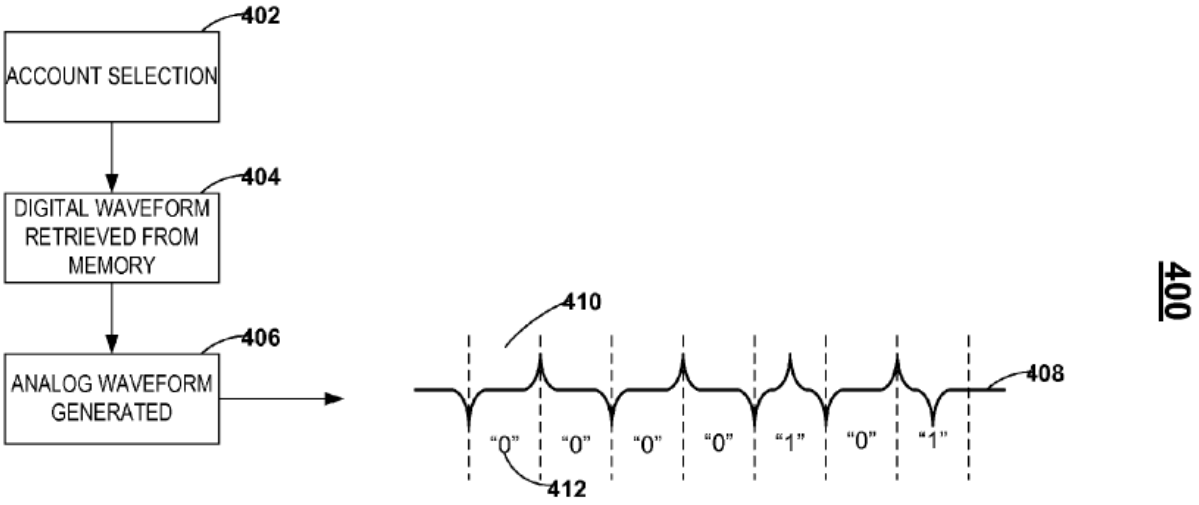
| **Dynamics' Proposed Construction** | **Samsung's Proposed Construction** |
|---|---|
| a waveform that conveys information in a non-binary manner | a wave shape whose amplitude changes in a continuous fashion |

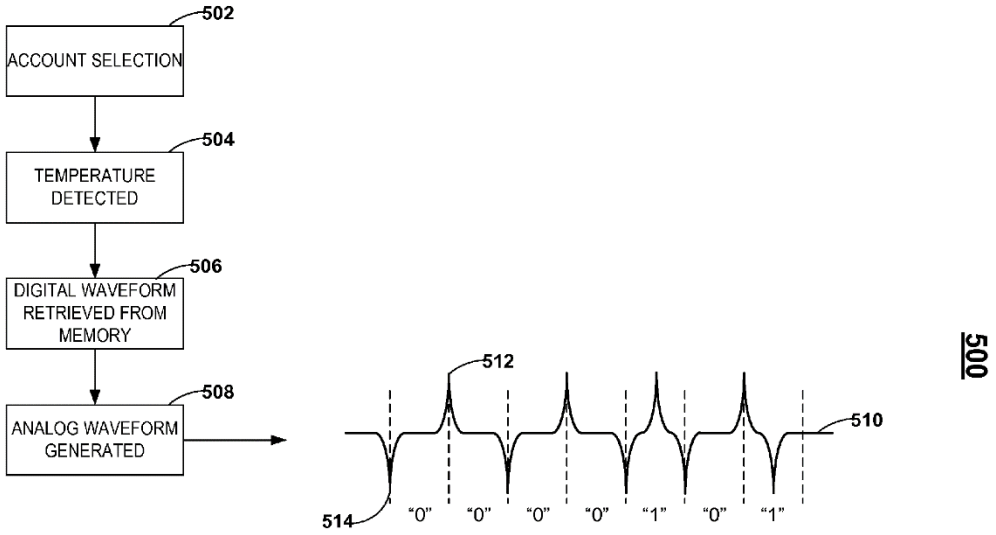
*Id.* After reviewing the parties' arguments and the evidence they cited, the ALJ concluded that "neither proposal is especially well-supported by the intrinsic evidence" and declined to adopt either construction. *Id.* ("I am not obliged to accept one or the other proposed construction; an adjudicator 'may adopt a definition not proposed by either party that best fits with the claim language and the specification.'" (quoting *Homeland Housewares, LLC v. Whirlpool Corp.*, 865 F.3d 1372, 1376 (Fed. Cir. 2017))). The ID ultimately found that "[t]he crucial point for claim construction purposes, though, is that any construction consistent with the specification must encompass real-world square waves, whatever the correct construction may be" and concluded that "that finding resolves the parties' dispute over infringement." ID at 40.

On review, the Commission adopts Samsung's proposed construction and construes "analog waveform" to mean "a wave shape whose amplitude changes in a continuous fashion," and clarifies that the construction includes so-called real-world square waves because they have waveforms with amplitudes that change in a continuous fashion. The Commission agrees with

Samsung that this definition comports with the plain and ordinary meaning of "analog waveform."

In adopting Samsung's construction, the Commission notes that it is undisputed that the plain and ordinary meaning of "waveform" is the shape of a wave. Indeed, the record contains five different technical dictionaries, evincing the ordinary and customary meaning of analog waveform, that define "waveform" to be the shape, or graphical representation, of a wave. *See, e.g.*, IBM Dictionary of Computing (RX-1643 at 3) ("A graphical representation of the shape of a wave . . ."); Illustrated Dictionary of Electronics (RX-1645 at 3) ("The shape of a wave. . ."); McGraw-Hill Electronics Dictionary (RX-1647 at 3) ("The shape of a wave"); Newton's Telecom Dictionary (RX-1650 at 3) ("The characteristic shape of a signal"); and Wiley Electrical and Electronics Engineering Dictionary (RX-1662 at 3) ("The shape, or a graphical representation of such a shape, of a wave"). Dynamics' witnesses agreed that "waveform" means "waveshape." Tr. (Workley) at 57:16-21 ("Q. The word 'waveform' means waveshape, correct? A. That would be a definition of it, yes. Q. Well, that's how you used it at your deposition when I asked you how you could tell a waveform and you said look at the waveshape, right? A. Yes."); Tr. (Zatkovich) at 190:5-7 ("Q. So a synonym of waveform is waveshape, right? A. I would not disagree with that."). Next, the specification discloses that an analog waveform is a continuous wave shape as shown in Figures 4-6:


402
ACCOUNT SELECTION
404
DIGITAL WAVEFORM RETRIEVED FROM MEMORY
406
ANALOG WAVEFORM GENERATED
410
408
"0"
"0"
"0"
"0"
"1"
"0"
"1"
412
400


502
ACCOUNT SELECTION
504
TEMPERATURE DETECTED
506
DIGITAL WAVEFORM RETRIEVED FROM MEMORY
508
ANALOG WAVEFORM GENERATED
512
510
514
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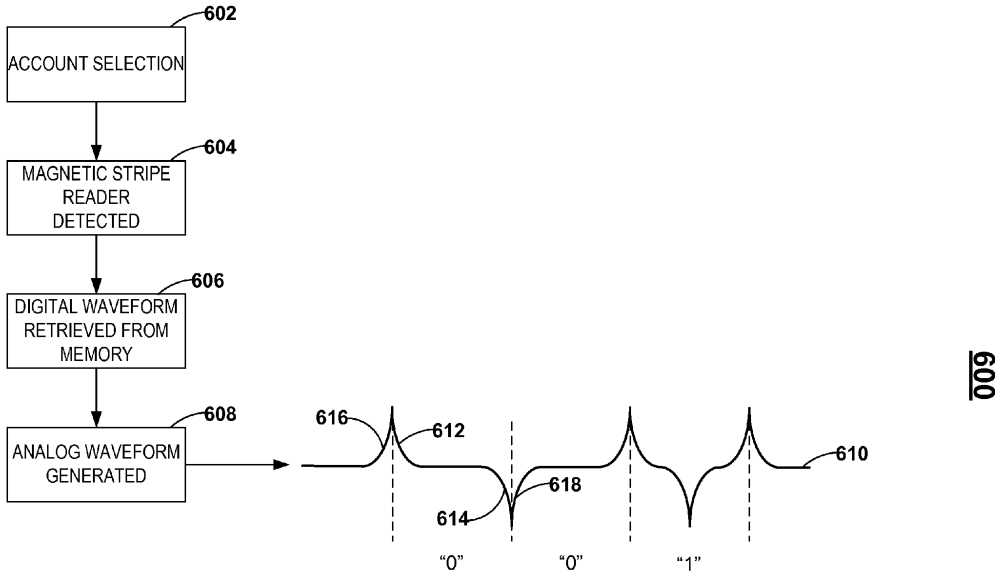
"1"
"0"
"1"
500




The patent disclosure is consistent with the technical literature that teach that an analog wave shape is a continuous wave shape. *See, e.g.*, RX-1665 at 5 (Putman textbook explaining that "[t]he term 'analog' refers to a waveform whose amplitude changes in a continuous fashion."); RX-1654 at 5 (Smillie textbook explaining that "[a]n analog signal is defined as a continuous waveform having positive peak and a negative peak and having an infinite range of levels."). Indeed, no one disputes this intrinsic evidence confirmed by the extrinsic evidence. Yet, Samsung urges the Commission to exclude real-world square waveforms from the scope of the construction because it contends that the wave shape of a square wave is a digital waveform having a discretely changing amplitude rather than an analog waveform having a continuously changing one. The Commission agrees with the ID that the term "analog waveform" includes real-world square waveforms.

The ID noted Samsung's argument that, under its proposed construction, a square wave is a wave comprised of discrete states, akin to a digital wave and not an analog wave. ID at 39. The ID agreed that "a signal that consists purely of discrete amplitudes would likely not qualify

as analog in the context of the '153 patent," and went on to observe that "it is not clear how Samsung's proposed construction encompasses the one waveform illustrated in the Figures—what one skilled in the art apparently would know as a 'Lorentz waveform' (*see* CX-0155C.0025)—while excluding real-world square waves." *Id.*

To ascertain the meaning of an analog waveform, the ALJ examined the specification. Specifically, the ALJ focused upon waveform 408 depicted in Figure 4 (shown above), which is indisputably an analog waveform. ID at 38 (reproducing '153 patent, Fig. 4 and additionally citing Figs. 5, 6, 12:46-61; CIB at 25; RIB at 17). The ALJ found that "[t]he Lorentz waveform has an amplitude of zero for most of its length, but is nonetheless continuous and has transitions." *Id.* (citing '153 patent at Fig. 4 (waveform 408)). The ALJ stated that the 1 and 0 annotations indicate that the information in the signal is conveyed in a binary, not a non-binary, manner and that "consistent with the preferred embodiment (the F2F encoding scheme), signal level transitions are the mechanism by which the information is conveyed." *Id.* (citing CIB at 24-27; CRB at 4; '153 patent at 10:36-40 ("The magnetic stripe message may, for example, be encoded (e.g., F2F encoded) such that a logic "1" may be encoded as a transition within any bit period and a logic "0" may be encoded as a lack of a data transition within any bit period.")). Further, the ID notes that the transitions "are inherently continuous and require periodic verticality in the wave shape." *Id.*

Moreover, the ID evaluated the disclosures of the specification relating to Figure 4 and found that this embodiment appears to disclose a square wave as an example of an analog waveform. ID at 39-40. The ID quotes from the specification as follows:

> In step 406, the magnetic stripe message may be converted from a digital format to an analog format to produce waveform 408. In particular, a DAC may be used to convert each digital symbol into an analog signal (e.g., a current signal having a magnitude that is proportional to a digital value of the digital symbol and a

> polarity as defined by a sign bit of the digital symbol). Each digital symbol may be converted to its analog equivalent at a rate that may be defined by a frequency of a clock signal that is provided to the DAC.

*Id.* (quoting '153 patent at 12:59-67). The ALJ explained that "the description of that analog signal apparently corresponds to a square wave, with time on the x-axis and the magnitude of the current on the y-axis, and where the magnitude of the current is 'proportional to a digital value of the digital symbol,' that is, except for transitions it is either at its maximum or at zero, assuming the 'digital symbol' is either one or zero." ID at 40.

The ALJ explained that "any real-world square wave may have an amplitude at either the maximum or minimum for most of its length, but it is still continuous and has transitions, that is, its amplitude passes through zero and every intervening value between maximum and minimum. And, again, any square wave which would be operative to encode magnetic stripe data using the F2F protocol necessarily would be a real-world, continuous square wave possessing transitions." *Id.*

The Commission agrees with the ALJ, and notes that the ALJ implicitly found that Samsung's proposed construction of "a wave shape whose amplitude changes in a continuous fashion" includes real-world square waveforms based on the disclosures in the specification in Figure 4 and as explained in column 12. As the ALJ observed, "under Samsung's proposed construction, there appears to be no principled distinction between the admittedly analog Lorentz waveform and a square wave." ID at 39. Accordingly, the Commission adopts Samsung's proposed construction and construes "analog waveform" to mean "a wave shape whose amplitude changes in a continuous fashion" with the clarification that the construction includes real-world square waveforms.

### *2. Infringement of Claims 1 and 7*

#### *a) Legal Standard*

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995), *aff'd,* 517 U.S. 370 (1996). A patentee must prove infringement by a preponderance of the evidence, which "requires proving that infringement was more likely than not to have occurred." *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

#### *b) Analysis: "Analog Waveform"*

For infringement, the ID found that "[t]he parties' dispute over 'analog waveform' in the infringement context is straightforward to resolve, notwithstanding Dynamics' lack of argument on the point, because it is undisputed that the Accused Products employ a square wave." ID at 51. The ID observed that "Samsung touts the evidence that they employ a square wave and that '[i]t stands to reason, however, that Samsung would not have taken such a position had the parties raised 'analog waveform' as a disputed claim in the *Markman* process." *Id.* The ID found that "[r]egardless, 'a waveform generator operable to generate said analog waveform' has been shown in the Accused Products." *Id.*

Samsung argues that its accused products do not meet the limitation under its claim construction because its products "do not generate or communicate a wave shape whose amplitude changes in continuous fashion." Samsung Sub. at 6. Samsung explains that the wave form in its products "undisputedly varies between two and only two amplitudes: [[

]] and argues that, as such, its "MST square wave has a discretely changing amplitude, not a continuously changing one." *Id.* at 6-7.

Dynamics asserts that Samsung's accused products employ a real-world square wave that meets the "analog waveform" limitation and that "Samsung's own witnesses – Dr. Apsel and Woosup Lee – have consistently testified that Samsung's Accused Products communicate a real-world square wave to a magnetic stripe card reader." Dynamics Sub. at 6-7 (citing RX-1675C (Apsel) at Q/A 270, 296; RX-1670C (Lee) at Q/A 1-7, 22-24, 17). According to Dynamics, "[i]n addition to expressly referring to the output of the MST antenna as a 'square wave,' Samsung's witnesses further note that this 'square wave' exists in the real world, and thus includes the qualities of a real-world square wave, including continuity (*i.e.*, no immediate change between values), rise times, and fall times." *Id.* at 7.

The Commission affirms and adopts the ID's infringement findings because the ID applies a claim construction that embraces real-world square waves as having analog waveforms, and compares that construction to the waveforms generated by the Samsung products. Specifically, the ID credited the evidence that "Samsung's technical documentation shows [[

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ID at 50 (citing RX-121C at 9). In explaining the infringement finding, the ID observed that "the Accused Products operate in essentially the same way as one of the embodiments disclosed in the 153 patent." *Id.* (citing '153 patent at 12:59-67). That is, the oscilloscope reading from the Samsung product shows [[

]].

Samsung's primary argument on this point is that "the amplitude of its MST square wave does not change continuously as required by Samsung's construction, but discretely." Samsung Sub. at 8. Samsung relies on the testimony of its engineer, Woosup Lee, and its expert, Dr. Apsel, that the accused MST IC is a motor controller that uses two and only two discrete states, high or low, corresponding to forward and reverse and that the MST IC "***only has two outputs***, [[

]]." *Id.* at 7-8. Samsung also points to the testimony of Dynamics' expert, Mr. Zatkovich, who admitted that the amplitude of the accused

products changes discretely in the Samsung square wave. Tr. (Zatkovich) at 325:5-8; 207:16-24 (the MST square wave "has ***two discrete*** levels, high and low, and alternates between them")." *Id.* at 8. However, as Dynamics argued, Samsung's expert, "Dr. Apsel admitted, despite her opinion that a digital waveform must be discontinuous, in the real world, to call a square wave digital is a misnomer, because there is no such thing as a discontinuous real-world square wave." Dynamics Sub. at 8-9 (comparing RX-1675C (Apsel) at Q/A 290 ("Q290. What is the shape of a digital waveform? A290. It will be discontinuous with discrete levels, like a square wave."), with RDX-1101 and RX-1675C (Apsel) at Q/A 294 ("[W]hile idealized digital waveforms are drawn with instantaneous transitions, in reality the transition from one discrete amplitude value to another takes some non-zero amount of time.")).

Samsung also argues that "the distinction between a digital waveform like Samsung's MST square wave, and an analog waveform under Samsung's construction, is not whether the shape of the wave in a vacuum is continuous or discontinuous, but whether the ***amplitude changes*** continuously or discretely." Samsung Sub. at 9 (emphasis by Samsung). Samsung then alleges that its expert, Dr. Apsel, testified that "rise and fall times ***do not represent signal amplitudes***, but represent the amount of time the square wave needs to transition from one discrete amplitude to another." *Id.* (citing RX-1675C (Apsel) at Q/A 294). In Q/A 294, Dr. Apsel testified:

> Q294. Do digital waveforms have instantaneous transitions between their discrete levels?
>
> A294. As I explained at my deposition, while idealized digital waveforms are drawn with instantaneous transitions, in reality ***the transition from one discrete amplitude value to another takes some non-zero amount of time***, referred to as the rise time or fall time, depending on which edge of the pulse you're looking at.

RX-1675C (Apsel) at Q/A 294 (emphasis by Samsung). Dr. Apsel's testimony that Samsung cites, however, belies Samsung's argument. Dr. Apsel testified that "the transition from one discrete amplitude value to another takes some non-zero amount of time," and the Commission finds that during that non-zero amount of time (*e.g.*, the rise and fall times), the amplitude is changing continuously. RX-121C at 9 (Fig. 6 (reproduced above)).

Samsung argues that "[i]t is unclear precisely what the ID means by 'real-world square wave,' but the ID's infringement finding is contrary to the intrinsic record," pointing out that "the admitted prior art including the Poidomani reference [indicate that] a square wave like Samsung's MST square wave is a digital waveform." Samsung Sub. at 10 (citing RX-1675C (Apsel) at Q/A 312; CX-1204C (Zatkovich) at Q/A 39). The Commission finds this argument unpersuasive because the term "real-world square wave" as used in the ID is readily understandable to a person of ordinary skill in the art. The ID specifically stated that Samsung's technical documentation shows [[

]]. ID at 50. In other words, a real-world square wave results in a Lorentz waveform as disclosed in the '153 patent. The Commission finds that Samsung's reliance on the Poidomani reference for evidentiary support of non-infringement is untenable because while Poidomani may be relevant for claim construction, it has little relevance for assessing infringement. *See Tate Access Floors, Inc. v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1365 (Fed. Cir. 2002) ("there is no 'practicing the prior art' defense to literal infringement").

The ID did not err in finding that '"a waveform generator operable to generate said analog waveform' has been shown in the Accused Products." *Id.* The oscilloscope reading of

Samsung's accused products (RX-121C at 9 (Fig. 6)) shows a real-world square wave resulting in a Lorentz-type analog waveform, which is within the scope of the asserted claims.

The Commission is also unpersuaded by Samsung's argument that "there can be no infringement because the Samsung MST products do not have the related 'waveform generator' of claim 1." Samsung Sub. at 12. According to Samsung, if its "MST square wave that is output from the MST IC is a 'real-world square wave' within the meaning of the ID and therefore an analog waveform, then so is the input to the MST IC" and as such, "the MST IC would be converting an analog representation—not a digital representation as required by Claim 1—to an analog waveform." *Id.* at 12-13. The Commission finds this argument meritless. *See* ID at 50-56. The ID appropriately credited Dynamics' argument that "certain [[ ]] of data communicated by MST [[ ]] and that [[

]] ID at 51-52 (citing RX-1674C (Goldberg) at Q/A 24, 28, 36-38, 43-50; RX-1675C (Apsel) at Q/A 330, 347-348; RX-1486; CX-1199C (Zatkovich) at Q/A 73-74, 88; Hr'g Tr. at 497:7-498:18, 505:13-506:1; RX-1673C (Choe) at Q/A 7, 35-36). As Dynamics explains, [[

]] Dynamics Reply at 10 (citing Samsung Sub. at 13; RX-1675C (Apsel) at Q/A 80 ([[ ]]), Q/A 316 ([[

]])). Dynamics further explains that [[

]] and [[ ]] *Id.* (citing CX-1199C (Zatkovich) at Q/A 88; RX-1684C (Prasad) at Q/A 64; RX-1674C (Goldberg) at Q/A 46). Dynamics also explains that [[

]] *Id.* (citing CX-1199C (Zatkovich) at Q/A 88; RX-1684C (Prasad) at Q/A 64; RX-1674C (Goldberg) at Q/A 46). The Commission agrees with Dynamics' analysis on this point.

Accordingly, the Commission affirms the ALJ's finding that "the Accused Products meet the limitation 'wherein said device is operable to retrieve said digital representation from a plurality of digital representations of said at least one track of magnetic stripe data' along with 'analog waveform."' ID at 56. The ID found that all other limitations of claims 1 and 7 were satisfied, and therefore, the Commission affirms the ID's finding that Samsung's accused products infringe claims 1 and 7 of the '153 patent.

### *3. Technical Prong of the Domestic Industry Requirement*

#### *a) Legal Standard*

In a patent-based section 337 investigation, a complainant is required to show that an industry in the United States relating to the articles protected by the patent exists or is in the process of being established. 19 U.S.C. § 1337(a)(2). Under Commission precedent, this domestic industry ("DI") requirement has been divided into (i) a "technical prong" (which requires articles that practice the asserted patent) and (ii) an "economic prong" (which requires certain levels of investments and qualifying activities with respect to the articles protected by the patent, and under section 337(a)(3)(C), having a nexus to the patent itself). *See, e.g.*, *Certain Video Game Systems and Controllers*, Inv. No. 337-TA-743, Comm'n Op. at 6-7 (Apr. 14,

2011). To satisfy the technical prong, a complainant must show that its products practice the asserted patents. *See Crocs, Inc v. Int'l Trade Comm'n*, 598 F.3d 1294, 1306-07 (Fed. Cir. 2010) (discussing 19 U.S.C. § 1337(a)(2)). The test for claim coverage for the purposes of the technical prong is the same as that for infringement. *Id.* (citing *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003)).

***b) Analysis: "Analog Waveform"***

The ID found that, as with infringement, "Dynamics has only argued the waveform is 'analog' under Dynamics' construction—such that, if the construction is not adopted, Dynamics has failed to carry its burden." *Id.* at 61. The ID observed that it rejected Dynamics' argument and that "Dynamics offers no theory for why any waveforms generated and communicated in the DI Products are 'analog' apart from its erroneous construction involving frequency encoding." *Id.* The ID found that "[i]n contrast to infringement, where the record was clear and undisputed, for domestic industry technical prong Dynamics offers only evidence consistent with its erroneous claim construction proposal" and that Dynamics "points to no evidence in its post-hearing briefs regarding the shape of any alleged waveforms" with respect to its DI products and "'does not cite any evidence of what the waveform in the alleged DI products looks like.'" *Id.* (quoting RX-1675C (Apsel) at Q/A 358). Thus, the ID found that Dynamics failed to establish the technical prong.

The Commission has determined to affirm the ID's finding that Dynamics failed to adduce sufficient evidence to establish that its DI products meet the "analog waveform" limitation. Unlike infringement, where the adduced evidence shows that Samsung's accused products transmit a real-world square wave having an analog waveform, Dynamics has submitted no evidence to show that its accused products generate or communicate an analog

waveform. And this lack of evidence is of Dynamics' own making. Indeed, Dynamics was well aware of Samsung's proposed construction, and while Samsung sought to exclude real-world square waves from that construction, nothing prevented Dynamics from presenting a domestic industry theory based upon Samsung's proposed construction. Dynamics, however, concentrated all its efforts in attempting to show both infringement and technical prong of DI under its proposed construction, *i.e.*, "a waveform that conveys information in a non-binary manner." The ALJ rejected Dynamics' construction and largely adopted the construction proposed by Samsung. Thus, as the ALJ found, the record does not contain enough evidence to conclude that the DI products practice the '153 patent.

Dynamics relies heavily on "early oscilloscope readings shown in Dynamics' Chief Engineer James Workley's History of Card Technical Development" (reproduced below) and contends that the graph is "representative of the output of all DI products, as Mr. Workley testified." Dynamics Sub. at 13-14 (citing RX-42C (Workley Dep.) at 218:2-25).[9]

[9] Although Mr. Workley submitted a witness statement and testified at the hearing, Dynamics failed to elicit testimony sufficiently explaining how its DI products operate during either of these opportunities. *See generally* CX-1198C (Workley WS); Tr. (Workley) 30–102.

[[

]]

CX-155C (the "History" document) at 26. The ALJ, however, considered this evidence and appropriately found it insufficient. ID at 62. Specifically, the ID noted that "[t]he author of the document in which this figure and explanation appear, Mr. Workley, testified at his deposition that the 'input to the wave-shaping circuit' is 'digital,' and that after wave-shaping the signal is 'analogue,' and further agreed that the wave-shaping circuit [[

]] *Id.* (quoting RX-42C at 32:4-21). The ALJ, however, found that "[m]ore context is needed to fully understand this evidence." *Id.* The Commission agrees with the ALJ.

Moreover, it is unclear whether this evidence actually reflects the design of any of the alleged DI products at issue here. The History document states that "[t]he picture below show[s] the oscilloscope waveforms for our first circuit that controlled the wave shape driving the coil." CX-155C at 25-26. Dynamics points to Mr. Workley's deposition testimony that "these early designs were implemented into the DI products, which involve the same functionality, albeit with different versions of the same parts (*i.e.*, the DI products may use a different [[ ]] from the early designs, but those [[ ]] provide the same functionality in the same way the prior versions

did)" and that "the [[ ]] described in CX-0013C employ the same process for communicating with a read head that the current DI products employ." Dynamics Sub. at 14 (citing RX-42C (Workley Dep.) at 218:2-25). Dynamics, however, admits that "the DI products may use a different [[ ]] from the early designs," and the Commission finds that there is no evidence, besides Mr. Workley's unsupported deposition testimony, that the actual [[ ]] used by Dynamics "provide the same functionality in the same way the prior versions did" and meet the claim limitation. For instance, while Mr. Workley testified that "the circuitry is very much the same," he admitted that "[i]t may have been modified slightly." RX-42C (Workley Dep.) at 218:21-25. As Samsung argues, "[t]here is no evidence that the [[

]], uses the same design as this breadboard," and "[e]ven if the designs were the same, the 'History' document does not provide sufficient details on how the amplitude of the output waveform changes." Samsung Reply at 15.

To carry its burden, Dynamics should have produced evidence and analysis of a current DI product. For example, an oscilloscope reading from a current DI product, like the reading from the "Historical" document, would have sufficed to show the shape of the waveform. Yet, the record does not contain such evidence. Dynamics argues that "[s]imilar to the oscilloscope readings from 2015 that Samsung admits are representative of the output of all Accused Products . . . early oscilloscope readings shown in Dynamics' Chief Engineer James Workley's History of Card Technical Development are representative of the output of all DI products, as Mr. Workley testified." Dynamics Sub. at 13. However, unlike the oscilloscope readings from Samsung's accused products from 2015, Dynamics has not shown that the reading from the Dynamics' History document depicts its current products. Indeed, while the evidence presented by

Dynamics is heavily contested, no one disputes the oscilloscope evidence of Samsung's accused products.

In sum, the Commission finds that the ID did not err in finding that Dynamics failed to show that its DI products practice the '153 patent.

#### *4. Obviousness of Claims 1 and 7 – Gutman in View of Shoemaker*

##### *a) Legal Standard*

"Obviousness is a question of law based on underlying questions of fact." *Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V.*, 528 F.3d 1365, 1379 (Fed. Cir. 2008). The underlying factual determinations include the so-called "Graham factors": "(1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art, and (4) objective indicia of non-obviousness." *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). The Supreme Court has held that the critical inquiry in determining the differences between the claimed invention and the prior art is whether there is a reason to combine the prior art references. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-21 (2007). In so holding, the Court rejected the Federal Circuit's rigid teaching-suggestion-motivation test. *Id.* While the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does," it described a more flexible analysis:

> Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue . . . . As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

*Id.* at 418. In turn, the Federal Circuit has held that where a patent challenger contends that a patent is invalid for obviousness based on a combination of prior art references, "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device . . . and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007); *see KSR*, 550 U.S. at 399. An obviousness determination should also include a consideration of "secondary considerations," if evidence is presented in the case as to "commercial success, long felt but unsolved needs, failure of others, etc., which might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *Graham*, 338 U.S. at 17-18; *see Merck & Cie v. Gnosis S.P.A.*, 808 F.3d 829, 837 (Fed. Cir. 2015).

***b) Analysis***

As noted above, the Commission determined to review the ID's finding that the combination of Gutman and Shoemaker fails to render the asserted claims of the '153 patent obvious. In its notice of review, the Commission asked the parties the following questions:

> Given Gutman's disclosure that "communication of data by the card of the current invention is independent of movement of the card or placement of the card within the magnetic card reader" (Gutman at col.17 ll.10-13), please explain why or why not one of ordinary skill would be motivated to combine Shoemaker with Gutman.
>
> While Gutman states that "no 'swiping' movement is necessary," the disclosure "allows users to perform the familiar 'swiping' movement while using the card 200 of the present invention for users that have become accustomed to the 'swiping' movement of the card 106." Gutman at col.16 l.66 - col.17 l.4. Please discuss the legal significance of this disclosure to an obviousness inquiry in light of Samsung's proposal to combine Gutman with Shoemaker to solve the so-called directionality problem associated with "swiping."

86 Fed. Reg. 27652-53 (May 21, 2021).

The ID found that Samsung failed to show that a combination of Gutman and Shoemaker would have rendered asserted claims 1 and 7 of the '153 patent obvious to a person of ordinary skill in the art at the time of the invention. ID at 69. The ID noted Samsung's argument that Gutman discloses all limitations in claim 1 except for the "plurality of digital representations" limitation (*e.g.*, multiple representations of the same track data) and that Shoemaker supplies this subject matter by disclosing "use of forward and reverse representations of tracks." *Id.* at 65 (citing Shoemaker at 14:65-15:6; RX-1677C (Lipoff) at Q/A 484).

The ID found that "Samsung's proposed combination is not persuasive, particularly in view of the differences between the claimed invention and the prior art." ID at 66 (citing *Scanner Techs.*, 528 F.3d at 1379). Specifically, the ID stated that "it is not clear that Gutman would benefit from swipe sensors that trigger packaging or preparing track data in forward and reverse directions (*i.e.*, the imported feature of Shoemaker)" because "Gutman discloses its invention as functioning independent of the swiping motion of traditional payments cards." *Id.* Thus, the ID concluded that "while Gutman's invention 'may still be 'swiped,' the disclosure is clear—'no 'swiping' movement is necessary' because 'communication of data by the card of the current invention is independent of movement of the card or placement of the card within the magnetic card reader.'" *Id.* at 67-68 (citing Gutman (RX-877) at 16:64-17:13). Next, the ID found that "even if Gutman were in some way to benefit from Shoemaker's ability to detect swiping direction, Samsung admits that Shoemaker does not disclose storing forward and reverse

track data representations in memory." ID at 68.[10] Finally, the ID observed that Dynamics offers no evidence of secondary considerations of non-obviousness. *Id.*

Samsung argues that one of ordinary skill in the art would have been motivated to use Shoemaker's multiple representations in Gutman's card despite Gutman's disclosure that "communication of data by the card of the current invention is independent of movement of the card or placement of the card within the magnetic card reader." Samsung Sub. at 25 (citing Gutman at 17:10-13). As Samsung explains, "Shoemaker recognized in 2006—nine years after Gutman but nearly five years before the date of the alleged invention—that certain card readers will only process magnetic stripe track data if it is presented in the order that the card reader expects (forward or reverse), and will fail to process data presented in the wrong direction" and that "motivation to combine is to be evaluated as of the time of the alleged invention—2011—and not earlier." *Id.* at 26 (citing *KSR*, 550 U.S. at 420 ("Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed."); *Boston Scientific SciMed, Inc. v. Iancu*, 811 F. App'x 618, 624 (Fed. Cir. 2020) (finding motivation to combine because relevant problem was well-known prior to the priority date of patent-in-suit)).

According to Samsung, "[t]o address this problem, Shoemaker teaches using sensors to detect the direction in which its card is swiped, and formatting the data accordingly." *Id.* Samsung contends that an ordinarily skilled artisan "would have been motivated to incorporate Shoemaker's swipe direction dependent forward and reverse tracks in Gutman's device to permit

[10] Rather, Samsung argued that "such memory storage (as opposed to on-the-fly creation) would have further been obvious to one of ordinary skill in the art." *Id.* (RX-1677C (Lipoff) at 458-459, 486).

Gutman's magnetic emulator to work in all types of card readers, including those that require track data to be presented in an order that is consistent with the direction in which cards are swiped." *Id.* at 27 (citing Tr. (Lipoff) at 711:14-712:6; RX-1677C (Lipoff) at Q/A 486). Samsung argues that "[i]mplementing this functionality in Gutman's device is 'the mere application of a known technique to a piece of prior art ready for the improvement.'" *Id.* (citing *KSR*, 550 U.S. at 417).

Dynamics responds that "[o]ne of ordinary skill in the art would not have been motivated to combine Shoemaker with Gutman." Dynamics Sub at 27. Dynamics explains that "Samsung's proposed combination relies entirely on a supposed directionality problem associated with swiping" but that "Gutman, however, has nothing to do with the alleged directionality problem because data is transmitted from Gutman's device to the read head as soon as Gutman's device is inserted into the trough of the magnetic stripe card reader." *Id.* (citing Gutman at 17:4-10 ("Additionally, since the conductor 204 runs substantially the width of the card, the placement of the card along the 'swipe' direction in the magnetic card reader is not critical for operation with the magnetic card reader 100 as long as a portion of the length of the card is inserted in the slotted portion 104 of the magnetic card reader 100.")). Thus, according to Dynamics, "swiping Gutman through a magnetic stripe card reader has no effect on Gutman's operation nor on the operation of the magnetic stripe reader, other than potential wear and tear damage to Gutman's device and the card reader, which is one of the reasons why Gutman expressly warns against swiping." *Id.*

The Commission has determined to reverse the ID's finding. A review of the entirety of Gutman and Shoemaker makes clear that an ordinarily skilled artisan would have been motivated to combine them, and their combination would have rendered the asserted claims of the '153

obvious to a person of ordinary skill in the art at the time of the invention. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1093-94 (Fed. Cir. 1985) ("The well established rule of law is that each prior art reference must be evaluated in its entirety, and that all of the prior art must be evaluated as a whole."), *vacated on other grounds*, 475 U.S. 809 (1986); *see also In re Wesslau*, 353 F.2d 238, 241 (C.C.P.A. 1965) ("It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art."). As noted above, the ID gave two main reasons for finding that an ordinarily skilled artisan would not be motivated to combine the references. First, the ID found that because "Gutman discloses its invention as functioning independent of the swiping motion of traditional payments cards," "it is not clear that Gutman would benefit from swipe sensors that trigger packaging or preparing track data in forward and reverse directions (*i.e.*, the imported feature of Shoemaker)." ID at 65. Second, the ID found that "even if Gutman were in some way to benefit from Shoemaker's ability to detect swiping direction, Samsung admits that Shoemaker does not disclose storing forward and reverse track data representations in memory" but discloses on-the-fly creation. ID at 68.

With respect to the ID's first reason, the Commission finds that, while the focus of Gutman is a device that functions independently of the swiping motion of traditional payments cards, the section of Gutman upon which Samsung relied specifically states that "since the conductor 204, in the preferred embodiment, runs substantially the width 201 of the card, the card of the present invention may still be 'swiped' through a magnetic card reader" and that "[t]his allows users to perform the familiar 'swiping' movement while using the card 200 of the present invention for users that have become accustomed to the 'swiping' movement of the card

106." Gutman at 16:64-17:3. Thus, this is not a situation where the disclosure teaches away from swiping. *See DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) ("A reference does not teach away, however, if it merely expresses a general preference for an alternative invention but does not 'criticize, discredit, or otherwise discourage' investigation into the invention claimed."). Rather, the disclosure specifically discloses swiping for "individuals that have become accustomed to the 'swiping' movement of the card." Gutman at 16:64-17:3. Indeed, Gutman is specifically designed to accommodate swiping and states that "the conductor 204, in the preferred embodiment, runs substantially the width 201 of the card." Gutman at 17:64-66, FIG. 2.

Dynamics contends that "Gutman discourages swiping entirely in order to prevent damage to the card and the card readers." Dynamics Sub. at 37. For support, Dynamics cites the following from Gutman: "First, cards 106 tend to wear out and become unreliable after repeated use. For example, the magnetic material of the magnetic stripe 110 is subject to physical damage from external hazards, degradation of its magnetic qualities over time, and it can be affected by external magnetic fields." *Id.* at 34 (citing Gutman at 2:9-13). However, as Samsung notes, and the Commission agrees, "Gutman's solution to this problem was not to eliminate swiping, but to use a magnetic emulator below the surface of Gutman's card that could be damaged during swiping." Samsung Sub. at 35. The relevant portion of Gutman provides:

> the card 400 comprising the conductor 408 is a much more durable and reliable medium for initiating transactions with the magnetic card reader 100. With the invention, there are no problems with losing magnetic quality of the magnetic stripe 110 on a card 106 (see FIG. 1). The conductor 408 can be embedded deeply into the card 400 thereby protecting the conductor 408 from the external elements and physical damage. On the other hand, the conventional magnetic stripe 110 typically resides near the outer surface of the conventional magnetic stripe card and can be very susceptible to physical damage or external hazards."

Gutman at 11:20-30. Thus, even though Gutman expresses a preference for not swiping, Gutman does not teach away from swiping. *See DePuy Spine*, 567 F.3d at 1327. Rather, Gutman expressly teaches swiping for "individuals that have become accustomed to the 'swiping' movement of the card" and provides a "more durable and reliable medium" for doing so. Gutman at 16:64-17:3; 11:20-30.

Regarding the ID's second reason ("Shoemaker does not disclose storing forward and reverse track data representations in memory"), while Shoemaker discloses on-the-fly creation and does not disclose storing forward and reverse track data representations in memory, as Samsung notes, Gutman is a memory-based system that discloses storage of data in memory. RX-1677C (Lipoff) at Q/A 489; Gutman at 10:25-34, 11:4-13, 12:1-5, 14:16-24, 15:23-35). It would have been a routine step for a person of ordinary skill in the art to store Shoemaker's forward and reverse track data representations in Gutman's memory. *See* RX-1677C (Lipoff) at Q/A 458-459, 485-486; *B/E Aerospace, Inc. v. C&D Zodiac, Inc.*, 962 F.3d 1373, 1379-80 (Fed. Cir. 2020). Accordingly, the Commission finds that this limitation is disclosed.

In sum, there appears to be no dispute that Gutman discloses all of the limitations in claim 1 except for storing multiple representations of the same track data ("a plurality of digital representations of said at least one track of magnetic stripe data."). ID at 65. There is also no dispute that both Gutman and Shoemaker disclose payment cards using magnetic emulators. There is also no credible dispute that Shoemaker discloses the use of multiple representations of the same magnetic stripe track, specifically in the form of forward and reverse versions of the track, where the direction of the transmitted track is based on a detected swipe direction. Shoemaker (RX-0884) at 14:54-15:6. The only dispute is whether one of ordinary skill would be motivated to combine the references. In our view, such motivation exists.

Shoemaker recognized that for certain card readers, the data must be presented in a specific direction in order for the data to be read, and thus discloses multiple representations of the same magnetic stripe track, "specifically in the form of forward and reverse versions of the track, where the direction of the transmitted track is based on a detected swipe direction." Shoemaker at 14:54-15:6; Samsung Pet. at 32. Samsung's expert, Mr. Lipoff, testified that an ordinarily skilled artisan "would have been motivated in 2011 to incorporate Shoemaker's forward and reverse tracks into Gutman to permit Gutman's magnetic emulator to work in all types of card readers, whether they require forward tracks or reverse tracks." RX-1677C (Lipoff) at Q/A 458-459, 484-489. Mr. Lipoff explained that one of ordinary skill "looking at Gutman through the lens of Shoemaker would have been motivated to implement Shoemaker's forward/reverse tracks by storing them in Gutman's device (Gutman is already a memory-based architecture) because, without it, Gutman's device would generate an error if it were used in a reader that expected the track data to be in the opposite direction to that stored in Gutman's memory." RX-1677C (Lipoff) at Q/A 459, 486; Samsung Pet. at 32.[11] Further, Mr. Lipoff testified that implementing Shoemaker's forward/reverse track scheme in Gutman would have been "well within the skill of a POSITA[.]" RX-1677C (Lipoff) at Q/A 485; *KSR*, 550 U.S. at 427 (finding obviousness where the combination was "within the grasp of a person of ordinary skill in the relevant art"). Thus, an ordinarily skilled artisan would understand that Shoemaker's forward and reverse track data representations would be stored in the Gutman device's memory. RX-1677C (Lipoff) at Q/A 459, 486.

[11] We note that Dynamics' expert Mr. Zatkovich did not address or rebut Mr. Lipoff's testimony set out in this paragraph.

Gutman's statement that "no 'swiping' movement is necessary" because "communication of data by the card of the current invention is independent of movement of the card or placement of the card within the magnetic card reader" does not compel otherwise. Gutman at 16:64-17:13; ID at 67-68. As Samsung observes, "Shoemaker expressly and specifically disclosed implementing swipe-direction functionality in an embodiment that does not require swiping," demonstrating that Gutman's statement that "no 'swiping' movement is necessary" would not deter one of ordinary skill to combine the references. Samsung Sub. at 32 (citing Shoemaker at 8:47-51). Specifically, Samsung points to Shoemaker's description of "an embodiment that communicates 'a time-varying serial data stream' and so does not need to be swiped in order to communicate with a magnetic stripe reader: 'Since data values in the serial data stream vary as a function of time and not as a function of the swiping speed, ***the data pattern can be reliably provided even if the swiping velocity is zero*** or if the swiping velocity is erratic.'" *Id.* at 32 (citing Shoemaker at 8:47-51) (emphasis by Samsung).

Dynamics does not dispute this. Rather, Dynamics makes two arguments in response. First, Dynamics argues that Samsung makes this argument for the first time in its response to the Commission's question and asks the Commission to reject it as untimely. Second, Dynamics argues that "the Commission should . . . note that the embodiment Samsung relies on is shown in FIG. 7, and that Shoemaker states 'the data pattern can be reliably provided even if the swipe speed is zero' – a situation in which there is NO swipe direction" and that "that embodiment of Shoemaker appears virtually identical to Gutman because the swipe sensor is not mentioned, and, therefore, swipe direction cannot be determined." Dynamics Reply at 18 (citing Shoemaker at 8:47-50). Dynamics states that "Shoemaker's swipe direction detector embodiments, on the

other hand, are described in connection with FIG. 13 and require swipe movement in order to determine swipe direction." *Id.* (citing Shoemaker at 12:30-33 (see step 1302)).

Regarding the first argument, Dynamics is correct that Samsung makes this argument for the first time in its submission. However, Federal Circuit precedent makes clear that the obviousness inquiry requires that "each prior art reference must be evaluated in its entirety." *Panduit*, 774 F.2d at 1093-94. Thus, it would be error for the Commission to ignore Shoemaker's disclosure of implementing swipe-direction functionality in an embodiment that does not require swiping and thereby fail to evaluate the entirety of the Gutman and Shoemaker references.

Dynamics' second argument is also unpersuasive. Dynamics does not appear to dispute the understanding of the disclosure cited by Samsung, *i.e.*, that Shoemaker discloses an embodiment where there is no swiping. Dynamics states that the embodiment Samsung relies on is shown in Fig. 7, and that Shoemaker states "the data pattern can be reliably provided even if the swipe speed is zero' – a situation in which there is NO swipe direction" akin to Gutman. *See* Dynamics Reply at 18. Dynamics then states that Shoemaker's swipe direction detectors are disclosed in Fig. 13 and require swipe movement in order to determine swipe direction. *Id.* Shoemaker, however, claims an invention (claim 21)[12] that includes both the embodiments of

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[12] Claim 21 recites:

An active card compatible with a card reader, said card reader representing one of a card reader that is configured to read statically implemented magnetic stripe cards and a bar code reader that is configured to read statically printed bar codes, said active card being configured to exchange data with said card reader, comprising:
a card base;

dynamically reconfigurable data providing means attached to said card base, said dynamically reconfigurable data providing means being configured to provide said card reader a first data

Figs. 7 and 13. Using Dynamics' own understanding, Shoemaker in claim 21 recites a limitation "virtually identical to Gutman" as well as a "swiping" limitation, combining those two embodiments. Thus, Dynamics' argument that Samsung relies upon the wrong embodiment of Shoemaker ignores the disclosure of claim 21 which combines the embodiments of both Figures 7 and 13.

The Commission finds that the ID erred in concluding that an ordinarily skilled artisan would have had no motivation to include Shoemaker's forward and reverse tracks in Gutman's magnetic emulation card. And while Shoemaker teaches dynamically creating tracks because of potential fraud issues (Shoemaker at 5:3-8, 5:28-31), Gutman discloses storage of data in memory. The evidence indicates that it would have been a routine step for one of ordinarily skill in the art

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pattern for a first transaction that is different from a second data pattern for a second data transaction, said second data pattern also provided to said card reader by said dynamically reconfigurable data providing means, ***wherein at least one of said first data pattern and said second data pattern represents a time-varying serial data stream, wherein each data value in said time-varying serial data stream is a function of time***; and

***a swipe direction detector*** coupled with said dynamic reconfigurable data providing means, ***wherein each of said first data pattern and said second data pattern changes responsive to a swipe direction of said active card with respect to said card reader***, said swipe direction ascertained via said swipe direction detector.

Shoemaker (RX-884) at 17:32-57 (Claim 21) (emphasis by Samsung).

to store the forward and reverse tracks of Shoemaker in memory. *See* RX-1677C (Lipoff) at Q/A 458-459, 485-486.[13, 14]

### B. The '100 Patent

For the '100 patent, the Commission determined to review the ID's finding as to whether Doughty in combination with VivoTech would not have rendered claim 4 obvious to a person of ordinary skill in the art at the time of the invention and whether Samsung waived that issue. The Commission also reviewed whether claims 4 and 6 are infringed and whether the domestic industry requirement is satisfied.

#### *1. Infringement of Claims 4 and 6*

In the conclusions of law, the ID states that "Samsung directly infringes claims 1, 12, and 18 of the 100 patent." ID at 183-84. The Commission notes that the ID also found infringement as to claims 4 and 6 (only as to certain products) and revises the conclusion of law section accordingly. ID at 83-84.

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[13] Apart from the teaching away argument, the Commission notes that Dynamics did not present any secondary considerations evidence or argument for the '153 patent. *See generally* Dynamics Post-Hr'g Br. at 36-41 (contesting obviousness without discussing secondary considerations); Dynamics Post-Hr'g Reply at 19-25 (apart from teaching away, "Dynamics does not contend that other secondary considerations should be considered for the '153 patent."); *Geo. M. Martin Co. v. All. Mach. Sys. Int'l LLC*, 618 F.3d 1294, 1304 (Fed. Cir. 2010) ("Secondary considerations of non-obviousness must be considered ***when present***." (emphasis added)). Accordingly, the Commission finds that no evidence of secondary considerations supports a non-obviousness finding.

[14] Commissioner Johanson would affirm the ALJ in this regard. In his view, there is not clear and convincing evidence that supports a finding of obviousness. There is insufficient evidence that combination of the teachings of the references would lead one of skill in the art to the storage of multiple representations, which is not taught by either reference, rather than the "on the fly" creation taught by Shoemaker (*see* Respondents' Post-Hearing Reply Brief at 18).

### *2. Obviousness of Claim 4 – Doughty in View of VivoTech*

The ID found that "Samsung tersely asserts that 'to the extent claim 1 is obvious' in view of Doughty combined with other references, 'so is claim 4,' [but] this assertion only appears in its reply brief" and so "Dynamics therefore did not have an opportunity to rebut it, and it will not be considered further." ID at 109. Although the ID found claim 4 infringed, not invalid, and that Dynamics established a domestic industry as to the '100 patent, the ID stated that there is no violation of section 337 with respect to the '100 patent. For the reasons set forth below, the Commission finds claim 4 invalid as obvious and finds no violation as to that claim.

Samsung, in its contingent petition for review, asserted that at the hearing it "argued that claims 1 and 4 of the '100 patent are both anticipated by Doughty, or in the alternative, obvious based on the teachings of VivoTech" and that "[i]n disputing anticipation of these claims, Dynamics contended that only a single claim element was missing from Doughty, element 1[c][15] of the '100 patent." Samsung Pet. at 72. According to Samsung, "[a]ll other elements of claims 1 and 4—including the 'portable telephonic device' limitation of claim 4—were undisputed by Dynamics" and that "Dynamics conceded in its own brief that Doughty discloses incorporating its magnetic field generator' substrate into 'personal communications devices' such as "a telecommunications device." *Id.* at 72-73. Samsung added that the "ID expressly found that the only element of claims 1 and 4 missing from Doughty was element 1[c] above." *Id.* at 73 (citing ID at 102-104).

[15] Element 1[c] recites "wherein the circuit is operable to communicate the data to the read-head while located outside of the magnetic stripe reader at a distance of at least a quarter of an inch from the read-head."

Samsung further argued that "[i]n its alternative obviousness argument, Samsung contended that the only allegedly missing element of claims 1 and 4—element 1[c]—was obvious based on Doughty in combination with VivoTech" and that "Samsung's post-hearing brief took a consistent approach to all of its obviousness arguments, only addressing the allegedly missing limitations in the obviousness sections of its brief, rather than restating or re-explaining the undisputed limitations already addressed in the anticipation sections." *Id.* According to Samsung, the ID agreed "that element 1[c] was obvious based on Doughty in combination with VivoTech, and found claim 1 to be obvious." *Id.* (citing ID at 109-110). Samsung argued that "because element 1[c] was also the only allegedly missing element from claim 4, the ID should have found claim 4 (which was not disputed to be disclosed) obvious as well." *Id.*

Dynamics argued that the "ID properly declined to consider Samsung's assertion that claim 4 of the '100 patent was obvious in view of Doughty combined with other references because the assertion appeared only in Samsung's post-hearing reply brief, and Dynamics therefore did not have the opportunity to rebut it." Dynamics Resp. at 70 (citing ID at 109). Dynamics asserted that the "Ground Rules governing the conduct of the Investigation clearly required Samsung to raise – before its post-hearing reply brief – any invalidity defenses it wanted to preserve." *Id.* at 70-71. Dynamics argued that "Samsung waived any assertion that claim 4 was obvious over Doughty" as a result. ID at 71.

The ID found that Samsung did not specifically argue, in its pre- or post-hearing brief, obviousness of claim 4 based upon Doughty and VivoTech. ID at 109. Based on the record, the Commission finds that, in essence, Samsung made this argument. *See* Respondents' Post Hearing Brief at 96-97; Respondents Post Hearing Reply Brief at 55; ID at 138. The

Commission thus rejects Dynamics' waiver argument. The Commission further finds Dynamics' argument that it "did not have the opportunity to rebut [this argument]" disingenuous. Dynamics Resp. at 70 (citing ID at 109). Dynamics has had ample opportunity to, and, indeed, did extensively discuss both Doughty and VivoTech. *See, e.g.*, Complainant Dynamics Inc.'s Initial Post-Trial Brief at 54-64. Moreover, it appears that the ALJ's statement to the contrary may have been an oversight because in considering whether a similar claim in the '631 patent was obvious, the ID stated that claim 4 of the '100 patent had been shown to be obvious:

> As for claim 4 [of the '631 patent] and 'wherein the apparatus is a portable telephonic device,' Samsung refers to its discussion of the similar limitation in the 100 patent. RRB at 55. Dynamics refers similarly. CIB at 86-87; CRB at 51. As determined, Samsung has shown Doughty, on its own, discloses placing a magnetic emulator in a personal telecommunications device. RX-0283 at [0048]. Accordingly, Samsung has shown claim 4 of the 100 patent to be obvious over Doughty and VivoTech.

ID at 138.

The Commission finds claim 4 invalid because the evidence presented shows that it was obvious at the time of the invention to a person of ordinary skill in the art in light of Doughty in combination with VivoTech. Claim 4 recites: "The device of claim 1, wherein the device is a portable telephonic device." '100 patent at 14:58-59. Dynamics admits that Mr. Lipoff, Samsung's expert, contended that Doughty disclosed the limitations of claim 4. Dynamics Resp. at 72; RX-1677C (Lipoff) at Q/A 249 and RDX-3083. Dynamics also admits that Mr. Lipoff contended that claim 1 was obvious over Doughty combined with VivoTech. Dynamics Resp. at 72 (citing Tr. (Lipoff) at 729:18-730:3 (referring to Mr. Lipoff's witness statement at Q/A 245, which concerned claim 1)). As Samsung notes, the only limitation that VivoTech supplied to Doughty was the claim 1[c] limitation: "wherein the circuit is operable to communicate the data to the read-head while located outside of the magnetic stripe reader at a distance of at least a

quarter of an inch from the read-head." Taken together, the record evidence shows that a combination of Doughty and VivoTech renders claim 1 obvious as the ID found, and also renders claim 4 obvious since Doughty undisputedly discloses the additional limitation.

In sum, there is no dispute that Doughty discloses the "wherein the device is a portable telephonic device" of claim 4. As discussed above, the ID found that the combination of Doughty and VivoTech discloses all the limitations of claim 1, from which claim 4 depends. Further, as Samsung notes, "Dynamics conceded in its own brief that Doughty discloses incorporating its magnetic field generator' substrate into 'personal communications devices' such as "a telecommunications device." Samsung Pet. at 72-73. Thus, a combination of Doughty and VivoTech also renders claim 4 obvious. [16]

### *3. Domestic Industry*

For the '100 patent, the ID found the technical prong satisfied only as to claim 1, but subsequently concluded Dynamics satisfied the domestic industry requirement. ID at 88, 158, 183. The ID, however, also found claim 1 invalid. ID at 99, 184. The Commission determined not to review the invalidity finding. However, the Commission determined to review the domestic industry finding because this requirement cannot be satisfied by a complainant that practices an invalid patent claim, nor can the economic prong findings relate to articles that practice an invalid patent claim. *Certain Integrated Circuits and Products Containing the Same*, Inv. No. 337-TA-1148, Comm'n Op. at 12 (Dec. 30, 2020) ("Where the technical prong is otherwise met because the DI claims read on the DI products, but the DI claims are invalid, there

[16] Commissioner Johanson would affirm the ALJ's finding that Respondents failed to carry their burden of showing that claim 4 of the '100 patent is obvious over Doughty in view of VivoTech as Respondents elected not to assert this argument in their Pre-Hearing and Post-Hearing Briefs. *See* Respondents' Pre-Hearing Brief at 110–112; *see also* Respondents' Post-Hearing Brief at 99–100.

can be no violation because the domestic industry articles are not protected by the patent.”). Accordingly, the Commission has determined to reverse the ID’s finding that the domestic industry requirement is satisfied as to the ’100 patent.

### C. The ’545 Patent: Domestic Industry

With respect to the ’545 patent, the Commission has determined to take no position on the ID’s findings that Dynamics established a domestic industry in the process of being established as to the technical prong, but failed to show a domestic industry in the process of being established as to the economic prong. *See Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984).

## IV. CONCLUSION

Consistent with the analysis above, the Commission has determined, for the ’153 patent, to (1) construe the claim limitation “analog waveform” to mean “a wave shape whose amplitude changes in a continuous fashion” that includes so-called real-world square waveforms; (2) affirm the ID’s finding that the accused Samsung Products infringe the asserted claims; (3) affirm the ID’s finding that Dynamics failed to adduce sufficient evidence to establish that its DI products practice any claims of the patent; and (4) reverse the ID’s finding that the combination of Shoemaker and Gutman fails to render the asserted claims obvious. For the ’100 patent, the Commission has determined to (1) reverse the finding Samsung failed to show that Doughty in combination with VivoTech renders claim 4 obvious; (2) clarify that claims 4 and 6 are infringed; and (3) find the domestic industry requirement not met because the domestic industry claim has been found invalid. For the ’545 patent, the Commission has determined to take no position on the ID’s domestic industry findings. Accordingly, the Commission finds that there has been no violation of section 337 in this investigation.

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: July 27, 2021

**PUBLIC VERSION**

| | |
|---|---|
| **In the Matter of**<br><br>**CERTAIN MOBILE DEVICES WITH MULTIFUNCTION EMULATORS** | **Investigation No. 337-TA-1170** |

**SEPARATE VIEWS OF VICE CHAIR RANDOLPH J. STAYIN**

The Commission Opinion as to the '153 patent highlights the risks associated with construing claims towards the end of the investigation, which can result in fitting claims to the evidence of infringement rather than the intrinsic record, and denying parties a fair opportunity to present their case. For the reasons set forth below, in my view the plain and ordinary meaning of the term "analog waveform" as used in the '153 patent is a "continuous wave with negative and positive peaks." Pursuant to this construction, I would find the accused products do not infringe the '153 patent. Furthermore, I would find Dynamics presented sufficient evidence to show its products practice this claim term for purposes of the technical prong the domestic industry requirement, or is entitled to remand for the opportunity to supplement the record. As to invalidity, I believe the record does not show clear and convincing evidence of a motivation to combine the Gutman and Shoemaker references, and therefore would affirm the ID's conclusion that Samsung did not show the '153 patent to be invalid.

## I. Construction of "Analog Waveform"

The legal standard for claim construction as articulated in the ID and the Commission Opinion is not in dispute. Nonetheless, applying these principles the parties, the ID, and Commission Opinion reach four different constructions of the term "analog waveform" as used in the '153 patent:

| Dynamics | Samsung | ID | Comm'n Op. |
|---|---|---|---|
| "a waveform that conveys information in a non-binary manner" | "a wave shape whose amplitude changes in a continuous fashion" | "any construction consistent with the specification must encompass real-world square waves" | "a wave shape whose amplitude changes in a continuous fashion," but includes real-world square waves |

In my view, the ID and Commission Opinion err by adopting a construction of the term "analog waveform" tailored to their infringement analysis, rather than limited to the plain meaning in light of the specification. The intrinsic record demonstrates that the plain and ordinary meaning of "analog waveform" is a "continuous wave with negative and positive peaks."

*Plain and ordinary meaning*. I start from the basic principle that "analog" refers to something that is continuous in nature. I agree with the Commission Opinion that the plain and ordinary meaning of "waveform" is the "shape of a wave."[1] Comm'n Op. at 12.

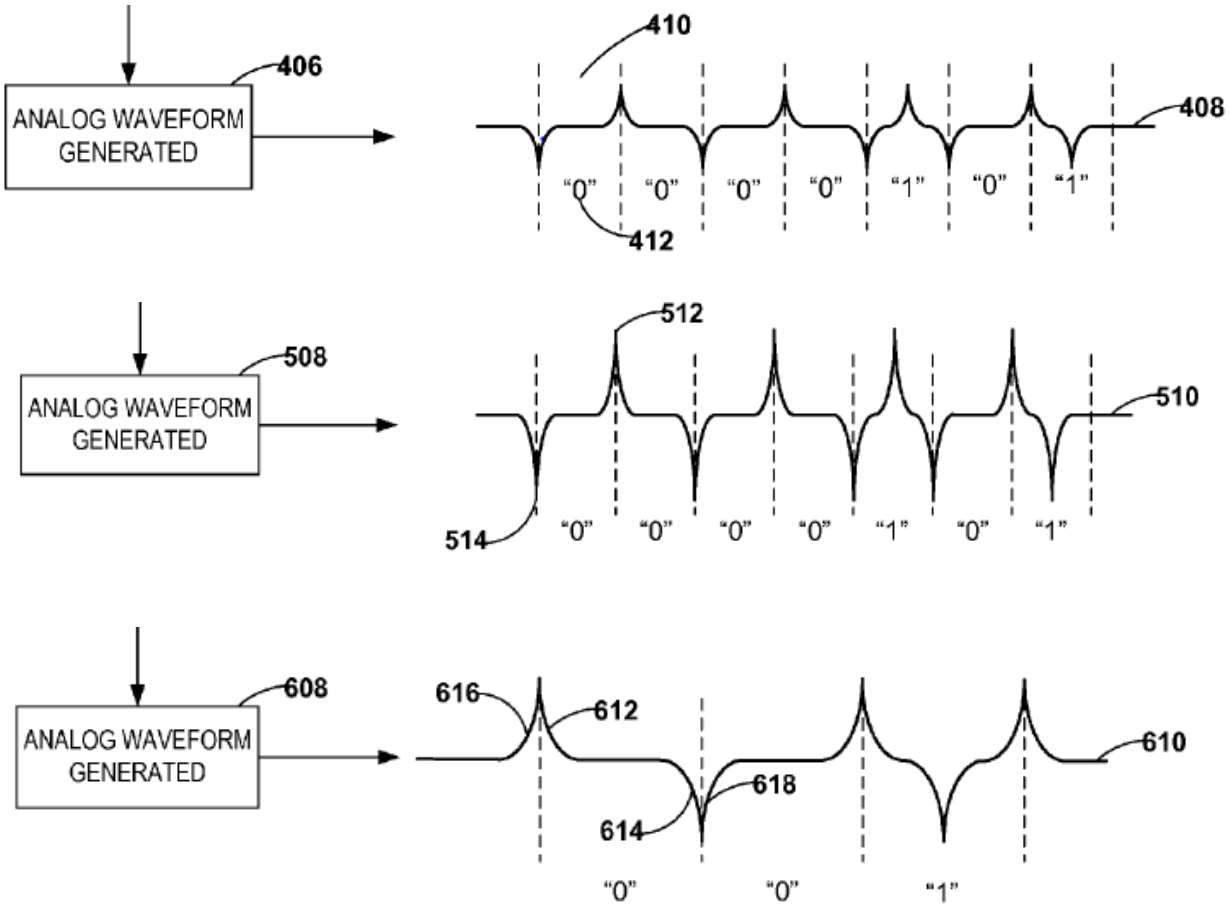
*Claims of the '153 patent.* The claims of the '153 patent describe the function of the "analog waveform" in the context of the invention, and how it is generated. For example:

- The analog waveform is generated by a "waveform generator" "from a digital representation" of magnetic stripe data," (15:18-20, 16:31-32);
- The analog waveform is "encoded with at least one track of magnetic stripe data," and can be encoded with two or even three tracks of data (15:16-17, 43-46);
- The analog waveform can be "generated based on a swipe speed," (15:33-34); and
- The analog waveform is "communicated" by "a magnetic stripe emulator" to complete a transaction, (15:15-19, 16:1-2, 33-34).

[1] *See also* "Waveform." Merriam-Webster.com Dictionary, Merriam-Webster, https://www.merriam-webster.com/dictionary/waveform. Accessed 13 Jul. 2021 ("a usually graphic representation of the shape of a wave that indicates its characteristics (such as frequency and amplitude) — called also *waveshape*").

The use of "analog waveform" in the claims does not suggest a meaning apart from the plain and ordinary understanding of "analog waveform" as a wave with a continuous shape.

*Specification*. Figures 4, 5, and 6 of the '153 explicitly depict three "analog waveforms":




*See* '153 patent at 12:59-61 ("In step 406, the magnetic stripe message may be converted from a digital format to an analog format to produce wave form 408."); *id.* at 13:47-51 ("Successive conversion of all symbols of the selected digital waveform may yield waveform 510 (e.g., as in step 508) having optimized characteristics (e.g., extended amplitudes 512 and 514)."); *id.* at 14:12-17 ("[A]n analog waveform may be generated (e.g., as in step 608) from a digital wave form stored within memory of a card encoded with characteristics (e.g., reduced slew rate 612-618) that may be known to be effective with the magnetic stripe reader as detected in step 604."). Each of these

waveforms are continuous in nature in the sense that the amplitude moves through intervening values when changing, rather than jumping or stepping from one to the next. And each contains negative and positive peaks that may be adjusted by a waveform generator for optimization. *See, e.g.*, *id.* at 13:47-51.

The remainder of the specification provides examples of how the values of an analog waveform might be adjusted based on internal or external parameters. For example, the specification explains that "data symbols retrieved from memory 316 may be modified to generate analog waveforms with better power efficiency (e.g., reduced magnitude and/or reduced slew rate) so as to reduce an amount of power consumed when communicated." '153 patent at 12:40-45; *see also id.* at 13:54-62. But none of these discussions suggest the patent uses the term "analog waveform" to mean something other than a continuous wave as depicted in Figures 4-6. Samsung's proposed construction is consistent with, but overly broad compared to the waves depicted in the specification. And notably, the notation of 1's and 0's on each waveform tend to contradict Dynamics' proposal that the analog waveform conveys information in a non-binary manner.

*Prosecution History*. The term "analog waveform" was not at issue during prosecution of the '153 patent. In fact, Dynamics did not dispute that the prior art taught converting a digital representation of magnetic stripe data into an analog waveform. Specifically, the examiner cited Poidomani (US20120205451) as disclosing the conversion from digital to analog waveform for communication to a magnetic stripe reader:

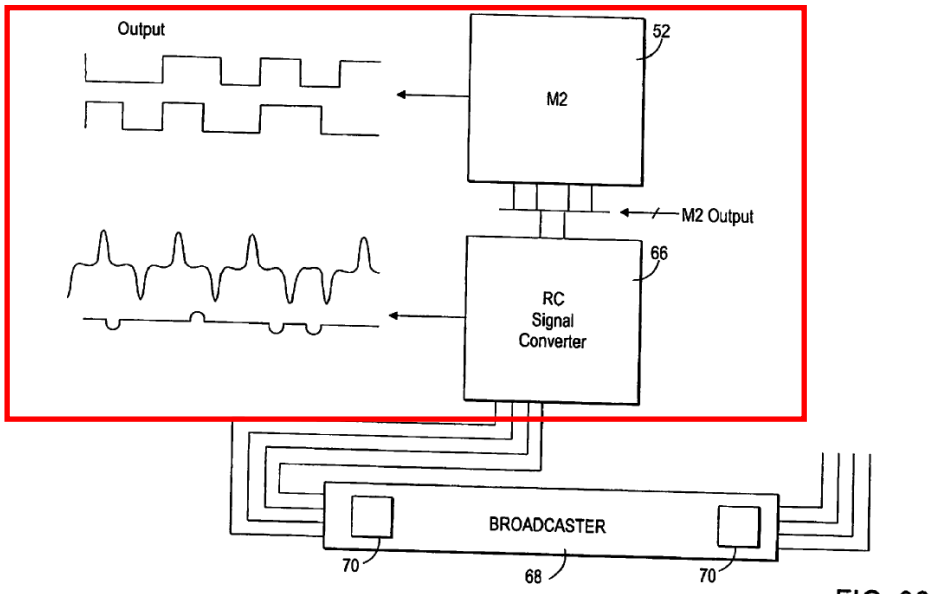



FIG. 32

> [0127] FIG. 32 shows an exemplary process for signal conversion which is used to transform the digital square wave output of general processor 52 into the custom waveforms needed to drive broadcaster 68. The digital square wave output of general processor 52 is used to drive the RC network of buffering circuit 66 which produces an analog waveform as output. This is, in turn, used to drive broadcaster 68 which produces magnetic impulses to be received by a magnetic stripe reader.

*See* CX-0026.0882 (annotation added). Dynamics did not dispute the examiner's citation to Poidomani as showing conversion of a square wave digital signal to an analog waveform. *Id.*; CX-0026.0062. Instead, Dynamics amended the claims to require that the digital signal to be converted is retrieved from a plurality of digital representations of a particular track, a feature it claimed was not taught by the prior art. *See* CX-0026.0086; CX-0026.0048. Figure 32 of Poidomani highlights the distinction between a digital square wave, with discrete steps and no peaks, and an analog wave, which continuously moves between positive and negative peaks.

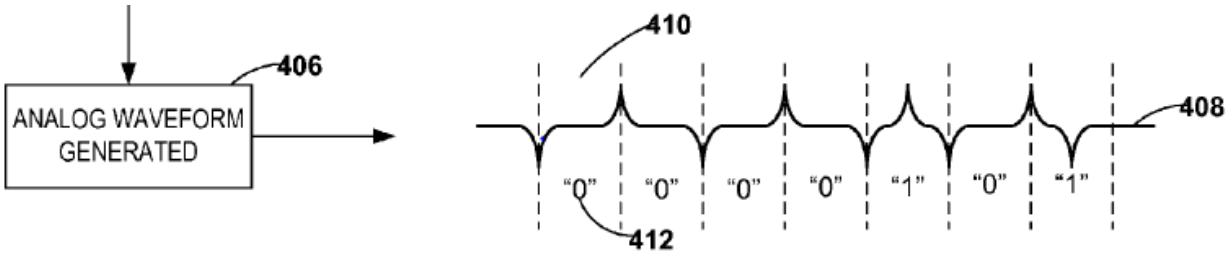
The prosecution history thus reinforces that the plain and ordinary meaning of "analog waveform" as "a continuous wave with positive and negative peaks," and in my view it is unnecessary to review the extrinsic record to construe this term.

Both the ID and Commission Opinion focus on the question of whether a "real-world square wave" is encompassed within a particular proposed construction. ID at 39-40; Comm'n Op. at 14-16. In my view this is a question of infringement, not claim construction.

The ID points 12:59-67 of the patent as describing a "real-world square wave," finding:

> the description of that analog signal apparently corresponds to a square wave, with time on the x-axis and the magnitude of the current on the y-axis, and where the magnitude of the current is "proportional to a digital value of the digital symbol," that is, except for transitions it is either at its maximum or at zero, assuming the "digital symbol" is either one or zero

ID at 40. Yet Figure 4, which the cited portion of the specification is describing, depicts an analog wave with positive and negative peaks, not a square wave.




Neither of the parties appear to have suggested the specification discloses a square wave, and on review, neither party defended the ID's characterization of this portion of the specification as describing a square wave (real-world or otherwise). Nothing in the intrinsic record references "real-world square waves," or suggest they should be a consideration in construing "analog waveform." Therefore, in my view the ID and Commission Opinion err in their construction of the term "analog waveform."

## II. Infringement

Properly construed, there would be no dispute that the accused products do not infringe claims 1 or 7 of the '153 patent because the Samsung devices do not generate an "analog waveform." Figure 6 of RX-121C is a screen shot of an oscilloscope reading representative of accused products: [[

]] the analog waveform in the '153 patent. This is consistent with the testimony of Samsung's engineer, Woosup Lee, who explained that the MST generates a "square wave that has only two discrete values, high or low." Samsung Sub. at 7 (quoting RX-1671C (Lee) at Q/A 30). Dynamics' expert agreed, noting the Samsung square wave "has two discrete levels, high and low, and alternates between them." *Id.* at 8 (quoting Tr. (Zatkovich) at 325:5-8; 207:16-24). MST generates a "discrete," not a "continuous wave," which lacks any peaks. Therefore, I would find no infringement of the '153 patent.

Furthermore, in my view an infringement analysis construing "analog waveform" to necessarily encompass "real-world square waves" is erroneous. In response to Samsung's contention that the term "real-world square wave" as used in the ID is vague, the Commission Opinion defines the term by reference to the oscilloscope reading of the accused products, and

concludes that "a real-world square wave results in a Lorentz waveform as disclosed in the '153 patent." Comm'n Op. at 21. In my view the MST square wave does *not* generate a Lorentz wave form on the reader head. The second through fifth peaks of the yellow wave in Figure 6 have discrete transitions from zero to the negative/positive amplitude, unlike Figures 4 through 6 of the patent, which show curved transitions on both sides of the peak.

The Commission Opinion relies on the testimony of Samsung's expert that even for the MST square wave "the transition from one discrete amplitude value to another takes some non-zero amount of time." RX-121C at 9; Comm'n Op. at 20. Dr. Apsel is simply acknowledging that even digital waveforms require some amount of time to transition between discrete amplitudes. *See* RX-1675C (Apsel) at Q/A 294. It would appear majority opinion holds that "real-world square waves" include a square wave with *any* amount of transition between discrete amplitude values. Such a finding would read digital waves out of existence, and expand the scope of "analog waveform" well beyond what would be understood by a person of ordinary skill.

## III. Domestic Industry – Technical Prong

Procedurally, I believe the Commission Opinion errs in faulting Dynamics for failing to present sufficient evidence that its domestic industry products practice the '153 patent. The parties did not propose constructions for "analog waveform" until requested by the ALJ after the hearing, meaning Dynamics' only opportunity to present a technical prong case under Samsung's proposed construction was in its *post-hearing reply brief*. Moreover, the ALJ did not even adopt Samsung's proposed construction; as a result, the first opportunity for Dynamics to make its case under the construction used in the final initial determination was in its petition for review. I would remand to allow Dynamics the opportunity to show its domestic industry products practice the "analog waveform" as I believe the term should be construed. If, as the Commission holds, the record is

insufficient for its purposes, Dynamics should have been given the opportunity to supplement the record on remand.

Nevertheless, I would find remand unnecessary under the majority's approach as the record demonstrates by a preponderance of the evidence that Dynamics' products practice the "analog waveform" limitation of the '153 patent. As construed by the Commission Opinion, Dynamics need only show that its products generate a "real-world square wave" or otherwise produce a Lorentz-type waveform on the reader head. Comm'n Op. at 21.

Dynamics presented the following evidence:

- Testimony from Dynamics' technical expert Ivan Zatkovich that Dynamics' products include a waveform generator in the form of an [[ ]], which generates an analog waveform from a digital representation of magnetic stripe data. (CX-1199C (Zatkovich) at Q/A 80-81).

- Testimony from James Workley, the Chief Scientist at Dynamics, that Dynamics' products include a waveform generator in the form of an [[ ]], which generates an analog waveform from a digital representation of magnetic stripe data. (CX-1198C (Workley) at Q/A 64-66).

- An internal Dynamics document titled "History of Card Technical Development," updated in August 2019. (CX-0155C). The document includes a picture of an oscilloscope reading for "our first circuit that controlled the wave shape driving the coil," showing the resulting output signal from the reader head in the form of a Lorentz-type waveform. (CX-0155C.0025-26).

[[

]]

- Deposition testimony from Mr. Workley that the input into the [[ ]] takes a digital wave, [[ ]]" and outputs a "waveform that looks just like the waveform coming out of a head from a normal credit card." (RX-0042C (Workley Dep.) at 32:4-21).

- Deposition testimony from Mr. Workley that the CIBC card uses the wave depicted in the Technical Development document. (RX-0042C (Workley Dep.) at 204:16-23 (referring to CX-0155C.0026)).

- Deposition testimony from Mr. Workley that the newer Dynamics products use a [[ ]] and the [[ ]] to create the shaped wave depicted in the Technical Development document. (RX-0042C (Workley Dep.) at 204:24-205:12).

- A document from [[ ]], dated August 30, 2010, that describes the technical features of the [[ ]]. (CX-0013C).

- Deposition testimony from Mr. Workley that Dynamics' newer products use the same process for wave-shaping as described in the [[ ]] document. (RX-0042C (Workley Dep.) at 218:2-25, 219:2-21).

Samsung does not offer any evidence of its own on this issue; it simply argues there is "insufficient context" for Dynamics' evidence. The Commission Opinion dismisses Mr. Workley's deposition testimony as "unsupported." Comm'n Op. at 26. Mr. Workley—the Chief Scientist at Dynamics since 2015 and an employee of the company since 2009—testified as to the waveforms generated by past and present Dynamics products, and confirmed the documents produced by Dynamics demonstrate the relevant functionality as currently used. In my view the documents and testimony, particularly Mr. Workley's unrebutted testimony regarding how Dynamics' current products operated is credible, reliable and probative evidence, sufficient to meet Dynamics' burden on this issue.

## IV. Validity of the '153 patent

Samsung alleges claims 1 and 7 of the '153 patent would have been rendered obvious by Gutman (U.S. Patent No. 6,206,293) and Shoemaker (U.S. Patent No. 7,690,580). ID at 64. It appears undisputed that Gutman includes every limitation of claims 1 and 7, except for the requirement that the device have "a plurality of digital representations of said at least one track of

magnetic stripe data" stored in the memory of the device. Gutman at 15:22-23 (claim 1). To supply this missing limitation, Samsung relies on Shoemaker, which teaches having multiple representations of a particular track in the form of forward and reverse versions of track data to be used depending on the direction the card is swiped. Shoemaker at 14:65-15:3. Samsung argues, and the Commission Opinion finds, the person of ordinary skill would have been motivated to implement the forward/reverse track data functionality taught by Shoemaker on the card disclosed by Gutman. In my view, the record evidence does not show by clear and convincing evidence that the person of ordinary skill would have been motivated to combine Gutman and Shoemaker in the claimed manner.

"Identifying a motivation to combine the prior art is important because 'inventions in most, if not all, instances rely on building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.'" *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1357 (Fed. Cir. 2019) (quoting *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–19 (2007)). In my view, the Commission Opinion mistakes overlapping building blocks for evidence of a motivation to combine references seeking to solve distinct problems in the prior art.

Samsung argues that the person of ordinary skill would have been motivated to incorporate the forward/reverse tracks from Shoemaker into the Gutman card "to permit Gutman's magnetic emulator to work in all types of card readers, including those that require track data to be presented in an order that is consistent with the direction in which cards are swiped." Samsung Sub. at 27. Likewise, the Commission emphasizes Samsung's expert's testimony that without this functionality "Gutman's device would generate an error if it were used in a reader that expected

the track data to be in the opposite direction to that stored in Gutman's memory." Comm'n Op. at 35 (quoting RX-1677C (Lipoff) at Q/A 459, 486; Samsung Pet. at 32).

This purported motivation is belied by Gutman itself. Gutman teaches in one embodiment that the conductor that generates the magnetic field "runs substantially the width of the card" such that "the placement of the card along the 'swipe' direction in the magnetic card reader is not critical for operation with the magnetic card reader *as long as a portion of the length of the card is inserted in the slotted portion of the magnetic card reader*." Gutman at 17:4-10 (emphasis added). The result of this design is that "communication of data by the card of the current invention is *independent* of movement of the card or placement of the card within the magnetic card reader," and "*no 'swiping' movement is necessary*." *Id.* at 17:4, 10-13 (emphasis added). In other words, data is transmitted from the Gutman card to the reader as soon as it is inserted into the slot, regardless of whether the user proceeds to swipe the card.[2]

Samsung explicitly concedes that Gutman's card "does not need to be swiped in order to communicate with a magnetic stripe reader." Samsung Sub. at 31. Samsung's Submission lays out in detail that magnetic field emulators can transmit data to readers without being swiped. *Id.* Nonetheless, Samsung argues "Gutman expressly discloses that it can and likely will be swiped, and would therefore benefit from the improvement described by Shoemaker." *Id.* at 26. This argument simply ignores the portion of Gutman immediately following the discussion of swiping: "communication of data by the card of the current invention is *independent* of movement or the card." Gutman at 17: 10-13. Communication of the data by the Gutman device has *no relation* to

[2] It is an interesting question whether a reference "teaches away" from swiping by explaining its drawbacks yet accommodating it with the design of the invention, but one that is ultimately irrelevant because the Gutman device communicates data to the read head before any swiping occurs.

swiping, thus there is nothing to suggest the Gutman card would have the forward/reverse data problem of a traditional credit card. It is not simply that the Gutman card does not need to be swiped, swiping has no effect on the data transmission.

Samsung and the Commission Opinion stress that Shoemaker purportedly discloses a card that includes both swiping and the ability to transmit data without swiping. Comm'n Op. at 36-37; Samsung Sub. at 32-33. Specifically, claim 21 recites (in relevant part) a card:

> dynamically reconfigurable data providing means attached to said card base, said dynamically reconfigurable data providing means being configured to provide said card reader a first data pattern for a first transaction that is different from a second data pattern for a second data transaction, said second data pattern also provided to said card reader by said dynamically reconfigurable data providing means, *wherein at least one of said first data pattern and said second data pattern represents a time-varying serial data stream, wherein each data value in said time-varying serial data stream is a function of time*; and
>
> *a swipe direction detector* coupled with said dynamic reconfigurable data providing means, *wherein each of said first data pattern and said second data pattern changes responsive to a swipe direction of said active card with respect to said card reader*, said swipe direction ascertained via said swipe direction detector.

Shoemaker at 17:32-57 (claim 21) (emphasis by Samsung). Shoemaker explains that the "time-varying serial data stream" is meant to address the problem in the prior art wherein "variations in the swiping speed have often-time caused the magnetic stripe reader to fail to read the data pattern on the prior art credit card." Shoemaker at 8:33-36. To address this issue, Shoemaker teaches configuring the data "such that data can be reliably provided to the magnetic reader head irrespective of the speed at which the card is swiped through the magnetic stripe card reader." *Id.* at 8:38-41.

Samsung argues "given Shoemaker's implementation of this [forward/reverse] functionality in a device that does not require swiping, a POSITA would have been motivated to combine Shoemaker and Gutman, even though Gutman's card does not need to be swiped through

a card reader either." Samsung Sub. at 33. The implication is that because Shoemaker includes transmission that does not rely on swiping and forward/reverse data, there must be some reason the person of ordinary skill would have added forward/reverse data to Gutman as well. This supposition does not amount to clear and convincing evidence of motivation to combine. Likewise the Commission Opinion asserts that Shoemaker's disclosure "demonstrat[es] that Gutman's statement that 'no swiping movement is necessary' would not deter one of ordinary skill to combine the references." Comm'n Op. at 36. "Would not deter" is insufficient basis for a motivation to combine. As Dynamics noted, there is no support in the record for the notion that in 2011 the person of ordinary skill "would seek out Gutman's invention that was already almost a decade old, so that he or she go back and modify that old technology to add features that were already present in Shoemaker." Dynamics Reply at 25.

At most, Shoemaker supports the notion that the forward/reverse functionality *could be* combined with the Gutman card, not that the person of ordinary skill would be motivated to do so. Gutman and Shoemaker, though both art in the same field, have fundamentally different purposes. Gutman provides alternative hardware to traditional magnetic stripe cards making swiping irrelevant, while Shoemaker offers a different approach to generating data communicated by the cards when swiped. Neither Samsung nor the Commission Opinion cited evidence to reconcile the disparate purposes of these inventions such that the person of ordinary skill would have sought to combine them in the manner claimed by the '153 patent. *See Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1359–60 (Fed. Cir. 2020). Accordingly, I would affirm the ID's finding that Samsung failed to show by clear and convincing evidence that the '153 patent is invalid.

**CERTAIN MOBILE DEVICES WITH MULTIFUNCTION EMULATORS** **Inv. No. 337-TA-1170**

## PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER, COMMISSION** has been served upon the following parties as indicated, on **July 27, 2021.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

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