

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN MOBILE AND PORTABLE
ELECTRONIC DEVICES INCORPORATING
HAPTICS (INCLUDING SMARTPHONES AND
LAPTOPS) AND COMPONENTS THEREOF**

Inv. No. 337-TA-1004

Inv. No. 337-TA-990

(Consolidated)

**ORDER 27: CONSTRUING THE TERMS OF THE ASSERTED CLAIMS OF
THE PATENT AT ISSUE**

(February 2, 2017)

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I. INTRODUCTION

Complainant Immersion Corporation (“Immersion”) filed a complaint on February 11, 2016. The complaint, as supplemented, alleges violations of section 337 based on the importation and sale of certain mobile electronic devices incorporating haptics and components thereof that purportedly infringe U.S. Patent Nos. 8,773,356 (“the ’356 patent”); 8,619,051 (“the ’051 patent”); and 8,659,571 (“the ’571 patent”). 81 Fed. Reg. 14,889-890 (Mar. 18, 2016). The investigation was instituted on March 18, 2016. *Id.* The Notice of Institution named Apple Inc. (“Apple”), AT&T Mobility LLC (“AT&T”), and AT&T Inc.¹ as respondents. *Id.* at 14,890.

Immersion filed another complaint on May 5, 2016. The complaint, as supplemented, alleges violations of section 337 based on the importation and sale of certain mobile and portable electronic devices incorporating haptics and components thereof that purportedly infringe U.S. Patent Nos. 8,749,507 (“the ’507 patent”); 7,808,488 (“the ’488 patent”); 7,336,260 (“the ’260 patent”); and 8,581,710 (“the ’710 patent”). 81 Fed. Reg. 37,210-211 (June 9, 2016). The Commission instituted the investigation on June 9, 2016. *Id.* Apple and AT&T (collectively, “Respondents”) were named as respondents. The Notice of Institution authorized the Chief Administrative Law Judge to “consolidate Inv. No. 337-TA-990 and this investigation if he deems it appropriate.” *Id.* at 37,211. The investigations were consolidated on June 9, 2016. (*See* Order No. 3.)

Pursuant to Ground Rule 5A, a *Markman* hearing was held October 18, 2016. Prior to the hearing, Immersion, Respondents, and the Commission Investigative Staff (“Staff”) met and conferred in an effort to reduce the number of disputed claim terms to a minimum. The parties also filed initial and reply claim construction briefs, wherein each party offered its construction

¹ AT&T Inc. has been terminated from this Investigation. (*See* Notice of Comm’n Determination Not to Review an Initial Determination Terminating the Investigation as to one Respondent on the Basis of Withdrawal of the Compl. (May 4, 2016).)

for the claim terms in dispute, along with support for its proposed interpretation. After the hearing and pursuant to Order No.9, the parties submitted an updated Joint Claim Construction Chart.²

II. IN GENERAL

The claim terms construed in this Order are done so for the purposes of this section 337 Investigation. Those terms not in dispute need not be construed. *See Vanderlande Indus. Nederland BV v. Int'l Trade Comm'n*, 366 F.3d 1311, 1323 (Fed. Cir. 2004) (noting that the administrative law judge need only construe disputed claim terms).

III. RELEVANT LAW

“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) (*en banc*) (internal citations omitted), *aff'd*, 517 U.S. 370 (1996). Claim construction is a “matter of law exclusively for the court.” *Id.* at 970-71. “The construction of claims is simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims.” *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000).

² For convenience, the briefs and chart submitted by the parties are referred to hereafter as:

CMIB	Immersion's Initial <i>Markman</i> Brief
CMRB	Immersion's Reply <i>Markman</i> Brief
RMIB	Respondents' Initial <i>Markman</i> Brief
RMRB	Respondents' Reply <i>Markman</i> Brief
SMIB	Staff's Initial <i>Markman</i> Brief
SMRB	Staff's Reply <i>Markman</i> Brief
JC	Updated Joint Proposed Claim Construction Chart

Claim construction focuses on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*); *see also Markman*, 52 F.3d at 979. As the Federal Circuit in *Phillips* explained, 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 the 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).

“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*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). “Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claims terms.” *Id.* at 1314; *see also 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.’”). The context in which a term is used in an asserted claim can be “highly instructive.” *Phillips*, 415 F.3d at 1314. Additionally, other claims in the same patent, asserted or unasserted, may also provide guidance as to the meaning of a claim term. *Id.*

The 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.” *Id.* 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 other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor." *Id.* As a general rule, however, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Id.* at 1323. In the end, "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be . . . the correct construction." *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

In addition to the claims and the specification, the prosecution history should be examined, if in evidence. *Id.* at 1317; *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). 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 also 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. Extrinsic evidence is generally viewed as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Id.* at 1317. "The court may receive extrinsic evidence to educate itself about the invention and the relevant

technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence.” *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

If, after a review of the intrinsic and extrinsic evidence, a claim term remains ambiguous, the claim should be construed so as to maintain its validity. *Phillips*, 415 F.3d at 1327. Claims, however, cannot be judicially rewritten in order to fulfill the axiom of preserving their validity. *See Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999). Thus, “if the only claim construction that is consistent with the claim’s language and the written description renders the claim invalid, then the axiom does not apply and the claim is simply invalid.” *Id.*

IV. LEVEL OF ORDINARY SKILL IN THE ART

Immersion submits that “[a] person of ordinary skill in the art for each of the asserted patents would have at least: (1) a Bachelor’s of Science degree in an engineering discipline such as Mechanical Engineering or Computer Science; or (2) at least two years’ experience working with human machine interface systems, graphical user interfaces, haptic feedback systems, robotics, biomechanics, or mobile devices or equivalent embedded systems.” (CMIB at 8 (citing Oliver Decl. ¶ 17).)

For all of the asserted patents, Respondents propose that a person of ordinary skill in the art would have a bachelor’s degree in computer science, electrical engineering or a comparable field of study. (RX-4 at ¶ 30; RX-7 at ¶¶ 15, 26, 32; RX-13 at ¶ 14.) In addition, Respondents assert that a person of ordinary skill in the art for the ’356 and ’571 patents would also have approximately two to three years of professional experience with software engineering, haptics programming, human-computer interaction, or other relevant industry experience.” (RX-4 at ¶ 30; RX-13 at ¶ 14.) For the ’051 and the ’710 patents, Respondents believe a person of ordinary

skill in the art would have “approximately two to three years of professional experience with software engineering, haptics programming, or other relevant industry experience.” (RX-7 at ¶ 15; SX-2 at 3.) Their proposal for the ’488, ’260, and ’507 patents merely substitutes “touch sensitive devices” for “haptics programming.” (RX-7 at ¶¶ 26, 32.)

In Staff’s view, “[g]iven the straightforward nature of the haptics technology involved during the relevant time period, it is unlikely that a person with a bachelors’ degree in mechanical or electrical engineering or in computer science would have gained a significantly different understanding of the state of the art after only two years of work experience.” (SMIB at 9.) Staff therefore submits that the level of skill in the art is “a bachelor’s degree in mechanical engineering, electrical engineering, or computer science, or at least two years’ of work experience in a relevant technical field.” (*Id.*)

While all of the parties generally agree as to the type of education one of ordinary skill in the art would have, they disagree on the relevant experience required. (CMIB at 8; RX-4 at ¶ 30; RX-7 at ¶¶ 15, 26, 32; RX-13 at ¶ 14; SMIB at 9.) Immersion and Staff contend that two years of relevant experience could substitute for formal college education, whereas Respondents believe that two years of relevant experience are needed in addition to a formal college education. (*Id.*) None of the parties, however, believe this minor difference affects the construction of the disputed claim terms. (CMIB at 8 n.3; RMRB at 1; SMIB at 9.)

Accordingly, the undersigned finds that one of ordinary skill in the art would have at least a bachelor’s degree in mechanical engineering, electrical engineering, computer science, or a related field, and at least two years of experience in a relevant technical field.

V. THE '051 PATENT

A. Overview

The '051 patent, entitled “Haptic Feedback System With Stored Effects,” issued on Dec. 31, 2013. The '051 patent is assigned on its face to Immersion Corporation. It generally “provides advances in haptic feedback in certain mobile electronic devices (such as a cellular telephone) having a touchscreen.” (2/11/16 Compl. at ¶ 4:8.)

The asserted claims read as follows (with the first instance of the agreed-upon term highlighted in *italics* and the disputed terms highlighted in **bold**):

1. A haptic feedback system comprising: a processor; a memory coupled to the processor, wherein the memory stores a plurality of pre-defined haptic effects; an actuator drive circuit coupled to the processor; and an actuator coupled to the actuator drive circuit; wherein the processor is adapted to output a first **stored haptic effect** of the pre-defined haptic effects in response to a haptic effect request; wherein the haptic effect request is a control signal generated in response to a first application that identifies the first stored haptic effect to be played; wherein the output causes the first stored haptic effect to be played; wherein **the entire haptic output in response to the haptic effect request consists of the first stored haptic effect**; wherein an application program interface (API) receives the haptic effect request from the first application and retrieves the requested first stored haptic effect, wherein the first application is registered with the API and a second application is also registered with the API and has access to the first stored haptic effect.
2. The haptic feedback system of claim 1, wherein the haptic effect request comprises an identity of the pre-defined haptic effect to be outputted.
3. The haptic feedback system of claim 1, wherein each of the plurality of pre-defined haptic effects are stored as a **digitized streamed envelope construct**.
5. The haptic feedback system of claim 1, wherein the haptic effect request comprises a priority, and the first stored haptic effect is outputted based on the priority.
6. The haptic feedback system of claim 1, wherein the first stored haptic effect is outputted to the actuator drive circuit, and in response the actuator drive circuit generates a haptic feedback signal that is applied to the actuator to generate haptic feedback.
7. The haptic feedback system of claim 6, wherein the haptic feedback signal is based only on one of the predefined haptic effects.
8. A method of generating haptic feedback comprising: *receiving a request for one of a plurality of pre-defined stored haptic effects, wherein the request is a control signal*

generated in response to a first application that identifies the haptic effect out of the plurality of haptic effects to be played; retrieving the requested pre-defined stored haptic effect; generating drive signals based on the retrieved pre-defined stored haptic effect; and applying the drive signals to an actuator, wherein the entire haptic output in response to the request consists of the requested pre-defined stored haptic effect; wherein an application program interface (API) receives the haptic effect request from the first application and retrieves the requested pre-defined stored haptic effect, wherein the first application is registered with the API and a second application is also registered with the API and has access to the requested pre-defined stored haptic effect.

9. The method of claim 8, wherein each of the plurality of pre-defined haptic effects are stored as a digitized streamed envelope construct.
10. The method of claim 8, wherein the request comprises a priority, and the one of the pre-defined haptic effects is retrieved based on the priority.
11. The method of claim 8, wherein the haptic feedback is generated from only the pre-defined stored haptic effects.
12. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, causes the processor to generate haptic feedback, the instructions comprising: receiving a request for one of a plurality of pre-defined stored haptic effects, wherein the request is a control signal generated in response to a first application that identifies the haptic effect out of the plurality of haptic effects to be played; retrieving the requested pre-defined stored haptic effect; generating drive signals based on the retrieved pre-defined stored haptic effect; and applying the drive signals to an actuator; wherein the entire haptic output in response to the request consists of the requested pre-defined stored haptic effect; wherein an application program interface (API) receives the haptic effect request from the first application and retrieves the requested pre-defined stored haptic effect, wherein the first application is registered with the API and a second application is also registered with the API and has access to the requested pre-defined stored haptic effect.
13. The computer readable medium of claim 12, wherein each of the plurality of the pre-defined haptic effects are stored as a digitized streamed envelope construct.
14. The computer readable medium of claim 12, wherein each of the request comprises a priority, and the one of the pre-defined haptic effects is retrieved based on the priority.
15. The computer readable medium of claim 12, wherein the haptic feedback is generated from only the pre-defined stored haptic effects.

B. Claim Construction

1. Construction of Agreed-Upon Claim Term

The parties agree on the construction of the following term:

Relevant Claim(s)	Agreed-to Definition
Claim 8	The parties agree that the language “receiving a request for one of a plurality of pre-defined stored haptic effects, wherein the request is a control signal in response to a first application that identifies the haptic effect out of the plurality of haptic effects to be played” is a claim limitation.

(JC at 5.) The undersigned hereby adopts the parties’ proposed construction and shall construe the term set forth above according to their agreed-to definition.

2. Construction of the Disputed Claim Terms

a) “stored haptic effect”

The disputed term appears in claims 1, 5, 6, 8, 11, 12, and 15 of the ’051 patent. (JC at 1.)

The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“haptic effect predefined with low-level haptic parameters such as voltage levels over time”	“haptic effect predefined with low level parameters (such as voltage levels over time) rather than from high-level parameters”	“haptic effect predefined with low-level haptic parameters such as voltage levels over time”

(*Id.*)

Immersion argues that its construction is consistent with the specification. According to Immersion, “the specification distinguishes ‘stored haptic effects’ from prior art haptic effects that were not pre-defined with low-level haptic parameters (such as voltage levels and time durations) but were instead computed and generated in real-time from high level parameters.” (CMIB at 12-13 (citing ’051 Patent at 5:25-31).) Immersion explains that the invention of the

'051 patent “avoids the need for real-time generation of the effect from high-level parameters and reduces the required processing power.” (*Id.* at 14 (citing '051 Patent at 2:4-6).) Thus, according to Immersion, its construction “comports with the specification’s description of the advantages of the '051 patent over the prior art.” (*Id.* at 13.)

Immersion argues that Respondents’ proposal “improperly imports a negative limitation.” (CMIB at 14.) Immersion notes that “[a]bsent an explicit disavowal, importing negative limitations into a claim is generally disfavored.” (*Id.* at 14 (citing *Omega Eng’g Inc. v. Raytek Corp.*, 334 F.3d 1314, 1332-33 (Fed. Cir. 2003); CMRB at 8-9.) Immersion also argues that “Respondents’ negative limitation would improperly exclude several uses of high level parameters that are contemplated in the specification.” (CMIB at 14; CMRB at 4-5.)

Respondents’ proposal includes the language contained in Immersion’s definition but adds the language “rather than from high level parameters.” Respondents assert that this additional language is necessary because the “specification draws a clear and unequivocal distinction between stored haptic effects which are predefined using low-level parameters, and prior art haptic effects which are generated in real-time from high-level parameters.” (RMIB at 5.) According to Respondents, the specification discusses the benefits of using pre-defined low-level haptic effects and “that distinction between the prior art and the invention must be honored in the construction of this claim term.” (*Id.* at 6-7.) Respondents also argue that “the stated purpose of the invention – reducing processing power – is accomplished by using low-level parameters rather than high-level parameters, which require more processing runtime.” (*Id.*)

Staff agrees with Immersion’s proposed construction but does not object to Respondents’ definition. (SMIB at 24.) Staff submits that “the language ‘predefined with low-level haptic parameters’ unambiguously indicates that the haptic effect is not predefined with high-level

haptic parameters.” (*Id.*) Thus, Staff believes that Respondents’ additional language is unnecessary. (*Id.*) Staff does, however, agree that “the construct containing the stored haptic effect” may contain other data that “is neither a low-level nor a high-level haptic parameter.” (SMRB at 2.) Staff also notes that “it is clear that the distinction” being drawn between the invention and the prior art is that “prior art systems . . . generated haptics in real time” while the claimed invention “uses predefined haptic effects.” (*Id.* at 2.)

The parties all agree that a “stored haptic effect” is a haptic effect predefined with low-level haptic parameters such as voltage levels over time. Thus, the only dispute to be resolved is whether the language “rather than from high-level parameters” is necessary. The undersigned finds that the evidence does not support adding this language to the construction.

A clear disavowal of claim scope is required to import negative limitations into a claim. *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1306 (Fed. Cir. 2011) (“To disavow claim scope, the specification must contain expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope. In general, statements about the difficulties and failures in the prior art, without more, do not act to disclaim claim scope.”). Here, there is no such evidence.

Respondents argue that such a disavowal can be found because the specification distinguishes the invention from an aspect of the prior art. (RMIB at 5 (citing *Gemalto S.A. v. HTC Corp.*, 754 F.3d 1364, 1369 (Fed. Cir. 2014).) Specifically, Respondents argue that the “specification draws a clear and unequivocal distinction between stored haptic effects which are predefined using low-level parameters, and prior art haptic effects which are generated in real-time from high-level parameters.” (*Id.* at 5.) Respondents ignore, however, that the distinction drawn in the specification is between haptic effects that are predefined versus haptic effects

generated in real-time. For example, the specification states: “Some known devices modify or generate haptic effects in real-time or ‘on the fly.’ Although this allows a wide variety of haptic effects to be generated, it may require a substantial amount of processing power and may not facilitate rapid development of new devices.” (’051 Patent at 1:54-58.) The specification notes the benefit of storing haptic effects because “[t]he stored haptic effect, unlike real-time generated haptic effects, reduces the required processing power.” (*Id.* at 2:4-6.) Thus, contrary to what Respondents argue, the specification does not clearly draw a distinction between the invention’s use of haptic effects using low-level parameters versus the prior art’s use of haptic effects using high-level parameters. It does not, for example, state that haptic effects with high-level parameters cannot be stored. It is possible that the inventors of the ’051 patent did not contemplate including pre-defined haptic effects with high-level parameters, but there is no clear disavowal excluding them. Without such, it would be improper to import a negative limitation into the claim.

Accordingly, the undersigned hereby construes the term “stored haptic effect” as “***haptic effect pre-defined with low-level haptic parameters such as voltage levels over time.***”

- b) “the entire haptic output in response to the [haptic effect] request consists of the [first/requested predefined] stored haptic effect”**

The disputed term appears in claims 1, 8, and 12 of the ’051 patent. (JC at 1.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“the haptic output is created from a single stored haptic effect, rather than by assembling multiple stored effects in real time”	“the haptic output in response to the request is limited to a single timeslot with a single pre-defined stored haptic effect and is not a timeline of a series of basis haptic effects”	“the haptic output is created from a single stored haptic effect, rather than by assembling multiple stored effects in real time”

(*Id.*)

Immersion argues that its construction is consistent with the specification and prosecution history. (CMIB at 16.) Immersion explains that this limitation was added during prosecution to overcome a rejection as a result of U.S. Patent Pub. No. 2006/0129719 to Cruz-Hernandez (“the Cruz-Hernandez application”). (*Id.*) According to Immersion, it sought to differentiate the ’051 claims from the Cruz-Hernandez application during prosecution by explaining that, in the ’051 patent’s invention, “the haptic output is created from a single predefined stored haptic effect” rather than by assembling a series of effects generated in real-time. (*Id.*)

Immersion argues that “Respondents’ construction . . . is overly narrow and improperly reads in a number of additional elements that are inconsistent with the intrinsic record.” (CMIB at 17.) Immersion contends that the language used during prosecution constituted “characterizations of the disclosure of the Cruz-Hernandez [application]” rather than statements about the claims of the ’051 patent. (*Id.*) Thus, according to Immersion, these statements cannot constitute a “‘clear and unmistakable’ disavowal of claim scope.” (*Id.*) Immersion also argues that “Respondents’ proposed construction . . . invites confusion by importing terminology that is peculiar to the Cruz-Hernandez prior art reference”, *i.e.* “timeslots,” “timelines,” and “basis haptic effects.” (*Id.* at 17.)

Respondents contend that Immersion’s proposal is “incomplete and inaccurate.” (RMIB at 11.) Respondents take issue with two aspects of Immersion’s proposed construction. First, they disagree that the haptic effect can be “created” from a single stored haptic effect. (*Id.* at 9-10.) Respondents contend that the word “created” is too broad and would allow, for example, “‘the entire haptic output’ to include output in addition to the single stored haptic effect, as long as this additional output was ‘created from’ the single stored haptic effect.” (*Id.* at 12.) Respondents explain that “[t]he transitional phrase of ‘consists of’ now limits claim 1 . . . to a

single stored haptic effect in response to the haptic effect request.” (*Id.* at 9 (quoting RX-8 at 8.) Respondents therefore contend that Immersion disavowed “any haptic effect output that includes more than the ‘single stored haptic effect.’” (*Id.* at 10.) Respondents also argue that the use of the phrase “consists of” demonstrates an intent to limit the claim. (*Id.* at 12.) Second, Respondents assert that Immersion limited the invention to a haptic output that consists only of a single timeslot rather than a timeline of a series of basis haptic effects. (*Id.* at 10-11 (citing RX-9).)

Staff agrees that Immersion’s definition is the correct one. Staff explains that “[i]t is important that the haptic effect is *stored* in memory rather than being generated on the fly” and that “the entire haptic output consists of a *single* haptic effect, rather than a timeline of multiple haptic effects assembled in real time.” (SMIB at 22 (emphasis in original).) Staff disagrees with Respondents that the language “consists only of a single timeslot” should be added as “it introduces an unnecessary ambiguity.” (*Id.* at 22-23.) Staff also argues that the use of the word “creates” comports with the restrictive nature of the phrase “consisting of.” (SMRB at 4.) According to Staff, its proposal is consistent with the principle that the “entire haptic output” is limited to a single stored haptic effect. (*Id.*) Staff argues that Respondents’ proposal, on the other hand, goes too far and adds a limitation that is both without support and unnecessarily ambiguous. (*Id.* at 4-5.)

The undersigned disagrees with Immersion and Staff that the phrase “is created from” is appropriate. This phrase is inconsistent with the limiting statements made during prosecution.

During prosecution, Immersion argued:

In the Office Action, the rejections based on Cruz-Hernandez are maintained, at least in part, because ‘claim 1 provides no limitation that a signal from an application will cause a **single** pre-stored haptic effect to be displayed. . . . In response, claim 1 has been amended to recite ‘the entire haptic output in response to the haptic effect request consists of the first stored haptic effect.’ The transitional phrase of ‘consists of’ now limits claim 1 (and the remaining

independent claims that include similar limitations) to a single stored haptic effect in response to the haptic effect request.

(CMX-005 at 7-9 (emphasis in original).) The law is clear that the use of the phrase “consisting of” means “I claim what follows and nothing more.” *Vehicular Techs. Corp. v. Titan Wheel Int’l, Inc.*, 212 F.3d 1377, 1383 (Fed. Cir. 2000.) Accordingly, Immersion indicated a clear intent to limit the meaning of the claim. The use of the phrase “created from,” in contrast, appears to exceed this limitation. As Respondents note, this language could allow Immersion to argue that the claim covered a haptic output which included output in addition to the single stored haptic effect, so long as the haptic output was “created from” a single stored haptic effect. This would conflict with Immersion’s clear intent during prosecution to limit the claim.

Staff argues that, despite this prosecution disclaimer, the use of the phrase “is created from” is consistent with the understanding that the entire haptic output is limited to a single stored haptic effect. (SMRB at 4.) It is clear, however, that Immersion does not have the same understanding. Immersion argues that “in at least some embodiments,³ the haptic output produced by the system may be based on more than just the stored haptic effect.” (CMRB at 12.) In other words, despite its statements during prosecution, Immersion now argues that the entire haptic output is not limited to a single stored haptic effect.

Despite the conclusion that the phrase “is created from” is inappropriate, the undersigned cannot adopt Respondents’ proposal in full. In addition to the phrase “the haptic output in response to the request is limited to a single timeslot,” Respondents wish to add the limitation that the haptic output “is not a timeline of a series of basis haptic effects.” The evidence does not

³ Immersion bases its argument on dependent claims 11 and 15. While these claims imply that the haptic feedback of the independent claim is not limited to a single stored haptic effect, it is important to note the difference in the language of the claim. Dependent claims 11 and 15 use the term “haptic feedback” as opposed to “haptic output.” These terms are not equivalents. Thus, the fact that the haptic *feedback* is not limited to a single stored haptic effect does not lend itself to the conclusion that the haptic *output* is likewise not so limited.

show that Immersion intended to limit the claim in this way. While Respondents suggest that Immersion injected these terms into the '051 patent, Immersion's statements during prosecution indicate an attempt to distinguish the Cruz-Hernandez application rather than a characterization of the '051 patent. The evidence shows that the examiner argued that a figure in the Cruz-Hernandez application "does show that during its associated time slot, a single pre-defined stored haptic effect is to be played." (CMX-005 at 3.) In response, Immersion noted: "[T]he entire haptic output in Cruz-Hernandez in response to a haptic effect requests [sic] includes multiple pre-defined effects assembled in real-time during a timeline. Cruz-Hernandez fails to disclose a haptic output that consists only of a single timeslot with a single pre-defined 'basis' haptic effect." (CMX-004 at 8.) Thus, the use of the words "timeslot" and "timeline" appear to be in response to the examiner's characterization of the Cruz-Hernandez application and not an indication that the '051 patent includes such features. *Netcraft Corp. v. eBay, Inc.*, 549 F.3d 1394, 1402 (Fed. Cir. 2008) (finding no disavowal when "it is not entirely clear whether [the discussion of the prior art reference] was meant to characterize the present invention . . . or whether it was meant to simply refute the Examiner's prior assumption [regarding the prior art reference]").

Additionally, the use of these terms injects uncertainty into the definition. The terms "timeslot," "timeline," and "basis haptic effects" are not used in the '051 Patent nor are they terms that a person of ordinary skill in the art would understand. Because the addition of these terms to the definition will create confusion, rather than clarification, it is not appropriate to include them in the construction.

Accordingly, the undersigned hereby construes the term as "*the haptic output in response to the request is limited to a single stored haptic effect.*"

c) “digitized streamed envelope construct”

The disputed term appears in claims 3, 9, and 13 of the '051 patent. (JC at 1.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“data format containing a stream of control information (<i>e.g.</i> , magnitude or strength values) over time for the stored haptic effect, encoded as a sequence of bytes”	“data format containing a stream of strength control information over time for the stored haptic effect, encoded as a sequence of bytes”	“data format containing a stream of control information (<i>e.g.</i> , magnitude or strength values) over time for the stored haptic effect, encoded as a sequence of bytes”

(*Id.*)

Immersion explains that “[t]he specification describes the digitized streamed envelope construct as a data format for encoding haptic effects.” (CMIB at 18.) Immersion further argues that the specification indicates that the control information can be magnitude or strength values. (*Id.*) In support, Immersion points to Tables 1-3 which provide examples of how stored haptic effects may be encoded as digitized streamed envelope constructs. (*Id.* at 19.) Immersion notes that in Table 1, “[e]ach byte contains a data value representing a voltage level or a time interval.”

(*Id.*)

Respondents agree that a “digitized streamed envelope construct” is a “data format containing a stream of . . . control information over time for the stored haptic effect, encoded as a sequence of bytes.” (RMIB at 12.) Respondents argue, however, that the control information must be “strength” control information. (*Id.*) Respondents point to the two portions of the '051 patent discussing digitized streamed envelopes and note: “In both places, the specification describes the [digitized streamed envelope] construct as being a set of strength information over time.” (*Id.* at 13.) Respondents also introduce extrinsic evidence of Immersion’s understanding of the word “envelope” in support of their proposal. (*Id.* at 13-14.)

Staff agrees with Immersion “that magnitude or strength values are merely one example of the type of control information that the construct may contain.” (SMIB at 20.) Staff explains that the inclusion of the language “in one embodiment” suggests that “in other embodiments of the invention the digitized streamed envelope may contain control information other than magnitude or strength values.” (*Id.* at 21.) Staff further notes: “Nothing in either the specification or the prosecution history precludes this interpretation” and nothing in the claim language limits “‘digitized streamed envelope construct’ to a .dse file containing strength control information.” (*Id.*)

The evidence shows that “digitized streamed envelope construct” did not have a generally accepted meaning to one of ordinary skill in the art at the time of the ’051 patent’s filing. (RX-7 at ¶ 20.) As such, as a “term[] coined by the inventor [it is] best understood by reference to the specification.” *Intervet Inc. v. Merial Ltrd.*, 617 F.3d 1282, 1287 (Fed. Cir. 2010). “Construing the claims in light of the specification does not, however, imply that limitations discussed in the specification may be read into the claims. It is therefore important not to confuse exemplars or preferred embodiments in the specification that serve to teach and enable the invention with limitations that define the outer boundaries of claim scope.” (*Id.*)

The undersigned finds that Immersion’s and Staff’s proposal is the correct one. Respondents do not – and cannot – dispute that magnitude and strength values are types of control information contained in the digitized streamed envelope construct. (’051 Patent at 4:59-62, 5:18-20.) Instead, they take issue with the proposal’s use of the term “e.g.,” as Respondents dispute that the control information can be broader than magnitude or strength values. Accordingly, Respondents’ proposal attempts to limit “digitized streamed envelope construct” to the embodiments specified in the ’051 patent.

There is no evidence to support such a limitation.⁴ The Federal Circuit has repeatedly held: “[I]t is improper to read limitations from a preferred embodiment described in the specification – even if it is the only embodiment – into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.” *GE Lighting Sols., Inc. v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014). Respondents cannot point to any such indication, much less a clear one. Respondents appear to recognize this and claim instead that their proposal is permissible because it is actually broader than the embodiments. (RMRB at 9.) Such an argument is not persuasive. It does not change the fact that Respondents’ proposal still attempts to limit the meaning of “digitized streamed envelope construct” without any indication that such a limitation is supported by the specification.⁵

Accordingly, the undersigned hereby construes the term “digitized streamed envelope construct” as “*data format containing a stream of control information (e.g., magnitude or strength values) over time for the stored haptic effect, encoded as a sequence of bytes.*”

VI. THE '356 PATENT

A. Overview

The '356 patent, entitled “Method and Apparatus for Providing Tactile Sensations,” issued on July 8, 2014. The '356 patent is assigned on its face to Immersion Corporation. It generally “describes advances in providing feedback in certain mobile electronic devices such as

⁴ As stated, *infra*, when a coined term is used, it is construed “only as broadly as provided for by the patent itself.” *Irdeco*, 383 F.3d at 1300. The question of what kind of control information may be included, however, is a different question than what the coined term “digitized streamed envelope construct” means. Both parties agree that it is a “data format containing a stream of . . . control information over time for the stored haptic effect, encoded as a sequence of bytes.” The disagreement stems from what kind of control information is permitted. The parties do not argue that “control information” is a coined term and thus it is assumed that a person of ordinary skill in the art would understand this term. Beginning from this perspective, one must look to what the patent says about the type of control information included and, more importantly for purposes of the parties’ disagreement, whether the patent specifically *excludes* any control information.

⁵ Respondents’ attempt to use extrinsic evidence as to the meaning of “envelope” is likewise unavailing. Setting aside the fact that the extrinsic evidence is a book published by Immersion’s founder – not an inventor of the '051 patent – and relates to only part of the term at issue here, a source published fourteen years prior to the filing of the application is unlikely to be helpful.

mobile phones that have, among other things, a touchscreen and an actuator.” (2/11/16 Compl. at ¶ 4.4.)

The asserted claims read as follows (with the first instance of the disputed terms highlighted in **bold**):

1. A method comprising: outputting a display signal configured to display a graphical object on a touch-sensitive input device; receiving a sensor signal from the touch-sensitive input device, the sensor signal indicating an object contacting the touch-sensitive input device; determining an interaction between the object contacting the touch-sensitive input device and the graphical object; and generating an actuator signal based at least in part on the interaction and **haptic effect data in a lookup table**.
2. The method of claim 1, wherein the actuator signal is configured to cause a haptic effect to be output.
3. The method of claim 1, wherein the actuator signal is generated when the object contacts the touch-sensitive device at a location corresponding to the graphical object.
5. The method of claim 1, wherein the display signal is configured to display a keypad comprising a plurality of softkeys.
7. The method of claim 5, wherein the plurality of softkeys comprises one softkey for each digit from 0 to 9.
9. The method of claim 1, wherein the graphical object comprises a first graphical object and a second graphical object, the haptic effect comprises a first haptic effect and a second haptic effect, and wherein the first haptic effect is configured to be output when the object contacts the first graphical object, and the second haptic effect is configured to be output wherein the object contacts the second graphical object.
10. The method of claim 1, wherein the haptic effect data comprises a plurality of haptic effects.
11. The method of claim 1, wherein the lookup table comprises one or more of input device data, position data, pressure data, or function data.
12. A system, comprising: a touch sensitive input device configured to output a sensor signal indicating an object contacting the touch-sensitive input device; an actuator coupled to the touch-sensitive input device, the actuator configured to receive an actuator signal and output a haptic effect to the touch-sensitive surface based at least in part on the actuator signal; and a processor in communication with the sensor and the actuator, the processor configured to: output a display signal configured to display a graphical object on the touch-sensitive input device, receive the sensor signal from the touch-sensitive input

- device; determine an interaction between the object contacting the touch-sensitive input device and the graphical object; generated the actuator signal based at least in part on the interaction and haptic effect data in a lookup table; and transmit the actuator single to the actuator.
13. The system of claim 12, wherein the processor is configured to generate the actuator signal when the object contacts the touch-sensitive input device at a location corresponding to the graphical object.
 15. The system of claim 12, wherein the display signal is configured to display a keypad comprising a plurality of softkeys.
 17. The method of claim 15, wherein the plurality of softkeys comprises one softkey for each digit from 0 to 9.
 19. The method of claim 12, wherein the graphical object comprises a first graphical object and a second graphical object, the haptic effect comprises a first haptic effect and a second haptic effect, and wherein the first haptic effect is configured to be output when the object contacts the first graphical object, and the second haptic effect is configured to be output wherein the object contacts the second graphical object.
 20. The system of claim 12, wherein the haptic effect data comprises a plurality of haptic effects.
 21. The system of claim 12, wherein the lookup table comprises one or more of input device data, position data, pressure data, or function data.
 22. A computer-readable medium comprising program code, comprising: program code for outputting a display signal configured to display a graphical object on a touch-sensitive input device; program code for receiving a sensor signal from the touch-sensitive input device, the sensor signal indicating an object contacting the touch-sensitive input device and the graphical object; and program code for generating an actuator single based at least in part on the interaction and haptic effect data in a lookup table, the actuator signal configured to cause a haptic effect to be output.
 23. The computer readable medium of claim 22, wherein the actuator signal is generated when the object contacts the touch-sensitive device at a location corresponding to the graphical object.
 25. The computer-readable medium of claim 22, wherein the haptic effect data comprises a plurality of haptic effects.
 26. The computer-readable medium of claim 22, wherein the lookup table comprises one or more of input device data, position data, pressure data, or function data.

B. Claim Construction

1. Construction of the Disputed Claim Terms

a) “haptic effect data”

The disputed term appears in claims 1, 12, and 22 of the '356 patent. (JC at 2.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“data identifying or describing a tactile sensation”	“tactile feedback information”	“data identifying or describing a tactile sensation”

(*Id.*)

Immersion believes that its proposal “comports with the context of the claim and the intrinsic record.” (CMIB at 22.) It states that “[t]he '356 patent broadly describes ‘haptic effect data’ as ‘data to be accessed by the controller 9 for example a correlation between tactile sensations to be produced in the actuator 6 and input information or input signal received from the input device.’” (*Id.* at 23.) Immersion argues that, per the specification, “the ‘information’ that is accessed by the controller may be stored in at least one or more databases in memory.” (*Id.*) Immersion also contends that “[t]he data in the lookup table can describe or identify the tactile sensation, such as by providing data used to generate the tactile sensation or a label or pointer that identifies the location of the data used to generate the tactile sensation.” (*Id.*)

Immersion disagrees with Respondents’ proposal that haptic effect data is limited to “tactile feedback information” because “the specification does not exclude information that may identify the tactile sensation as well as describe the sensation.” (*Id.* at 24.) According to Immersion, “[i]nstead the specification describes information ‘for’ or ‘associated with’ a particular sensation.” (*Id.* (citing '356 patent at 14:33-35, 14:46-48).)

Respondents assert that a person of ordinary skill in the art “would have understood that ‘haptic effect data’ in the context of the claims, specification and file history is the actual tactile

feedback information, and not merely an identifier of the haptic effect.” (RMIB at 17.) Respondents explain that a person of ordinary skill in the art would have “used a different phrase . . . such as ‘haptic effect identifier,’ ‘pointer,’ or ‘reference’” to describe an identifier or descriptor of the tactile feedback information. (*Id.*) Respondents argue that this understanding is “consistent with the contemporaneous technical definition of ‘data’ in the context of computers at the time of the invention.” (*Id.* at 17-18.)

Respondents further claim that the plain language meaning of “haptic effect data” is supported by the claim and specification. (*Id.* at 18-21.) Respondents explain that “[t]he ’356 patent [claims and] specification unequivocally confirm[] that ‘haptic effect data’ means the actual tactile feedback information.” (*Id.* at 19.) Respondents also argue that its construction “is faithful to the reliance placed on this limitation by Immersion during prosecution to distinguish the Rosenberg prior art reference.” (*Id.* at 21.)

Staff agrees with Immersion. (SMIB at 13.) Staff explains that, in its proposal, “the data provides sufficient information for the controller to produce the haptic effect, for example by causing an actuator to vibrate the input device at a particular frequency.” (*Id.*) Staff asserts that this understanding “is supported by the specification, which provides that ‘[t]he controller uses the tactile feedback information received from the memory to provide the necessary input to control circuitry 45 to drive the actuator 46 to produce the desired tactile sensation in the appropriate input device.” (*Id.* at 13-14 (quoting ’356 patent at 13:48-52).)

Staff disagrees with Respondents’ proposal claiming that “[i]t fails to recognize” that “the haptic effect data *describes* the tactile sensation and how to produce it; it is not the tactile sensation itself.” (*Id.* at 14.) Staff notes that “[t]he haptic effect data may also *identify* a tactile sensation by providing instructions for where the haptic effect parameters can be obtained from

storage memory.” (*Id.* (emphasis in original).) Staff “submits that there is no meaningful distinction between a lookup table consisting of memory cells that contain the parameters described by the haptic effect data and a table that instead contains pointers to memory locations where those parameters are stored.” (SMRB at 9.)

The undersigned finds that the proposal from Immersion and Staff is the correct one: “data identifying or describing a tactile sensation.” This proposal is consistent with the specification. The specification describes haptic effect data generally as data obtained from memory used to control an actuator to produce a tactile sensation. (’356 patent at 13:48-52.) The specification further indicates that the information obtained from memory can be located in one or more databases. For example, the specification provides that “a memory device 54 in which is stored at least one database containing information necessary to produce the desired function in the electronic device and the predetermined tactile sensation in an input device.” (*Id.* at 14:17-20.) The disclosure of a system with more than one database necessarily contemplates that the information may be obtained using pointers. The specification likewise describes information “for” or “associated with” a particular sensation. (*Id.* at 14:33-35 (noting that controller can read the table and obtain “the associated function and tactile feedback information”); *id.* at 14:46-50 (“The controller uses the information *for* distinct tactile Sensation 13 to produce Sensation 13 in an input device 56, by for example, causing an actuator to cause the input device to vibrate at a frequency *associated* with Sensation 13.”). The use of the words “for” and “associated with” indicates that the information in the lookup table need not be the tactile feedback information itself but can rather be information identifying or describing the tactile sensation.

Figure 9 also supports Immersion’s and Staff’s proposal. Figure 9 represents “[a]n exemplars group of associations,” and includes a number of labels in the column entitled “Tactile

Sensation.” (*Id.* at 14:23-25.) These labels can be “understood as referring to pointers to memory which contain the underlying data used to generate the actuator signal to cause the desired tactile sensation.” (CMX-001 at § 42.)

Respondents’ claim, on the other hand, that “haptic effect data” is a term that has an ordinary and customary meaning is unsupported by the evidence. Although Respondents’ expert opines that a person of ordinary skill in the art would understand this term, Respondents do not claim that the term “haptic effect data” is itself a term with a plain and ordinary meaning.⁶ Instead, Respondents submit dictionary definitions of the term “data,” which is not, of course, the same term at issue here. (RX-5.) Thus, it is inaccurate to say that the plain and ordinary meaning of “haptic effect data” is “the correct starting point for the construction of this claim term.” (RMRB at 10.) Rather, one must look to the specification itself. As discussed above, the specification supports Immersion’s and Staff’s proposal.

The undersigned is not persuaded that the prosecution history contradicts Immersion’s and Staff’s proposal. Respondents argue that the claim was amended during prosecution to add the phrase “haptic effect data in a lookup table.” Respondents claim that this phrase demonstrates that the data itself must be in the table, and cannot include a pointer or identifier. Respondents have not demonstrated, however, that such language is inconsistent with the inclusion of a pointer or identifier in the lookup table, rather than the data itself. As discussed below, the relevance of this phrase relates to the fact that the data must be in the form of a table – not that the data itself must be in the table.

The undersigned is likewise unpersuaded by Respondents’ argument that a person of ordinary skill in the art would have used a phrase such as “haptic effect identifier,” “pointer,” or

⁶ Respondents’ expert, Dr. Mihran, never testifies that “haptic effect data” has a plain and ordinary meaning, but instead notes that the understanding of “data” in this term “is consistent with the ordinary meaning of the term as evidenced by the technical definition of ‘data’ in the context of computers.” (RX-4 at ¶ 63.)

“reference.” (RMIB at 17.) In order to encompass the understanding that the “haptic effect data” could be either the data itself or a reference to the data, the inventors would have found it necessary to use an unwieldy phrase, such as “haptic effect data or a pointer or descriptor for the haptic effect data.” Given the common usage of pointers or references in the field, such specific language would be unnecessary. (CMX-018 at ¶ 13.)

Accordingly, the undersigned hereby construes the term “haptic effect data” as “*data identifying or describing a tactile sensation.*”

b) “lookup table”

The disputed term appears in claims 1, 11, 12, 21, 22, and 26 of the '356 patent. (JC at 2.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“data structure containing associations between interactions and haptic effect data”	“table of values used in obtaining the value of a function using a table look-up procedure”	“data structure in the form of a table containing associations between input signals and haptic feedback signals”

(*Id.*)

Immersion argues that the plain and ordinary meaning of “table” to a person of ordinary skill in the art refers to a “data structure” containing associations. (CMIB at 25 (citing Oliver Decl. § 48).) Immersion further asserts that the claim language and specification reveal that the lookup table of the '356 patent associates data between interaction and haptic effect data. (*Id.* at 25-26 (citing '356 patent, cl. 1, 14:40-50; Fig. 9).)

Respondents agree that “lookup table” has an ordinary and customary meaning, but believe that meaning is “table of values used in obtaining the value of a function using a table look-up procedure.” (RMIB at 22.) Respondents disagree with defining “lookup table” as a data structure, as they contend such a construction improperly rewrites and broadens the scope of the

claim. (*Id.* at 23.) Respondents also argue that “the only thing that the claims require be present in the ‘lookup table’ is the ‘haptic effect data.’ . . . The claims do not recite that the associations” are in the table. (*Id.* at 24.) Respondents assert that “the interaction” is a “separately recited claim element” that, in accordance with the rules of grammar, “is not modified by the phrase ‘in the lookup table.’” (*Id.*)

Immersion argues that Respondents’ proposal “is divorced from the specification and does not capture the purpose of the lookup table in the claims.” (CMIB at 28-29.) According to Immersion, Respondents’ construction also “adds limitations concerning how the lookup table is ‘used,’” thereby improperly converting a structural element into a functional one. (*Id.* at 29.) It also disagrees with Respondents that interactions are not part of the lookup table by pointing out that “Figures 9 and 10 depict a table with interaction data in the lookup table, making clear that ‘interaction and haptic effect data in a lookup table’ refers to both interaction data and haptic effect data in the lookup table.” (CMRB at 25.)

Staff proposes that “lookup table” be defined as a “data structure,” and asserts that the invention “requires a database, or data structure, containing instructions for producing specific functions and haptic sensations.” (SMIB at 11.) Staff explains that “[r]eceiving a particular combination of input data (such as position data and/or pressure data) causes the controller to generate feedback in the form of the corresponding function and haptic sensation.” (*Id.* at 12.) Staff also believes that its wording regarding associations “tracks the language of the specification, which provides that “[t]he storage memory includes a table in which input signals are associated with various haptic feedback signals.”” (*Id.* at 13.)

Unlike Immersion, Staff believes that it is necessary to specify that the data must be in the form of a lookup table. (*Id.* at 12.) Staff states: “It was this aspect of the invention that allowed the applicant to distinguish the invention from the Rosenberg prior art.” (*Id.*)

Immersion argues, in turn, that the addition of the word “table” to the construction is unhelpful and is contradictory to the Federal Circuit’s admonishment to refrain from using the word being defined in the definition. (CMIB at 27-28; CMRB at 22-23 (citing *Abbott Labs. v. Sandoz, Inc.*, 544 F.3d 1341, 1360 (Fed. Cir. 2008).) Immersion also disagrees with Staff’s proposal regarding associations. Immersion argues that Staff’s proposal to “insert[] ‘input signals and haptic feedback signals’ in place of the specifically claimed ‘interaction and haptic effect data’” is inconsistent with the claim language and “introduces additional and unnecessary ambiguity.” (CMIB at 27.) Immersion further claims that this construction limits the claim to particular embodiments. (*Id.* at 28.)

There are two central disputes regarding the meaning of “lookup table.” First, while the parties agree that “lookup table” has a plain and ordinary meaning, they disagree as to that meaning. Respondents contend that a “lookup table” is a “table of values used in obtaining the value of a function using a table look-up procedure.” The undersigned finds that Respondents have not supported this contention with sufficient evidence. Respondents use a definition from the IEEE Standard Dictionary of Electrical and Electronics Terms, 6th ed. (1996.). (RMIB at 22.)⁷ This dictionary predates the filing of the ’356 patent by sixteen years. Particularly given the changes in the field during this time, such a reference is inadequate to demonstrate how one of ordinary skill in the art *at the time the patent was filed* would understand the term.

⁷ Respondents also cite to the declaration of their expert. Dr. Mihran does not provide any explanation for his opinion regarding the plain and ordinary meaning of “lookup table,” other than the IEEE dictionary definition. (RX-4 at ¶ 79 (“This construction reflects the ordinary meaning of a lookup table to one of ordinary skill in the art at the time of the alleged invention, as is demonstrated by following the IEEE Std. 100-1996 dictionary definition.”).)

Both Immersion and Staff propose that a “lookup table” is a data structure containing associations. While they, too, support this contention using outdated dictionary definitions, it appears that this definition is the correct one. Respondents do not disagree that a “lookup table” is a data structure,⁸ but rather contend that defining it as such improperly broadens the claim. (See RMIB at 23.) Respondents state that, “for example, a ‘data structure’ would include the nodes of a tree that are traversed by a search algorithm.” (*Id.*) Staff agrees with this criticism, explaining: “While all tables are data structures in the context of computers, not all data structures are tables.” (SMRB at 10.)

It is clear from the term that the “data structure” of a “lookup table” must be in the form of a table. This view is confirmed by the prosecution history, as the claims of the ’356 patent were amended to require the use of data in the form of a table to distinguish the invention over prior art. (RX-3 at 9 (“Rosenberg . . . does not discuss determining which specific haptic effect to output for given a user input (or graphical object) based on data in a lookup table.”).) Thus, the undersigned finds that “lookup table” should be defined as “data structure in the form of a table containing associations . . .”

Immersion and Staff also disagree as to the specifics of the associations. Immersion contends that the associations are “between interactions and haptic effect data,” while Staff proposes that the associations are between “input signals and haptic feedback signals.” Immersion supports its argument by citing to the claim language which, for example in claim 1, recites “generating an actuator signal based at least in part on the interaction and haptic effect data in a lookup table.” Staff disagrees that this language describes the association. Staff explains that the “interaction is not a part of the lookup table,” but rather is “an element of the claim that is separate from the ‘haptic effect data in a lookup table.’” (SMRB at 12.) It is true that the

⁸ Dr. Mihran opines: “A lookup table is a particular form of data structure . . .” (RX-4 at ¶ 81.)

interaction itself is not part of the lookup table, but the specification describes data obtained from the interaction, *e.g.*, input signals, position data, and pressure data, as data that can be part of the lookup table. ('356 patent at 14:25-35.) Thus, the lookup table contains an association between the interaction and the haptic effect data, as claimed in the patent and suggested by Immersion.

Respondents' argument that the lookup table need not require any particular associations is unconvincing. Respondents contend that "the only thing that the claims require be present in the 'lookup table' is the 'haptic effect data.'" (RMIB at 24.) As Staff recognizes, a table requires at least two types of values; otherwise, it would be a list. (SMRB a 12.) Additionally, this argument conflicts with the specification, which depicts interaction data in a lookup table. Figure 9, for example, depicts input signals, position data, and pressure data in the table. ('356 patent at Fig. 9.) In this example, both the interaction data and the haptic effect data – defined *supra* as "data identifying or describing a tactile sensation" – are necessary to generate an actuator signal. Without the interaction data, the lookup table would be useless.

Accordingly, the undersigned hereby construes the term "lookup table" as "***data structure in the form of a table containing associations between interactions and haptic effect data.***"

VII. THE '488 PATENT

A. Overview

The '488 patent, entitled "Method and Apparatus for Providing Tactile Sensations," issued on October 5, 2010.⁹ The patent is assigned to Immersion and relates to "providing tactile sensations to input devices or electronic devices" ('488 patent at 2:19-21.) It teaches, among other things, "systems and methods in which the mobile electronic device displays on the touchscreen a graphical object." (5/5/16 Compl. at ¶ 4.8.)

The '488 patent has 29 claims. Immersion has asserted claims 1-2, 9-10, 17-18, 25-27, and 29 against Respondents. The asserted claims read as follows (with the first instance of the agreed-upon term highlighted in *italics* and the first instance of the disputed terms in **bold**):

1. A method, comprising: outputting a display signal configured to display a graphical object on a touch-sensitive input device; receiving a sensor signal from the touch-sensitive input device, the sensor signal indicating an object contacting the touch-sensitive input device and a pressure of the contact; determining an interaction between the object contacting the touch-sensitive input device and the graphical object based at least in part on the **pressure**; generating an actuator signal based at least in part on the interaction, wherein the actuator signal is configured to cause a **first haptic effect** if the pressure is less than a first pressure **threshold** and cause a **second haptic effect** if the pressure is between the first pressure threshold and a second pressure threshold; and outputting the actuator signal.
2. The method of claim 1, wherein the actuator signal is generated when the object contacts the touch-sensitive device at a location corresponding to the graphical object.
9. A system, comprising: a touch sensitive input device configured to output a sensor signal indicating an object contacting the touch-sensitive input device and a pressure of the contact; an actuator coupled to the touch-sensitive input device, the actuator configured to receive an actuator signal and output a haptic effect to the touch-sensitive surface based at least in part on the actuator signal, wherein the actuator signal is configured to cause a first haptic effect if the pressure is less than a first pressure threshold and cause a second haptic effect if the pressure is between the first pressure threshold and a second pressure threshold; and a processor in communication with the sensor and the actuator, the processor configured to: output a display signal configured to display a graphical object on the touch-sensitive input device; receive the sensor signal from the touch-

⁹ The '488 patent is from the same patent family as the '356 and '260 patents, and shares a common specification with those patents.

- sensitive input device; determine an interaction between the object contacting the touch-sensitive surface and the graphical object based at least in part on the pressure, generate the actuator signal based at least in part on the interaction; and transmit the actuator signal to the actuator.
10. The system of claim 9, wherein the processor is configured to generate the actuator signal when the object contacts the touch-sensitive input device at a location corresponding to the graphical object.
 17. A computer-readable medium comprising program code, comprising: program code for outputting a display signal configured to display a graphical object on a touch-sensitive input device; program code for receiving a sensor signal from the touch-sensitive input device, the sensor signal indicating an object contacting the touch-sensitive input device and a pressure of the contact; program code for determining an interaction between the object contacting the touch-sensitive input device and the graphical object based at least in part on the pressure; program code for generating an actuator signal based at least in part on the interaction, the actuator signal configured to cause a haptic effect to be output, wherein the actuator signal is configured to cause a first haptic effect if the pressure is less than a first pressure threshold and cause a second haptic effect if the pressure is between the first pressure threshold and a second pressure threshold; and program code for outputting the actuator signal.
 18. The computer-readable medium of claim 17, wherein the actuator signal is generated when the object contacts the touch-sensitive device at a location corresponding to the graphical object.
 25. An apparatus comprising: at least one input device comprising a first position and a second position, the input device moveable to the first position upon application of a first pressure to the input device, and moveable to the second position upon application of a second pressure to the input device, the second pressure greater than the first pressure; at least one actuator in communication with the input device, the actuator configured to output tactile sensations to the apparatus; and at least one processor in communication with the input device, the processor configured to: receive a first input signal from the input device, the first input signal associated with the first position, receive a second input signal from the input device, the second input signal associated with the second position, transmit a first actuator signal to the actuator, the first actuator signal configured to cause the actuator to output a **first tactile sensation** associated with the first position, and transmit a second actuator signal to the actuator, the second actuator signal configured to cause the actuator to *output a second tactile sensation associated with the second position*; wherein the input device comprises a pressure-sensitive touchpad, and the apparatus further comprises: a display panel in communication with the pressure-sensitive touchpad, the display panel configured to receive the tactile sensations from the pressure-sensitive touchpad; and at least one software-generated button configured to be displayed on the display panel.

26. The apparatus of claim 25, wherein the touchpad comprises a pressure calculator to measure the distinct amount of pressure.
27. The apparatus of claim 25, further comprising: an interface object configured to be used to contact a location on the display panel corresponding to the at least one software-generated button; and a pressure calculator to calculate an amount of pressure based upon an amount of area of the interface object in contact with the display panel.
29. An apparatus comprising: at least one input device comprising a first position and a second position, the input device moveable to the first position upon application of a first pressure to the input device, and moveable to the second position upon application of a second pressure to the input device, the second pressure greater than the first pressure; at least one actuator in communication with the input device, the actuator configured to output tactile sensations to the apparatus; and at least one processor in communication with the input device, the processor configured to: receive a first input signal from the input device, the first input signal associated with the first position, receive a second input signal from the input device, the second input signal associated with the second position, transmit a first actuator signal to the actuator, the first actuator signal configured to cause the actuator to output a first tactile sensation associated with the first position, and transmit a second actuator signal to the actuator, the second actuator signal configured to cause the actuator to output a second tactile sensation associated with the second position; wherein the apparatus comprises at least one of a mobile telephone, a personal computer, or a hand-held computing device.

B. Claim Construction

1. Construction of the Agreed-Upon Claim Term

a) “output a second tactile sensation associated with the second position”

The phrase “output a second tactile sensation associated with the second position” appears in claims 25 and 29. The parties agree it should be accorded its plain meaning.

The undersigned hereby adopts the parties’ proposed construction and shall construe the term set forth above according to their agreed-to definition.

2. Construction of the Disputed Claim Terms

a) “pressure”

The disputed term appears in claims 1, 9, 17, 25-27, and 29 of the '488 patent. (JC at 2.)

The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
Plain meaning. If construed, “pressure” refers to the “application of force from a contact.”	“force per unit area”	Plain meaning, <i>e.g.</i> , “force per unit area.”

(*Id.*)

Immersion argues that its claim construction is consistent with the language of the claims and the specification, with the plain meaning of the term, and is consistent with the way Apple uses the term to describe its own products. Immersion states that the claim construction of Respondents and Staff does not account for differences in the claim language where the term “pressure” appears. (CMIB at 42-49; CMRB at 36-38.)

Respondents argue that their claim construction is consistent with many contemporaneous technical dictionaries, and is consistent with the language of the claims and the specification. Respondents also assert that Immersion improperly uses a non-technical definition of pressure, and improperly attempts to rewrite the term “pressure” to mean “force.” Respondents state that their proposed construction does not write “switch-type input devices” out of the claim merely because such embodiments measure pressure indirectly, rather than directly. Respondent notes that to argue that a claim construction should rely in some way upon a respondent’s accused devices is contrary to Federal Circuit precedent. Finally, Respondents state that while Staff’s proposed claim construction is similar to Respondents’ construction, Staff’s

use of the term “e.g.” is incorrect because it indicates that the claim term could have more than one plain meaning, which it does not. (RMIB at 30-33; RMRB at 25-31.)

Staff argues that because of the various uses of the term “pressure” in the patent, the claim construction should be broad enough to encompass all of the different ways the term is measured. Staff also asserts that its proposed claim construction is consistent with several technical definitions of “pressure.” Staff states that its proposed construction should be adopted. (SMIB at 39-41; SMRB at 15-18.)

The language of the specification indicates that Immersion’s proposed construction is correct. It provides:

These levels of pressure may be defined by, for example, the physical location of, or the distance traveled by, a switch-type input device in the *x*-plane when pressed by a user (higher/lower), the magnitude of pressure placed on a touchpad-type device, or other means.

(’488 patent at 5:54-58.)

In contrast, the claim construction of Respondents and Staff would not fit all of the examples set forth in the above-quoted language. More specifically, the distance traveled by switch-type input device would be dependent on the application of force from a contact, not on the force per unit area. (CMX-001, Oliver Decl. ¶¶ 36-38.) The distance traveled would be the same regardless of whether the force was applied over the entire button or a tiny portion of the surface. (*Id.* ¶ 38.) To adopt the claim construction of Respondents and Staff would result in the reading out of disclosed embodiments using a switch-type device. A claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct. *MBO Labs., Inc. v. Becton, Dickinson & Co.*, 474 F.3d 1323, at 1333 (Fed. Cir. 2007).

Accordingly, the term “pressure” is construed to mean “*application of force from a contact.*”

b) “first/second haptic effect” and “first/second tactile sensation”

The disputed term appears in claims 1, 9, 17, 25, and 29 of the '488 patent. (JC at 3.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“the first haptic effect can be the same as or different from the second haptic effect” “the first tactile sensation can be the same as or different from the second tactile sensation”	“the first haptic effect/tactile sensation is different from the second haptic effect/tactile sensation”	“the first haptic effect/tactile sensation can be the same as or different from the second haptic effect/tactile sensation”

(*Id.*)

Immersion argues that the only difference between its position and that of Respondents is whether or not the first haptic effect must always be different from the second haptic effect, or whether the first haptic effect can also be the same as the second haptic effect.¹⁰ In support of its argument, Immersion cites several references in the specification of the '488 patent. (CMIB at 51-52 (citing '488 patent at 8:17-23, 9:50-56, 15:29-51, and 16:33-38).)¹¹ Immersion asserts that the principle of claim differentiation also supports its argument. (*Id.* at 50-54.)

Immersion disagrees with Respondents' argument that prosecution history estoppel requires the claim construction advocated by Respondents. Immersion argues that the applicant's distinguishing of the Rosenberg reference did not result in a clear and unmistakable disclaimer that the first and second haptic effects may be the same. (CMRB at 40-42 (citing SX-10 at IMMR-ITC2_0007649, 0007635, and 0007648).) Immersion also disagrees with Respondents' argument that the use of “first” and “second” in the claims must mean that the first and second elements must always be different. (*Id.* at 42-44.)

¹⁰ The same argument is said to apply with respect to the claims that use the term “tactile sensation.”

¹¹ Immersion cites the same language in the specification of the '260 patent.

Staff agrees with Immersion that the intrinsic evidence supports the claim construction proposed by Immersion and Staff. With respect to Respondents' prosecution history estoppel argument, Staff argues that it is not clear whether the applicant intended to distinguish Rosenberg by disavowing any embodiment in which two haptic effects are the same, or by disavowing any haptic effect that was not contingent on a minimum "sensed amount of pressure" on the touch sensitive surface. Thus, Staff asserts, the applicant's statement distinguishing Rosenberg does not rise to the level of a clear and unambiguous disavowal of the plain language in the specification that allows for the possibility that the first haptic effect may be the same as the second haptic effect. (SMIB at 42-45; SMRB at 18-20.)

Respondents argue that, regardless of the language cited by Immersion and Staff from the specification, there is a clear disavowal in the prosecution history of the possibility that the first and second haptic effects may be the same. Respondents also assert that the use of "first" haptic effect and "second" haptic effect means that the applicant must have intended that those two phrases represent different effects. (RMIB at 34-38; RMRB at 31-34.)

For the reasons set forth below, the claim construction supported by Immersion and Staff shall be adopted. First, it is clear that the specification supports that claim construction. The specification explicitly states, in connection with the multiple embodiments, that the enumerated haptic effects/tactile sensations¹² can be the same or different. One example is set forth below:

For example, the controller **9** of Fig. 2 is configured such that when the controller **9** receives a signal associated with the second level from button **10i** (the "9" key), the controller **9** sends a first control signal to the actuator, and when the controller receives a signal associated with the third level from the button **10i**, the controller sends a second control output signal to the actuator **61**, and so on. The first control output signal is one that causes the actuator to provide a vibration of a

¹² Independent claims 1, 9, and 17 of the '488 patent use "haptic effect" while independent claims 25 and 29 use "tactile sensation." All parties agree that the '488 patent uses the terms "haptic effect" and "tactile sensation" interchangeably.

certain, first frequency. The second control output signal is one that causes the actuator to provide a vibration of a certain, higher frequency, and so on. *In other embodiments, the vibrations provided may be of the same frequency.*

(’488 patent at 8:11-23 (emphasis added).) Similar examples can be found at 9:50-56 and 16:33-38 of the ’488 patent.

Respondents’ prosecution history disclaimer argument is not persuasive. It is true that in distinguishing the Rosenberg prior art, the applicant successfully argued that:

Rosenberg discloses outputting haptic effects to a touch-sensitive surface upon an object contacting a graphical object; however Rosenberg does not disclose outputting different haptic effects based on the sensed amount of pressure when an object contacts the touch-sensitive surface. Therefore, Rosenberg does not anticipate amended claim 1.

(SX-10 at IMMR-ITC-2_0007649.) However, it is not clear whether the applicant intended to distinguish Rosenberg by disavowing any embodiment in which two haptic effects were the same, or intended to distinguish Rosenberg by disavowing any haptic effect that was not contingent on the “sensed amount of pressure” on the touch-sensitive surface. In light of this, there is no clear disavowal for two haptic effects that are the same. “[F]or prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during the prosecution be both clear and unmistakable.” *Omega Eng’g, Inc.*, 334 F.3d at 1325-26.

Accordingly, the terms “first/second haptic effect” and “first/second tactile sensation” are construed to mean, respectively, “*the first haptic effect can be the same as or different from the second haptic effect*” and “*the first tactile sensation can be the same as or different from the second tactile sensation.*”

c) “threshold”

The disputed term appears in claims 1, 9, and 17 of the '488 patent. (JC at 3.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
Plain meaning. If construed: “level”	“point at which an effect is first produced, observed, or otherwise indicated”	Plain meaning, <i>e.g.</i> , “level against which a measurement is to be compared”

(*Id.*)

Immersion argues that its claim construction is supported by the relevant language of the claims where the term appears, and is also consistent with the specification. Immersion states that the terms “level” and “threshold” are interchangeable in the patent. Immersion asserts that Respondents’ claim construction is inconsistent with the language of the claims in which the term appears, as well as with the specification. Immersion notes that while Staff’s claim construction has some elements that are in line with Immersion’s proposal, the additional language “*e.g.*, level against which a measurement is compared” is redundant and unduly limiting. (CMIB at 55-58.)

Immersion argues that Respondents improperly rely on extrinsic evidence such as dictionaries and experts when there is no need to do so, and when such reliance results in a claim construction that contradicts the claim language, as well as the language of the specification. Immersion also disagrees with Respondents’ prosecution estoppel arguments. (CMRB at 44-49.)

Respondents argue that its claim construction is consistent with the definitions set forth in various technical dictionaries. Respondents also assert that its construction is consistent with the specification. Respondents state that applicants specifically disclaimed an embodiment illustrated in Figure 9 of the '488 patent, and discussed in the specification. Respondents state that Immersion’s construction should be rejected because it attempts to rewrite “threshold” to mean

“level.” Respondents cite several dictionary definitions as well as expert testimony in support of their argument.

Respondents disagree with Staff’s construction because Staff’s use of “e.g.” incorrectly suggests that the claim term could have more than one plain meaning. Also, Respondents state that while Staff’s construction requires a tangible comparison, it does not require that the comparison is that “an effect is produced, observed, or otherwise indicated,” which is the plain meaning of “threshold.” (RMIB at 38-44; RMRB at 34-37)

Staff argues that its dictionary citations support its claim construction, and that any construction adopted must be broad enough to encompass all of the examples set forth in the claims and the specification. Staff agrees that applicants specifically disclaimed an actuator signal based upon a single pressure threshold and that the prosecution history specifically excluded an embodiment disclosed in the specification. Therefore, Staff asserts that its claim construction is correct because it requires that a measurement be compared to each of two pressure thresholds. (SMIB at 45-47; SMRB at 20-24.)

For the reasons set forth below, a claim construction that is similar to the constructions proposed by Immersion and Staff shall be adopted. The term “threshold” appears in claims 1, 8, 9, 16, 17, and 24. The construction adopted must be broad enough to encompass all of the instances where it appears in the claims. For example:

...wherein the actuator signal is configured to cause a first haptic effect if the pressure is *less than* a first pressure **threshold** and cause a second haptic effect if the pressure is *between the* first pressure **threshold** and a second pressure **threshold**.

(488 patent at 20:18-23 (claim 1) (emphasis added).) The same language is found in claim 9 (*id.* at 20:65-21:3) and claim 17 (*id.* at 21:65-22:3). The specification also provides:

...if the object contacts the first graphical object, the first haptic effect is configured to be output if the pressure is *less than* the first pressure **threshold** and the second haptic effect is configured to be output if the pressure is *between* the first pressure **threshold** and a second pressure **threshold**, and

if the object contacts the second graphical object a third haptic effect is configured to be output if the pressure is *less than* the first pressure **threshold** and the fourth haptic effect is configured to be output if the pressure is *between* the first pressure **threshold** and a second pressure **threshold**.

(488 patent at 20:45-57 (claim 8) (emphasis added).) The same language is found in claim 9 (*id.* at 20:65-21:3), claim 16 (*id.* at 21:39-50), and claim 24 (*id.* at 22:29-40).

It is clear in all of these instances that that the event caused is not caused at the first or second threshold but either *before* the first pressure threshold or *between* the first and second pressure thresholds. In these instances, the threshold is not “the point at which an effect is first produced, observed, or otherwise indicated” as Respondents’ construction would require. Thus, Respondents’ proposed claim construction shall not be adopted.

The undersigned shall not adopt Immersion’s proposed claim construction of “level” either. The term “level” is used in many places in the specification in the context of “levels of pressure.” (*See, e.g., id.* at 5:54, 64, 67 and 6:2, 5.) In these instances, the levels of pressure refer to multiple gradations of pressure placed upon an input device. There are clearly more levels of pressure than there are pressure thresholds. Thus, while a threshold can be a type of level, there are levels that are not thresholds. Therefore, the appropriate claim construction for “threshold” is “a type of level.” In light of this decision, the undersigned need not decide the prosecution disclaimer argument of Respondents, which is supported by Staff, that the scope of the asserted

claims is limited to cases in which an actuator signal is based on a pressure relative to two different pressure thresholds.¹³

Accordingly, the undersigned hereby construes the term “threshold” as “*a type of level.*”

VIII. THE '260 PATENT

A. Overview

The '260 patent, entitled “Method and Apparatus for Providing Tactile Sensations,” issued on February 26, 2008. The patent is assigned to Immersion and teaches, among other things, “systems in which the electronic device detects different levels of pressure on the device and provide tactile sensations in response.” (5/5/16 Compl. at ¶ 4.12.)

The '260 patent has 9 claims. Only claims 1 and 2 are asserted against Apple.¹⁴ The asserted claims read as follows (with the first instance of the disputed terms highlighted in **bold**):

1. A computer-readable medium having instructions, the instructions including instructions that cause a processor to: detect a first **pressure** on a first input device; provide a first tactile sensation to the first input device, the **first tactile sensation** based at least in part on the first pressure; detect a second pressure on the first input device, the second pressure greater than the first pressure; and provide a **second tactile sensation** to the first input device, the second tactile sensation based at least in part on the second pressure; detect a third pressure on the first input device, the third pressure greater than the second pressure; and provide a **third tactile sensation** to the first input device.
2. The computer-readable medium of claim 1 further comprising stored instructions, the stored instructions including instructions which, when executed by a processor, cause the processor to: detect a fourth pressure on the first input device, the fourth pressure greater than the third pressure; and provide a **fourth tactile sensation** to the first input device.

¹³ In light of this decision, the undersigned need not decide the prosecution disclaimer argument of Respondents, which is supported by Staff, that the scope of the asserted claims is limited to cases in which an actuator signal is based on a pressure relative to two different pressure thresholds.

¹⁴ Immersion has not asserted this patent against AT&T in this Investigation.

B. Claim Construction

1. Construction of the Disputed Claim Terms

a) “pressure”

The parties agree that this term should be construed the same as “pressure” was construed in the ’488 patent. (CMIB at 60; RMRB at 38; SMRB at 24.) Because the ’260 patent shares the same specification as the ’488 patent, the undersigned agrees.

Accordingly, the term “pressure” is hereby construed to mean “*application of force from a contact.*”

b) “first/second/third/fourth tactile sensation”

The parties agree that these terms should be construed the same as the terms “first/second haptic effect” and “first/second tactile sensation” were construed in the ’488 patent. (CMIB at 61; RMRB at 45; SMIB at 50-51.) Because the ’260 patent shares the same specification as the ’488 patent, the undersigned agrees.

Accordingly, the terms “first/second/third/fourth haptic tactile sensation” are hereby construed to mean “*the first second/third/fourth haptic tactile sensation can be the same or different from the other claimed tactile sensations.*”

IX. THE '507 PATENT

A. Overview

The '507 patent, entitled "Systems and Methods for Adaptive Interpretation of Input from a Touch-Sensitive Input Device," issued on June 10, 2014. The patent is assigned to Immersion and relates generally to "receiving input from a touch-sensitive input device." ('507 patent at 1:24-25.) More specifically, it teaches, among other things, "systems and methods in which the mobile electronic device determines a pressure and a change in pressure based on contact data." (5/5/16 Compl. at ¶ 4.4.)

The '507 patent has 18 claims. Claims 1-5, 9-12, and 14-17 are asserted against Respondents. The asserted claims read as follows (with the first instance of the disputed terms highlighted in **bold**):

1. A method comprising: receiving contact data from an input device; determining an interaction with a displayed object on a screen based on the contact data; responsive to determining the interaction, determining a gesture based on the contact data comprising: determining a **pressure** and a change in pressure based on the contact data, and **determining a press if: the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold**, and a first interval has elapsed; and responsive to determining the gesture, outputting the haptic effect.
2. The method of claim 1, wherein the contact data comprises an actual pressure and a **pseudo pressure**.
3. The method of claim 2, wherein the pseudo pressure is based on a change in capacitance resulting from the contact.
4. The method of claim 3, wherein the contact data is based on a contact on a specific portion of a touch-sensitive input device.
5. The method of claim 4, wherein the contact information comprises position data, and further comprising determining whether a contact is made on a softkey based on the position data.

9. A non-transitory computer-readable medium comprising program code for causing a processor to execute a method, the program code comprising: program code for receiving contact data from an input device; program code for determining an interaction with a displayed object on a screen based on the contact data; program code for, responsive to determining the interaction, determining a gesture based on the contact data comprising: program code for determining a pressure and a change in pressure based on the contact data, and program code for determining a press if: the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold, and a first interval has elapsed; and program code for, responsive to determining the gesture, outputting the haptic effect.
10. The non-transitory computer-readable medium of claim 9, wherein the contact data comprises an actual pressure and a pseudo pressure.
11. The non-transitory computer-readable medium of claim 10, wherein the pseudo pressure is based on a change in capacitance resulting from the contact.
12. The non-transitory computer-readable medium of claim 11, wherein the contact data is based on a contact on a specific portion of a touch-sensitive input device.
14. A system comprising: a computer-readable medium; and a processor in communication with the computer-readable medium, the processor configured to: receive contact data from an input device; determine an interaction with a displayed object on a screen based on the contact data; responsive to determining the interaction, determine a gesture based on the contact data comprising: determining a pressure and a change in pressure based on the contact data, and determining a press if: the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold, and a first interval has elapsed; and responsive to determining the gesture, output the haptic effect.
15. The system of claim 14, wherein the contact data comprises an actual pressure and a pseudo pressure.
16. The system of claim 15, wherein the pseudo pressure is based on a change in capacitance resulting from the contact.
17. The system of claim 16, wherein the contact data is based on a contact on a specific portion of a touch-sensitive input device.

B. Claim Construction

1. Construction of the Disputed Claim Terms

a) “pressure”

The disputed term appears in claims 1, 2, 9, 10, 14, and 15 of the '507 patent. (JC at 4.)

The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
Plain meaning. If construed, “pressure” refers to the “application of force from a contact.”	“force per unit area”	Plain meaning, <i>e.g.</i> , “force per unit area”

(*Id.*)

Immersion argues that the specification explains that “pressure” refers to an object, such as a user’s finger, pressing down on another object, such as the touchscreen of an electronic device. Immersion states that, as with the '488 patent and the '260 patent, the usage of “pressure” in the intrinsic record of the '507 patent is consistent with the ordinary understanding of the word. Immersion asserts that Respondents’ and Staff’s limitation of “pressure” to force per square inch” is inconsistent with the claims and the specification. Immersion states that to adopt that claim construction would be inconsistent with the purpose of the invention which is to avoid inconsistencies caused by physical differences between users who may apply pressure differently. Immersion argues that if “pressure” meant “force per square inch” then a finger user would have to press 100 times harder than a stylus user in order to produce the “force per square inch” necessary to activate the desired function, a result at odds with the purpose of the invention. (CMIB at 64-66; CMRB at 50-52.)

Respondents incorporate by reference their arguments regarding this term that they made with respect to the '488 patent and the '260 patent. (RMIB at 46.) Respondents assert that Immersion's citation to two parts of the specification does not show that this is a reason to depart from the standard definition of "pressure" supported by Respondents. Respondents state that Immersion's citation to the "Background" section of the specification is inapposite and that another citation to the specification, in fact, supports Respondents' position. (RMRB at 39-40.) Staff generally agrees with Respondents and states that there is no need to deviate from the standard definition of pressure, as Immersion urges, in order to avoid an anomalous result. (SMIB at 29-31; SMRB at 25-27.)

Many of the arguments raised with regard to the term "pressure" in the '507 patent are similar to those raised with respect to the '488 patent and the '260 patent. Like the '488 patent and the '260 patent, there is no clear intent by the applicant to use the definition of "force per unit area," rather than "application of force from a contact." (See '507 patent at 2:41-45, 5:21-23.) While included in the "Background" section of the specification, the following citation makes clear the issue the invention was attempting to resolve: "Thus a method and system are needed for accurately determining a user's intent based on data supplied by a touch-sensitive input device." (*Id.* at 2:1-3.) It is clear that this citation, as well as the other language in the specification, that the "application of force from a contact" definition is the correct one. (*Id.* at 3:21-39.) The construction adopted below comports with the plain and ordinary meaning of the term in the context of the '507 patent.

Accordingly, the term "pressure" is hereby construed to mean "***application of force from a contact.***"

b) “pseudo pressure”

The disputed term appears in claims 2, 3, 10, 11, 15, and 16 of the '507 patent. (JC at 4.)

The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“a measure of the area of the screen contacted by an object”	“an indirect measure of pressure, such as one based on capacitance”	“an estimation of the vertical displacement by a conductor at a single point”

(*Id.*)

For the reasons set forth below, the undersigned will adopt a claim construction that is a modification of the construction proposed by Respondents. Immersion argues that its proposal is consistent with the “surrounding claim language” and the specification, which clarifies that “pseudo pressure” can occur in input devices that utilize a variety of different technologies. By contrast, Immersion states, Staff’s and Respondents’ respective proposals improperly attempt to limit “pseudo pressure” to embodiments that use capacitance.

Immersion argues that Respondents’ proposal is problematic for at least four reasons. Immersion states that the inclusion of the term “such as one based capacitance,” places too much emphasis on the sensing mechanism used by a preferred embodiment, *i.e.*, capacitance, when the specification clearly states that touchpads work by utilizing resistance, capacitance, or membrane switches. Second, the specification and the claims clearly distinguish “pseudo pressure” from actual pressure, which may be measured by a “pressure sensor.” Immersion asserts that, by contrast, “pseudo pressure” is a measure of the area of the screen contacted by the user and may not accurately measure the amount of pressure actually exerted on the touchpad. Third, the other portion of Respondents’ construction, “an indirect measure of pressure,” gives insufficient

guidance as to the meaning of “pseudo pressure.” Finally, Immersion asserts that Respondents’ proposal is vague and inconsistent with the surrounding claim language.

Immersion states that Staff’s proposal is equally problematic. Immersion argues that Staff’s claim construction appears to be drawn from a statement in the specification contrasting the “pseudo pressure” technique with a traditional pressure measurement technique that may be based upon vertical displacement. Immersion states that pseudo pressure cannot be limited to “an estimation ... based on the size of the resulting capacitance change” when the specification clearly states that the invention may be implemented in conjunction with non-capacitive devices, such as resistive and membrane-switch membranes. Immersion also asserts that Staff’s proposal is inconsistent with the principle of claim differentiation. (CMIB at 66-71.)

Immersion argues that its proposal is correct because pseudo pressure is a measure of the area of the screen contacted by an object, such as the user’s finger. Immersion asserts that its proposal encompasses all of the pseudo-pressure embodiments disclosed in the specification, including embodiments using capacitive sensors or other configurations. Immersion states that Respondents’ proposal to use “indirect measure of pressure” as the proper construction for the term “pseudo pressure” is in error because the claim language specifically describes “pseudo pressure” not as an indirect measure of pressure, but as a component of “contact data” received from an input device. Immersion argues that Respondents incorrectly define the contact data in terms of the measuring tool used (*e.g.*, capacitance) instead of what is actually being measured – the contact area. Immersion also asserts that Respondents’ construction encompasses types of contact data that are clearly not pseudo pressure because contact data “based on capacitance” is not necessarily a pseudo pressure. Immersion states that Staff’s definition is too narrow because it is limited to a preferred embodiment. (CMRB at 52-56.)

Respondents argue that the specification makes clear that Respondents' proposed construction is consistent with the specification and covers all of the examples of "pseudo pressure" set forth in the specification. Respondents assert that touchpad **102**, a preferred embodiment in the specification, senses "pseudo pressure" rather than "actual pressure." Respondents state that when a conductor, such as a user's finger, is placed on a touchpad described as a preferred embodiment, a capacitance is formed on perpendicular sets of wires in the touchpad and the touchpad measures which wires have the greatest capacitance to determine where the conductor is being touched. Respondents argue that the specification teaches that the touch pad uses this capacitance to provide a pseudo pressure.

Respondents state that pseudo pressure (including pseudo pressure determined by capacitance) is an indirect measure of pressure when it states capacitance-based pseudo pressure "may not actually accurately represent the amount of pressure actually exerted on the touchpad **102**." (RMIB at 51 (citing '507 patent at 3:20-12).) Respondents argue that other touchpads may use resistance or membrane switches, and that the specification distinguishes between resistive, capacitive, and membrane switch-based touchpads that measure pseudo pressure and those that measure actual pressure.

Respondents state that Staff's construction is consistent with Respondents' construction, but incorrectly excludes pseudo pressures not based on a change in capacitance. Respondents assert that Immersion's construction does not encompass the full scope of pseudo pressures disclosed by the specification because it excludes estimates of pressure that are based on capacitance that do not measure contact area, as well as estimates of pressure based upon resistance or the use of membrane switches that do not measure contact area. Respondents argue that the specification does not disclose the method that Immersion identifies in its proposed

construction, “a measure of the area of the screen contacted by an object.” Respondents state that Immersion’s construction is detached from the specification because it fails to address how capacitance is related to pseudo pressure. (RMIB at 49-54.)

Respondents argue that Immersion’s construction is supported only by language in claim 2 and some limited language in the specification. Respondents assert that the language of claim 2 only states that “the contact data comprised an actual pressure and a pseudo pressure.” Respondents state that claim 2 certainly does not either state or suggest that pseudo pressure is a measure of the area of the screen contacted by an object. Respondents argue that Immersion’s criticisms of Respondents’ construction are without merit. (RMRB at 44-47.)

In its reply brief, Staff modified its proposed construction by deleting the phrase “based on the size of the resulting capacitance charge” because of language in the specification that provides that the touchpad **102** cited in Figure 1 is merely an example of a touchpad that provides a pseudo pressure. (SMRB at 28.) Staff argues that pseudo pressure is an estimation of actual pressure because it may not accurately represent the amount of pressure exerted on the touchpad **102**. Staff asserts that the pressure actually exerted on the touchpad is measurable as the actual vertical displacement by a conductor at a single point on the touchpad **102**. Staff notes that the specification provides: “[T]he pseudo pressure or Z parameter provided by the touchpad **102** is not a measure of the actual vertical displacement by a conductor at a single point on the touchpad **102**, touchpad **102**, but rather an estimation of the actual vertical displacement based on the size of the capacitance change” (SRB at 29 (citing ’507 patent at 3:15-19).) Staff argues that both Immersion’s and Respondents’ constructions describe certain aspects of the meaning of “pseudo pressure,” but Immersion’s construction is overly narrow, while Respondents’ is overly broad. (SMRB at 27-29.)

It is clear from a review of the specification that the term “pseudo pressure” is a “coined” term in that it has no generally accepted meaning to one of ordinary skill in the art. Therefore, the meaning must be discerned from the specification and the language of the claims. Most of the discussion in the specification discusses a preferred embodiment, touchpad **102**, which is said to be a capacitance touchpad. (’507 patent, 3:66-67.) The specification notes that the touchpad **102**:

... does not sense an actual pressure. Instead, the pressure reading from the touchpad **102** is a pseudo pressure. Touchpads work by utilizing resistance, capacitance, or membrane switches. The touchpad **102** shown in FIG. 1 utilizes capacitance, however, an embodiment of the present invention may be implemented with any touch-sensitive input device, including resistive and membrane-switch touchpads.

(*Id.* at 2:53-60.) The specification goes on to describe other embodiments where:

... actual pressure may be sensed. For example, in one embodiment, a touch screen with an attached explicit pressure sensor is utilized.

(*Id.* at 2:61-63.) In further describing touchpad **102**, the specification states that it:

... also provides a pseudo pressure, Z. The pseudo pressure is based on the amount of capacitance resulting from the conductor touching the touchpad **102**. Accordingly, the amount of capacitance is not a direct measure of pressure, but rather a pseudo pressure.

(*Id.* at 3:10-14.) The specification also states that the pseudo pressure: “...may not accurately measure the amount of pressure actually exerted on the touchpad.” (*Id.* at 3:19-21.)

Neither Staff’s nor Immersion’s proposed construction shall be adopted. While Staff’s proposed construction, as modified, covers the instance of a touchpad that uses capacitance, Staff has not shown that it is broad enough to cover touchpads that use resistance or membrane switches. Immersion’s proposed construction is nowhere to be found in the claims or the specification. Immersion’s discussion of a capacitance touchpad in the specification using different sized fingers and other objects, and different pressures, is not sufficient to support Immersion’s construction.

The construction adopted must be broad enough to cover all embodiments. As noted in the above-quoted portions of the specification, pseudo pressure is “not a direct measure of pressure” (*id.* at 3:12-14), and is one that “may not accurately measure the amount of pressure actually exerted on the touchpad 102.” (*Id.* at 3:19-21.) While this language from the specification describes the operation of a capacitance-based touchpad, it is clear from the specification that “an embodiment of the present invention may be implemented in conjunction with any touch-sensitive input device, including resistance and membrane-switch touchpads. (*Id.* at 2:53-60.)

Accordingly, the construction that most accurately defines “pseudo pressure” is “*an indirect measure of pressure.*”¹⁵

c) “determining a press if . . . the change in pressure is greater than a change in pressure threshold”

The disputed phrase appears in claims 1, 9, and 14 of the ’507 patent. (JC at 4.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
Plain meaning. If construed: “determine a press if . . . the change in pressure is greater than a static or adaptive threshold for the change in pressure”	“determining that a press has occurred based on determining that the magnitude of the change in pressure is greater than a static or adaptive change in pressure threshold”	Plain meaning, <i>e.g.</i> , “determining that a press has occurred if . . . the magnitude of the change in pressure is greater than a static or adaptive threshold for the change in pressure”

(*Id.*)

Immersion argues that its proposed construction reflects the plain meaning of the claim term. Immersion asserts that Staff’s proposal falls within the meaning of the claim term but is too limiting because the use of the term “magnitude” in Staff’s proposed construction would exclude

¹⁵ This construction is a modification of Respondents’ construction which deletes Respondents’ additional language, “such as one based on capacitance.” The deletion of this extraneous language makes the construction more accurate.

instances where the change in pressure is negative in those cases where the current pressure is smaller than the previous pressure. Immersion states that Staff's proposal would also exclude other embodiments such as where the change in pressure is computed by maintaining a rolling average of recent pressure values and subtracting that average pressure from the current pressure, and where the change in pressure is filtered in numerous ways.

Immersion argues that Respondents' proposed construction also improperly uses the term "magnitude." Immersion notes that Respondents also add a new requirement that "determining a press" be "based on determining that" the change in pressure is greater than a change in pressure threshold, which is unsupported by the language of the claims. Immersion states that Respondents' proposal also violates the doctrine of claim differentiation. (CMIB at 71-74; CMRB at 56-58.)

Respondents argues that the plain meaning of the claim language as well as the specification support the inclusion of the second "determining" in Respondents' construction. Respondents agree with Staff that the term "magnitude" should be include in the claim construction because one of ordinary skill in the art would understand that in order to determine whether the change in pressure is greater than the change in the pressure threshold, one would compare the magnitude of the change in pressure to the change in pressure threshold. Respondents agree with Staff on what the claims substantively require, but argue that the "determining" step is warranted because Immersion refuses to acknowledge that this claim limitation necessarily includes determining that the change in pressure is greater than the change in pressure threshold. Respondents state that Immersion's argument ignores the claim language itself which recites "determining a press if," followed by the three specified criteria, thus indicating that the determination includes determining the presence of each of the three criteria.

(RMRB at 42 (citing '507 patent at 10:38-42, 11:12-16, and 12:13-17).) Respondents state that Immersion's argument also ignores the uniform teachings of the specification which provide that the claimed invention actually determines that the change in pressure criterion is satisfied.

Respondents argue that, contrary to Immersion's assertion, the term "magnitude" encompasses the possibility that a change of pressure in the negative direction, if large enough, could also exceed the change in the pressure threshold. Respondents argue that their construction does, in fact, cover other examples in the specification which Immersion asserts are not covered. (RMIB at 47-49; RMRB at 41-43.)

Staff asserts that the differences between its proposed construction and that proposed by Respondents is not substantive. Staff notes that the parties agree that the phrase "change in pressure threshold" does not refer to a "pressure threshold" that changes, but rather to a "change-in-pressure threshold" which may be either static or adaptive. Staff notes that nothing in the specification or the prosecution history indicates that the change in pressure must have a positive value. Staff argues that Staff and Respondents include the term "magnitude" in their construction to make clear that a change in pressure can have a positive or negative value such that a change in the negative direction, if large enough, could exceed the change in pressure threshold. Staff asserts that the only point of disagreement between Respondents and Staff appears to be that Respondents have added a "determining" step which Staff argues is not found in the language of the claims and is less clear than the plain language of the claim.

For the reasons set forth below, the construction proposed by Staff, with a modification, shall be adopted. The specific claim language over which the parties disagree is "the change in pressure is greater than a change in pressure threshold." All parties agree that the change in pressure threshold may be either static or adaptive. The first question to be resolved is whether

the change in pressure must always be positive, or if it can be positive or negative. Staff and Respondents argue that by putting the word “magnitude” in their respective constructions, it is made clear that change in pressure can be positive or negative. Immersion appears to agree that the change in pressure can be positive or negative, but disagrees that putting the term “magnitude” in the construction will make that clear. The plain meaning of the term “greater than” in the claim does not limit the amount of such change in pressure to a positive or negative number – it is the amount of the change that is discussed in the claim term.

The remaining dispute involves whether the claim construction must have a second “determining,” as advocated by Respondents. The language of claim 1, for example, provides that a “press” is determined as soon as [1] “the pressure is greater than a pressure threshold, [2] the change in pressure is greater than a change in pressure threshold, and [3] a first interval has elapsed.” (’507 patent at 10:39-43.) Respondents have not shown anything in the claim language, the specification, or the prosecution history that requires this extra step, *i.e.*, the second “determining.” Moreover, this additional step is not necessary because the process of determining whether a press has occurred necessarily includes determining that the change in pressure is greater than the relevant threshold. (*Id.*) Accordingly, Respondents’ proposal to add a second “determining” to the claim construction shall not be adopted.

In light of the above discussion, the claim term “determining a press if ... the change in pressure is greater than a change in pressure threshold” is hereby construed to mean *“determining that a press has occurred if ... the magnitude of the change in pressure (positive or negative) is greater than a static or adaptive threshold for the change in pressure.”*

X. THE '571 PATENT

A. Overview

The '571 patent, entitled “Interactivity Model for Shared Feedback on Mobile Devices,” issued on February 25, 2014. The patent is assigned to Immersion and is directed to “a user interface for a device, and in particular to producing a dynamic haptic effect using multiple gesture signals and real or virtual device sensor signals.” ('571 patent at 1:15-18.)

The '571 patent has 30 claims. Claims 1-7, 12-18, and 23-29 are asserted against Respondents. The asserted claims read as follows (with the first instance of the disputed term highlighted in **bold**):

1. A method of producing a haptic effect comprising: receiving a first gesture signal; receiving a second gesture signal; generating a **dynamic interaction parameter** using the first gesture signal and the second gesture signal; and applying a drive signal to a haptic output device according to the dynamic interaction parameter.
2. The method of claim 1 wherein the first or second gesture signal comprises a vector signal.
3. The method of claim 1 wherein the first or second gesture signal comprises an on-screen signal.
4. The method of claim 1 wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter from a difference between the first gesture signal and the second gesture signal.
5. The method of claim 1 wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and a physical model.
6. The method of claim 1 wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and an animation.

7. The method of claim 1 further comprising: receiving a first device sensor signal; receiving a second device sensor signal; and wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and the first device sensor signal and the second device sensor signal.
12. A haptic effect enabled system comprising: a haptic output device; a drive module electronically coupled to the haptic output device for receiving a first gesture signal, receiving a second gesture signal, and generating a dynamic interaction parameter using the first gesture signal and the second gesture signal; and a drive circuit electronically coupled to the drive module and the haptic output device for applying a drive signal to the haptic output device according to the dynamic interaction parameter.
13. The system of claim 12 wherein the first or second gesture signal comprises a vector signal.
14. The system of claim 12 wherein the first or second gesture signal comprises an on-screen signal.
15. The system of claim 12 wherein the drive module comprises a drive module for generating a dynamic interaction parameter from a difference between the first gesture signal and the second gesture signal.
16. The system of claim 12 wherein the drive module comprises a drive module for generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and a physical model.
17. The system of claim 12 wherein the drive module comprises a drive module for generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and an animation.
18. The system of claim 12 wherein the drive module comprises a drive module for receiving a first device sensor signal, receiving a second device sensor signal, and generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and the first device sensor signal and the second device sensor signal.
23. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, causes the processor to produce a haptic effect, the instructions comprising: receiving a first gesture signal; receiving a second gesture signal; generating a dynamic interaction parameter using the first gesture signal and the second gesture signal; and applying a drive signal to a haptic output device according to the dynamic interaction parameter.
24. The non-transitory computer readable medium of claim 23, wherein the first or second gesture signal comprises a vector signal.

25. The non-transitory computer readable medium of claim 23, wherein the first or second gesture signal comprises an on-screen signal.
26. The non-transitory computer readable medium of claim 23, wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter from a difference between the first gesture signal and the second gesture signal.
27. The non-transitory computer readable medium of claim 23, wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and a physical model.
28. The non-transitory computer readable medium of claim 23, wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and an animation.
29. The non-transitory computer readable medium of claim 23, further comprising: receiving a first device sensor signal; receiving a second device sensor signal; and wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and the first device sensor signal and the second device sensor signal.

B. Claim Construction

1. Construction of the Disputed Claim Term

a) “dynamic interaction parameter”

The disputed term appears in claims 1, 4-7, 12, 15-18, 23, and 26-29 of the '571 patent.

(JC at 2.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“parameter that changes over time or reacts in real time based on a user’s interaction with a device”	“a parameter that defines a haptic effect that evolves over time based on a user’s interaction with a device”	“a parameter that defines a haptic effect that evolves over time based on a user’s interaction with a device”

(*Id.*)

Immersion asserts that the “key feature of interaction parameters, including dynamic interaction parameters, is that they are derived from the user’s interaction with a device and therefore correspond primarily to the user’s input, rather than any haptic output.” (CMIB at 33

(citing Oliver Decl. ¶ 71); CMRB at 27-28.) It contends that the focus on the user's interaction, rather than any haptic output, is evident from the structure of the claims and the specification. (CMIB at 33-34 (claiming that the dynamic interaction parameter is a mechanism for the user's input to influence a haptic effect that is provided by the device).) Immersion further claims that its proposed construction is in accord with the prosecution history. (*Id.* at 34 (citing CMX-008, Aug. 17, 2002 Notice of Allowance, at 6).) In particular, it states: "during prosecution of the '571 patent's parent application, the examiner noted that 'a dynamic interaction parameter can be any type of signal that is changing over time or reacting in real time (representing a change in state of a given input signal.'" (*Id.* (emphasis in original).) Thus, Immersion argues that an interaction parameter becomes dynamic when it changes over time or reacts in real time based on the user's interaction with the device. (*Id.* at 34-35 (arguing that the concept of "changing over time or reacting in real time" is linked to the word "dynamic" in both the prosecution history and the specification).)

Immersion objects to Respondents' and Staff's proposed construction as being at odds with the intrinsic evidence. (CMIB at 35-37; CMRB at 28-32, 34-35.) Specifically, Immersion argues: "The central defect in their construction is that it requires the dynamic interaction parameter to 'define a haptic effect.' This fundamentally misstates the role of the dynamic interaction parameter and converts it from a reflection of the user's interaction into an exact specification of a haptic output." (CMIB at 35-37.) It further argues that Respondents' and Staff's proposal improperly imports features of a particular embodiment into the asserted claims and creates unnecessary ambiguity as to the terms "define" and "evolve." (CMRB at 28-32, 34-35.)

Respondents characterize the dispute between the parties as “whether the dynamic interaction parameter must *define* a dynamic haptic effect, *i.e.* “a haptic effect that evolves over time based on a user’s interaction with a device” (Respondents’ and Staff’s position), or whether the dynamic interaction parameter may be any parameter that changes over time, regardless whether or not it results in a dynamic haptic effect (Immersion’s construction).” (RMIB at 27 (emphasis in original).) They assert that their construction is consistent with the teachings of the specification, while Immersion’s construction is not. (*Id.*)

In support of their position, Respondents assert that the meaning of “dynamic interaction parameter” must be derived from the specification because it is a coined term without a generally accepted meaning to one of ordinary skill in the art. (RMIB at 27 (citing RX-13, Bove Decl. at ¶ 16); RMRB at 17-20, 22-24.) They claim the specification makes clear that the “entire point” of the invention is to provide dynamic haptic effects. (RMIB 27-29; RMRB at 17-20.) For example, they argue that the specification defines a “dynamic haptic effect” as a haptic effect that evolves over time as it responds to one or more input parameters and further teaches that haptic effects are “defined” or “determined” by parameters. (RMIB at 27-28 (citing ’571 patent at 2:64-66, 4:11-19, 4:19-22).) They also argue that consistent with those teachings, the specification describes an “interaction parameter” as a parameter that defines a dynamic haptic effect. (RMIB at 28.) Thus, according to Respondents, “the specification teaches that a continuously evolving (dynamic) haptic effect is provided while the user is gesturing, with the effect being ‘determined’ by the interaction parameter.” (RMIB at 28.)

Respondents challenge Immersion’s construction on two grounds. First, Respondents allege that Immersion’s construction fails to recognize that the “dynamic interaction parameter” defines the haptic effect. They explain that Immersion focuses its construction on the user’s

input. (RMIB at 29; RMRB at 20.) By ignoring the resulting dynamic output, Respondents submit that Immersion's construction does not encompass the full meaning of this term as taught by the specification. (*Id.*) Second, Respondents contend that Immersion's proposal would permit the claims to cover prior art systems distinguished in the specification. (RMIB at 29-30; RMRB at 21.) They state: "[T]he specification distinguished its purportedly novel 'dynamic haptic effect' from acknowledged prior art systems that provided static haptic effects in response to triggered events. . . . Immersion's construction would encompass the distinguished prior art system that generates a static haptic effect, for example, by generating a static haptic effect based upon the triggering event of the interaction parameter reaching a particular value." (RMIB at 29 (citing RX-13, Bove Decl. at ¶ 21).)

As noted above, Staff's proposed construction is identical to that of Respondents. Staff asserts that this construction captures the specification's emphasis on the dynamic nature of the haptic effect by specifying that it is the haptic effect that evolves over time based on a user's interaction with a device.¹⁶ (SMIB at 16-17; SMRB at 13-14.) Staff explains that while the specification does not expressly define the disputed term, it does define a "dynamic haptic effect" as "a haptic effect that evolves over time as it responds to one or more input parameters." (SMIB at 16 (citing '571 patent at 2:64-66).) Staff contends that a dynamic interaction parameter is therefore an "input parameter" to which a dynamic haptic effect responds. (*Id.*) Staff further explains that the specification describes the haptic effect as "dynamic" rather than the input parameter. (*Id.* at 16-17.) In Staff's view, the word "dynamic" in "dynamic interaction parameter" modifies "interaction" rather than "parameter."¹⁷ (*Id.* at 17.) Thus, Staff submits that

¹⁶ Staff clarifies that in its proposed construction, the phrase "based on a user's interaction with a device" modifies "evolves," not "parameter." (SMRB at 14.)

¹⁷ Staff notes that whether or not the input parameters used to define the haptic effect are static or dynamic is unimportant. (SMRB at 13.)

the “dynamic interaction parameter” is a constant parameter that defines a dynamic interaction.¹⁸
(*Id.*)

Staff disagrees with Immersion’s proposed construction because it does not explain the purpose of the dynamic interaction parameter. (SMRB at 15.) It also criticizes Immersion’s proposal for failing to recognize any connection at all between the parameter and the dynamic haptic effect. (*Id.*)

The parties all agree that a “dynamic interaction parameter” is “based on a user’s interaction with a device.” (JC at 2.) Thus, the dispute centers on whether the dynamic interaction parameter is a parameter that changes over time or reacts in real time, or if it must define a haptic effect.

The phrase “dynamic interaction parameter” did not have a generally accepted meaning to those of ordinary skill in the art at the time of the ’571 patent’s filing. (RX-13 at ¶ 16.) “Without a customary meaning of a term within the art, the specification usually supplies the best context for deciphering claim meaning.” *Honeywell Int’l Inc. v. Universal Avionics Sys. Corp.*, 488 F.3d 982, 991 (Fed. Cir. 2007) (citing *Irdeto Access, Inc. v. Echostar Satellite Corp.*, 383 F.3d 1295, 1300 (Fed. Cir. 2004) (“[I]f a disputed term has ‘no previous meaning to those of ordinary skill in the prior art[,] its meaning, then, must be found [elsewhere] in the patent.’”).)

The undersigned finds that the proposal from Respondents and Staff is consistent with the specification, which makes clear that the point of the invention is to provide dynamic haptic effects. For example, the Abstract states:

¹⁸ Staff submits that a parameter that “influences,” “changes,” or “modifies” a haptic effect is in fact “defining” that haptic effect. (*Id.* at 14.)

A system that ***produces a dynamic haptic effect*** and generates a drive signal that includes a gesture signal and a real or virtual device sensor signal. The ***haptic effect is modified dynamically*** based on both the gesture signal and the real or virtual device sensor signal such as from an accelerometer or gyroscope, or by a signal created from processing data such as still images, video or sound.

('571 patent at Abstract (emphasis added); *see also id.* at 1:15-18.) The Summary of the Invention also reiterates that the purpose of the claimed invention is to provide dynamic haptic effects:

One embodiment is a system that ***produces a dynamic haptic effect*** and generates a drive signal that includes a gesture signal and a real or virtual device sensor signal. ***The haptic effect is modified dynamically*** based on both the gesture signal and the real or virtual device sensor signal such as from an accelerometer or gyroscope, or by a signal created from processing data such as still images, video or sound. ***The haptic effect may optionally be modified dynamically*** by using the gesture signal and the real or virtual device sensor signal and a physical model.

(*Id.* at 1:66-2:8 (emphasis added).)

The “Detailed Description” of the patent then expressly defines a “dynamic haptic effect” as “a haptic effect that evolves over time as it responds to one or more input parameters.” (*Id.* at 2:64-66.) The specification teaches that haptic effects are “defined” or “determined” by high or low level parameters:

In general, the high level parameters that define a particular haptic effect include magnitude, frequency and duration. Low level parameters such as streaming motor commands could also be used to determine a particular haptic effect.

(*Id.* at 4:14-18.) The specification further teaches that dynamic haptic effects are defined by parameters that vary:

A haptic effect may be considered dynamic if it includes some variation of these parameters when the haptic effect is generated or a variation of these parameters based on a user’s interaction.

(*Id.* at 4:19-22.)

Consistent with these teachings, the specification explains that an interaction parameter can be derived from a user's gesture and that it is used to generate dynamic effects. (*Id.* at 10:24-49.) Thus, the specification teaches that the dynamic interaction parameter is generated based on a user's interaction, with the effect being "determined" by the interaction parameter.

While Immersion contends that the specification does not contain any statements of disavowal or words of manifest exclusion that justify limiting this term to "dynamic haptic effects," Immersion overlooks the fact that absent an accepted meaning, a claim term is construed "only as broadly as provided for the patent itself." *Irdeto*, 383 F.3d at 1300. As discussed above, the specification makes clear that providing dynamic haptic effects is the purported invention. ('571 patent at Abstract, 1:15-18, 1:66-2:8.) Furthermore, all of the embodiments generate haptic effects. (*Id.* at 4:19-22, 10:22-26, 12:62-67, 13:51-52, 14:6-26, 14:41-43.) The undersigned therefore finds that Respondents' and Staff's construction reflects the specification's teaching regarding how a dynamic interaction parameter is generated and how it is used.¹⁹

Accordingly, the undersigned hereby construes "dynamic interaction parameter" as a ***"parameter that defines a haptic effect that evolves over time based on a user's interaction with a device."***

¹⁹ Immersion claims that Respondents' and Staff's construction is ambiguous as to what it means to "define" a haptic effect and the kinds of parameters that do so. The undersigned disagrees. The specification explains what it means to define a haptic effect and the types of parameters – such as magnitude, frequency and duration – that do so. (See, e.g., '571 patent at 4:41-18.)

XI. THE '710 PATENT

A. Overview

The '710 patent, entitled "Systems and Methods for Haptic Confirmation of Commands," issued on November 12, 2013. The patent is assigned to Immersion. It relates to haptic feedback and "more particularly to haptic confirmation of commands." ('710 patent at 1:15-16.) It teaches, among other things, "systems and methods in which the mobile electronic device receives user input via the touchscreen." (5/5/16 Compl. at ¶ 4.6.)

The '710 patent has 9 claims. Claims 1, 7-10, and 12 are asserted against Respondents. The asserted claims read as follows (with the first instance of the disputed terms highlighted in **bold** and the first instance of the undisputed term in *italics*):

1. A system for generating haptic effects to confirm receipt of a command, the system comprising: a sensor; a housing configured to be contacted by a user; an actuator configured to output a haptic effect to the housing; and a processor in communication with the sensor and the actuator, the processor configured to: receive, from the sensor, a sensor signal associated with a user input; recognize the user input and **determine a command associated with the user input**; if the user input is recognized and the command is determined: generate a first actuator signal configured to cause the actuator to output a *first haptic effect*; and transmit the first actuator signal to the actuator; **otherwise**: generate a second actuator signal configured to cause the actuator to output a *second haptic effect*; and transmit the second actuator signal to the actuator.
7. The system of claim 1, further comprising a display in communication with the processor, and wherein the processor is further configured to: generate a display signal configured to cause the display to display an image; and transmit the display signal to the display.
8. The system of claim 1, wherein the first haptic effect is configured to emulate the command.
9. The system of claim 1, wherein the sensor, actuator, and processor are disposed within the housing.
10. The system of claim 1, wherein the housing comprises one of: a device configured to be worn by the user, a mobile phone, a personal digital assistant, a touch-sensitive surface, a medical alert device, a mouse, or a keyboard.

12. The system of claim 1, wherein command is a request associated with an operation, and the first haptic effect is configured to provide information associated with the status of the operation.

B. Claim Construction

1. Construction of the Undisputed Claim Term

a) “first/second haptic effect”

The parties agree that “first/second haptic effect” should be construed as “the first haptic effect is different from the second haptic effect.” (JC at 5.)

The undersigned hereby adopts the parties’ proposed construction and shall construe this term according to its agreed-to definition.

2. Construction of the Disputed Claim Terms

c) “determine a command associated with the user input”

The disputed phrase appears in claim 1 of the ’710 patent. (JC at 4.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
“determine whether the command associated with the user input is supported”	Plain meaning.	Plain meaning, <i>e.g.</i> , “determine which command, if any, is associated with the specific user input”

(*Id.*)

Immersion explains that “in the context of the claims, it is important that the determination of a command result in a true or false output because the determination is used by the system to decide which of two different haptic effects to output.” (CMIB at 78.) Thus, according to Immersion, the appropriate construction of this phrase is “determine whether the command associated with the user input is supported” because it best describes the meaning of the term as it is used in the claims. (*Id.*) Immersion further contends that this construction is

consistent with the specification and the purpose of the invention. (CMIB at 77-78; CMRB at 58-59.)

Immersion objects to Respondents and Staff's proposal that the term be accorded its plain and ordinary meaning. (CMIB at 78.) In particular, Immersion argues:

Staff's proposal includes, as an example, "determine which command, if any, is associated with the specific user input." Determining which command, if any, is associated with the specific user input might be *part* of the process of determining whether the command associated with the user input is supported, but standing alone it does not provide the information necessary for the system to determine which haptic effect to output.

(*Id.* (emphasis in original).)

Respondents assert that this phrase is easily understood and requires no construction. (RMIB at 58.) They also insist there is nothing in the claims, specification, or file history that suggests "the applicants intended to adopt a meaning of this phrase that is at odds with its plain meaning." (*Id.*) If the undersigned deems it necessary to construe this phrase, Respondents submit that Staff's proposed construction accurately reflects the plain and ordinary meaning, and is consistent with the use of the claim term in the specification.²⁰ (RMIB at 58-59; RMRB at 50.)

Respondents argue that Immersion's construction improperly imports the limitation "determine whether the command ... *is supported*" into the claim. (RMIB at 58 (emphasis in original); RMRB at 49.) They contend that there is no basis for such a requirement in either the claims or the specification and for this reason, Immersion's construction must be rejected. (RMIB at 59-60; RMRB at 49-50.)

Staff agrees with Respondents that the plain meaning of this term should govern, and submits that "the only reason to construe it at all would be to confirm that a command associated with the user input may or may not actually exist." (SMIB at 34-35.) Staff asserts that it is

²⁰ Respondents' only disagreement with Staff's proposed construction is the use of "*e.g.*," which Respondents believe incorrectly suggests that there is more than one plain meaning to this claim term. (RMIB at 59 n.14.)

evident from the claim language, as well as the specification, that once the user input is recognized, there may or may not be a command associated with that user input. (*Id.* at 35.) In other words, “[i]f such a command exists, the processor transmits the first actuator signal. If the command does not exist, the processor transmits the second actuator signal. One or the other event will always occur.” (*Id.*) Staff believes its proposed construction reflects this concept. (SMIB at 35-36 (citing ’710 patent at 3:9-13, 21-25, 36-40); SMRB at 32.)

Staff notes that “Immersion agrees . . . the important aspect of this claim language is that either a valid command exists, in which case the processor transmits the first actuator signal, or it does not, in which case the processor transmits the second actuator signal.” (SMRB at 31.) Staff therefore submits that Immersion’s and its proposed constructions have essentially the same meaning. (*Id.*) In Staff’s view, however, its construction is preferable since the word “supported” is not found in the patent specification and its wording is closer to the wording of the patent. (*Id.* at 31-32.)

When construing claim terms, “[w]e generally give words of a claim their ordinary meaning in the context of the claim and the whole patent document.” *World Class Tech. Corp. v. Ormco Corp.*, 769 F.3d 1120, 1123 (Fed. Cir. 2014); *see also Phillips*, 415 F.3d at 1312-17. This meaning controls unless the intrinsic evidence clearly indicates that the patentee meant to assign the term a different meaning. *See Bell Atl. Network Servs. v. Communications Group, Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001). In the instant case, the intrinsic evidence does not justify departing from the plain and ordinary meaning of the claim language, which the undersigned finds is “determine which command, if any, is associated with the user input.”

Claim 1 of the ’710 patent includes, among other things, a processor configured to receive “a sensor signal associated with a user input.” (’710 patent at claim 1.) The processor is

further configured to “recognize the user input and determine a command associated with the user input.” (*Id.*) The claim language makes evident that once the user input is recognized, there may or may not be a command associated with that user input.

The specification also supports this interpretation. For example, the detailed description of the patent explains: “If the processor **110** is able to recognize the speech information, it executes software stored in memory **115** that attempts to identify a command associated with the recognized speech information.” (*Id.* at 3:9-13 (emphasis added).) “[I]f the speech information is not recognized, or if a command corresponding to the speech information is not found, the processor **110** generates a second actuator signal configured to cause the actuator **130** to output a second haptic effect.” (*Id.* at 3:21-25.) “[I]f the voice command is not recognized, only the second actuator signal is generated and transmitted to the actuator; the first signal, indicating that the voice command was recognized, is not generated or transmitted to the actuator.” (*Id.* at 3:36-40.) Thus, the specification consistently teaches that “determining a command associated with a user input” involves determining which command is associated with the user input, if such a command exists.

The undersigned further finds that the intrinsic record does not support Immersion’s proposed construction. Immersion attempts to add in the limitation “determine whether the command . . . *is supported*” into the claim. There is no basis for such a requirement in either the claims or the specification. *See, e.g., N. Telecom Ltd. v. Samsung Elecs. Co.*, 215 F.3d 1281, 1290 (Fed. Cir. 2000) (noting that the Federal Circuit has “repeatedly and clearly held that it will not read unstated limitations into claim language”).) Indeed, nowhere in either the specification or the claims are the words “support” and “supported” ever used. (*See generally* ’710 patent.)

Accordingly, the undersigned hereby construes this phrase according to its plain and ordinary meaning, which is “*determine which command, if any, is associated with the user input.*”

d) “otherwise”

The disputed term appears in claim 1 of the ’710 patent. (JC at 4.) The parties disagree on the proper claim construction and have proposed the following constructions:

IMMERSION	RESPONDENTS	STAFF
Plain meaning.	“in any other case”	Plain meaning, <i>e.g.</i> , “else”
If construed: “alternatively”		

(*Id.*)

Immersion believes this term should be afforded its plain and ordinary meaning, which it submits is “alternatively.” (CMIB at 79.) In support of its proposal, Immersion explains that the “’710 patent discloses alternative paths, depending on whether the user input was recognized and a command was determined.” (CMRB at 60 (citing ’710 patent at 3:33-40).) Thus, Immersion urges adoption of its proposed construction because it “contemplates that when the ‘if’ limitation is not satisfied, i.e., when the user input is not recognized and/or the command is not determined, the second haptic effect *is* generated.” (*Id.* at 69-70 (emphasis in original).)

Immersion asserts that Respondents’ proposed construction should be rejected because it does not clarify the meaning of the term. (CMIB at 79 (arguing that use of “in any other case” is ambiguous).) It finds, however, that Staff’s construction for this term is agreeable, noting that it is similar to Immersion’s. (CMRB at 61.)

Respondents argue that their position is mandated by the claim language (and confirmed by the specification), which “plainly recites that for each user input, one of the following two things will occur: (1) the ‘if’ claim limitation is satisfied and the first haptic effect is generated;

or (2) the ‘if’ limitation is not satisfied and the second haptic effect is generated.” (RMIB at 55; *see also* RMRB at 48.) They contend that adoption of their proposal will “leave no doubt . . . that when the two conditions of the ‘if’ claim limitation are not both met, then a second haptic effect always is generated.” (RMIB at 57.) Respondents further note that the only difference between their construction and Staff’s is the particular words chosen for their respective constructions. (RMRB at 48.)

Respondents object to Immersion’s construction as being inconsistent with the intrinsic evidence. (RMIB at 57-58.) They argue: “Immersion’s construction does not on its face reflect the binary nature of the claims, and instead appears to leave room for a scenario in which neither the first or the second haptic effect is output. However, nothing in Immersion’s argument supports such a result, which would be contrary to the plain language of the claim and the teaching of the specification.” (RMRB at 48; *see also* RMIB at 57-58.)

Staff agrees with Immersion that “otherwise” should be accorded its plain meaning. (SMIB at 36.) In Staff’s view, the structure of claim 1 is similar to the “if . . . then . . . else . . .” structure commonly found in computer code and logical reasoning. (*Id.* at 37.) It explains that “[t]he language of claim 1 unambiguously provides that if the user input is recognized and the command is determined, then the processor will generate a first actuator signal, otherwise the processor will generate a second actuator signal.” (*Id.*) Staff further explains that “[t]he ordinary and customary meaning of ‘otherwise,’ when part of a binary logic structure, is ‘else’.” (*Id.* (citing SX-9 at 531); *see also* SMRB at 33.) Thus, Staff submits that “otherwise” should be construed according to its plain meaning, “*e.g.*, ‘else.’”

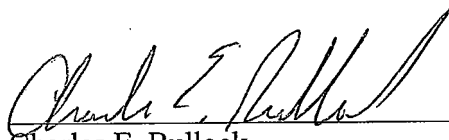
The parties all agree that the second haptic effect must be generated when the “if” limitation of claim 1 is not satisfied. (CMIB at 79; RMRB at 48; SMRB at 33.) Thus, the parties

appear to be in agreement as to the meaning of this term. Of the three proposals, the undersigned finds Staff's proposed construction, as modified, to be the least ambiguous and also the construction that most accurately reflects the binary nature of the claim language. (See SX-9 at 531 (demonstrating that the ordinary and customary meaning of "otherwise" is "else" when part of a binary logic structure).)

Accordingly, the undersigned hereby construes "otherwise" to mean "*else*."

Within seven days of the date of this document, each party shall submit to the Office of the Administrative Law Judges a statement as to whether or not it seeks to have any portion of this document deleted from the public version. Any party seeking to have a portion of this document deleted from the public version must submit a copy of this document with red brackets indicating the portion(s) asserted to contain confidential business information. The parties' submissions need not be filed with the Commission Secretary.

SO ORDERED.



Charles E. Bullock
Chief Administrative Law Judge

**CERTAIN MOBILE ELECTRONIC DEVICES
INCORPORATING HAPTICS (INCLUDING
SMARTPHONES AND LAPTOPS) AND COMPONENTS
THEREOF**

Inv. No. 337-TA-1004

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **PUBLIC VERSION ORDER NO. 27** has been served by hand upon the Commission Investigative Attorney, **Lisa Murray, Esq.**, and the following parties as indicated, on **February 8, 2017**.



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

On Behalf of Complainant Immersion Corporation:

Barbara A. Murphy
FOSTER, MURPHY, ALTMA & NICKEL, PC
1899 L Street NW, Suite 1150
Washington, DC 20036

- ☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other: _____

On Behalf of Respondent Apple Inc. & AT&T Mobility LLC:

Mark Fowler
DLA PIPER LLP (US)
2000 University Avenue
East Palo Alto, CA 94303

- ☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other: _____