

**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**  
Washington, D.C. 20549

**FORM 8-K**

**CURRENT REPORT**  
Pursuant to Section 13 or 15(d)  
of The Securities Exchange Act of 1934

**Date of Report (Date of earliest event reported): September 14, 2022**

**Larimar Therapeutics, Inc.**

(Exact name of registrant as specified in its charter)

**Delaware**  
(State or other jurisdiction  
of incorporation)

**001-36510**  
(Commission  
File Number)

**20-3857670**  
(I.R.S. Employer  
Identification No.)

**Three Bala Plaza East, Suite 506**  
**Bala Cynwyd, Pennsylvania**  
(Address of principal executive offices)

**19004**  
(Zip Code)

**Registrant's telephone number, including area code: (844) 511-9056**

(Former name or former address, if changed since last report.)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

- Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
- Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
- Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
- Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value \$0.001 per share	LRMR	Nasdaq Global Market

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

#### **Item 1.01 Entry into a Material Definitive Agreement.**

On September 14, 2022, Larimar Therapeutics, Inc. (the “*Company*”) entered into an underwriting agreement (the “*Underwriting Agreement*”) with Guggenheim Securities, LLC, as representative of the underwriters named therein (the “*Underwriters*”) relating to the offering, issuance and sale (the “*Offering*”) of 22,225,000 shares of the common stock, par value \$0.001 per share (the “*Common Stock*”) of the Company. The shares of Common Stock were sold at an offering price of \$3.15 per share, which will result in approximately \$65.5 million of proceeds to the Company after deducting underwriting discounts and commissions and estimated offering expenses.

In addition, the Company has granted to the Underwriters an option to purchase up to 3,333,750 additional shares of common stock at the public offer price, less underwriting discounts and commissions, solely to cover over-allotments, if any. If the Underwriters exercise their option to purchase additional shares in full, the total proceeds to the Company, before expenses, will be approximately \$75.7 million.

Guggenheim Securities, LLC, is acting as sole book-running manager for the Offering. The Offering is expected to close on or about September 16, 2022, subject to satisfaction of customary closing conditions. All of the shares of Common Stock in the Offering are being sold by the Company.

The Offering is being made pursuant to the Company’s effective shelf registration statement on Form S-3 (Registration No. 333-246370), filed with the Securities and Exchange Commission (the “*SEC*”) on August 14, 2020 and declared effective on September 1, 2020.

The Underwriting Agreement contains customary representations, warranties and agreements by the Company, customary conditions to closing, indemnification obligations of the Company and the Underwriters, including for liabilities under the Securities Act of 1933, as amended, other obligations of the parties and termination provisions. The representations, warranties and covenants contained in the Underwriting Agreement were made only for purposes of such agreement and as of specific dates, were solely for the benefit of the parties to such agreement and may be subject to limitations agreed upon by the contracting parties.

The Underwriting Agreement is filed as Exhibit 1.1 to this Current Report on Form 8-K and is incorporated herein by reference. The foregoing description of the terms of the Underwriting Agreement is qualified in its entirety by reference to such exhibits.

The legal opinion of Troutman Pepper Hamilton Sanders LLP relating to the legality of the issuance and sale of the shares in the Offering is attached as Exhibit 5.1 to this Current Report on Form 8-K.

#### **Item 8.01 Other Events.**

##### **Risks Related to the Company’s Product Development and Regulatory Approvals**

*The FDA has placed a partial clinical hold on CTI-1601. If the FDA does not remove the partial clinical hold on a timely basis, or at all, the Company’s development timelines and their business may be adversely affected and their stock price may decline.*

On May 25, 2021 the FDA placed a full clinical hold on the CTI-1601 Investigational New Drug, or IND, clinical program following the Company’s notification to the FDA of mortalities which occurred at the highest dose levels in an ongoing 26-week non-human primate, or NHP, toxicology study, which was designed to support extended dosing of patients with CTI-1601. In the clinical hold letter, the FDA stated it needed a full study report from the then

ongoing NHP study and that the Company may not initiate additional clinical trials until we have submitted the report and received notification from the FDA that additional clinical trials may commence. In July 2021, the Company completed dosing in the NHP toxicology study and data from the study were included in the complete response to the clinical hold submitted to the FDA in January 2022. In February 2022, the Company received a response from the FDA following their submission of a complete response including a comprehensive study report from the 26-week NHP toxicology study stating that it was maintaining its clinical hold at that time and requesting additional information. In August 2022, the Company submitted a complete response to the CTI-1601 clinical hold, following a Type C Meeting with the FDA. In conjunction with the complete response, the Company proposed as CTI-1601's next clinical trial a Phase 2, four-week dose exploration study in Friedreich's ataxia patients starting at the lower dose levels tested in their Phase 1 multiple-ascending dose clinical trial.

In September 2022, the FDA lifted its full clinical hold on the CTI-1601 program and imposed a partial clinical hold. A partial clinical hold, as opposed to a full clinical hold, is a delay or suspension of only a specific part of the clinical work requested under the IND, which allows otherwise unaffected parts of the clinical work to proceed under the IND. The Company plans to initiate a 25 mg cohort of a Phase 2, four-week, dose exploration trial of CTI-1601 in patients with Friedreich's ataxia in the last quarter of 2022, with top-line data expected by the second half of 2023. In connection with the FDA's partial clinical hold, the FDA will review the data from the 25 mg cohort prior to escalating the dose in the second cohort. If the Company is unable to reach agreement with the FDA to lift the partial clinical hold and the Company determines that they need to explore doses higher than 25 mg, they would be unable to complete their CTI-1601 clinical trials without delays in their clinical development plans and anticipated data milestones and additional clinical development costs, any of which could impair their ability, cost or timeline to obtain U.S. regulatory approval for CTI-1601. The Company cannot be certain whether or when the FDA will lift the partial clinical hold and/or permit them to conduct clinical trials with doses higher than 25 mg. If the FDA does not lift the partial clinical hold in a timely manner, or at all, the Company's development timelines and their business may be adversely affected and their stock price may decline. Further, even if the FDA lifts the partial clinical hold, or if the FDA or other regulatory agencies continue to express safety concerns after the partial clinical hold is lifted, additional CTI-1601 non-clinical or clinical studies may be required. In such instances, the Company's progress in the development of CTI-1601 may be significantly slowed and the associated costs may be significantly increased, adversely affecting their business, which could impair their ability to ultimately obtain FDA approval for CTI-1601.

#### **Item 9.01 Financial Statements and Exhibits.**

##### (d) Exhibits

Below is a list of exhibits included with this Current Report on Form 8-K.

<u>Exhibit No.</u>	<u>Document</u>
1.1	<a href="#">Underwriting Agreement*</a>
5.1	<a href="#">Opinion of Troutman Pepper Hamilton Sanders LLP*</a>
23.1	<a href="#">Consent of Troutman Pepper Hamilton Sanders LLP (included in Exhibit 5.1)*</a>
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

\* Filed herewith.

**SIGNATURES**

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Larimar Therapeutics, Inc.

By: /s/ Carole S. Ben-Maimon, M.D.

Name: *Carole S. Ben-Maimon, M.D.*

Title: *President and Chief Executive Officer*

Date: September 14, 2022

22,225,000 Shares of Common Stock

LARIMAR THERAPEUTICS, INC.

UNDERWRITING AGREEMENT

September 14, 2022

Guggenheim Securities, LLC

As Representative of the  
several Underwriters named in  
Schedule I attached hereto

c/o Guggenheim Securities, LLC  
330 Madison Avenue  
New York, New York 10017

Ladies and Gentlemen:

Larimar Therapeutics, Inc., a corporation organized and existing under the laws of the State of Delaware (the “**Company**”), proposes, subject to the terms and conditions stated herein, to issue and sell to the several underwriters named in Schedule I hereto (the “**Underwriters**”) an aggregate of 22,225,000 shares (the “**Firm Shares**”) of its common stock, par value \$0.001 per share (the “**Common Stock**”). The Company also proposes to issue and sell to the several Underwriters up to an additional 3,333,750 shares (the “**Additional Shares**”) of Common Stock at the option of the Underwriters, solely to cover over-allotments, as provided in Section 2(c) below. The Firm Shares and any Additional Shares purchased by the Underwriters are referred to herein as the “**Shares**.” Guggenheim Securities, LLC (“**Guggenheim Securities**”) is acting as representative (the “**Representative**”) of the several Underwriters in connection with the offering and sale of the Shares contemplated herein (the “**Offering**”).

As used in this underwriting agreement (the “**Agreement**”), the following defined terms shall apply:

The “**Registration Statement**” means the registration statement on Form S-3 (File No. 333-246370), including the exhibits, schedules and financial statements and any prospectus supplement relating to the Offering that is filed with the Securities and Exchange Commission (the “**Commission**”) pursuant to Rule 424(b) under the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder (the “**Securities Act**”) and deemed part of such registration statement pursuant to Rule 430B under the Securities Act, as amended on each Effective Date (as defined below), and, in the event any post-effective amendment thereto or any registration statement and any amendments thereto filed pursuant to Rule 462(b) under the Securities Act (a “**Rule 462(b) Registration Statement**”) becomes effective prior to the Closing Date (as defined in Section 2(b) hereof), shall also mean such registration statement as so amended or such Rule 462(b) Registration Statement, as the case may be.

The “**Effective Date**” means, with respect to the Registration Statement, each date and time that such Registration Statement, and any post-effective amendment or amendments thereto or any Rule 462(b) Registration Statement became or becomes effective.

The “**Base Prospectus**” means the base prospectus contained in the Registration Statement at the date and time that this Agreement is executed and delivered by the parties hereto.

The “**Preliminary Prospectus**” means any preliminary prospectus supplement to the Base Prospectus which is used prior to the filing of the Prospectus (as defined below), together with the Base Prospectus.

The “**Prospectus**” means the final prospectus supplement relating to the Offering that is first filed pursuant to Rule 424(b) under the Securities Act, together with the Base Prospectus.

The “**Pricing Disclosure Package**” shall mean (i) the Base Prospectus, (ii) the Preliminary Prospectus used most recently prior to the Applicable Time (as defined below), (iii) any issuer free writing prospectus, as defined in Rule 433 under the Securities Act (an “**Issuer Free Writing Prospectus**”), identified in Schedule II hereto, (iv) the information included on Schedule III hereto, and (v) any other free writing prospectus, as defined in Rule 405 under the Securities Act (a “**Free Writing Prospectus**”), that the parties hereto shall hereafter expressly agree in writing to treat as part of the Pricing Disclosure Package.

As used herein, “**Applicable Time**” is 6:00 a.m. (New York City time) on September 14, 2022.

As used herein, “**Road Show**” means a “road show” (as defined in Rule 433 under the Securities Act) relating to the offering of the Shares contemplated hereby that is a “written communication” (as defined in Rule 405 under the Securities Act).

All references in this Agreement to the Registration Statement, any Preliminary Prospectus, the Base Prospectus and the Prospectus shall include the documents incorporated or deemed to be incorporated by reference therein. All references in this Agreement to financial statements and schedules and other information that are “**contained in,**” “**included in,**” “**filed with,**” “**stated in**” or “**part of**” the Registration Statement, the Rule 462(b) Registration Statement, any Preliminary Prospectus, the Pricing Disclosure Package or the Prospectus, and all other references of like import, shall be deemed to mean and include all such financial statements and schedules and other information that is or is deemed to be incorporated by reference in the Registration Statement, the Rule 462(b) Registration Statement, any Preliminary Prospectus, the Base Prospectus, the Pricing Disclosure Package or the Prospectus, as the case may be.

All references in this Agreement to amendments or supplements to the Registration Statement, the Rule 462(b) Registration Statement, any Preliminary Prospectus, the Pricing Disclosure Package or the Prospectus shall be deemed to mean and include the filing of any document under the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder (collectively, the “**Exchange Act**”) that is or is deemed to be incorporated

by reference in the Registration Statement, the Rule 462(b) Registration Statement, any Preliminary Prospectus, the Pricing Disclosure Package, or the Prospectus, as the case may be. All references in this Agreement to the Registration Statement, any Preliminary Prospectus, the Base Prospectus or the Prospectus, any amendments or supplements to any of the foregoing, or any free writing prospectus, shall include any copy thereof filed with the Commission pursuant to its Electronic Data Gathering, Analysis and Retrieval System (“**EDGAR**”).

1. **Representations and Warranties of the Company.** The Company represents and warrants to, and agrees with, each of the Underwriters as of the date hereof, the Applicable Time, the Closing Date (as hereinafter defined) and any Additional Closing Date (as hereinafter defined) that:

(a) The Registration Statement has been declared effective by the Commission under the Securities Act. The Company has complied, to the Commission’s satisfaction, with all requests of the Commission for additional or supplemental information, if any. No stop order suspending the effectiveness of either Registration Statement is in effect and no proceedings for such purpose have been instituted or are pending or, to the Company’s knowledge, are contemplated or threatened by the Commission. At the time the Registration Statement was originally filed with the Commission, the Company met the then-applicable requirements for use of Form S-3 under the Securities Act. The documents incorporated or deemed to be incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus, at the time they were or hereafter are filed with the Commission, or became effective under the Exchange Act, as the case may be, complied and will comply in all material respects with the requirements of the Exchange Act.

(b) Each of the Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendment thereto, as of the applicable Effective Date, complied and, until such time as the Underwriters are no longer required to deliver a Prospectus in order to confirm sales of the Shares, will comply in all material respects with the Securities Act and the rules and regulations of the Commission thereunder (the “**Rules and Regulations**”). The Preliminary Prospectus and the Prospectus, at the time each was filed with the Commission, complied in all material respects with the requirements of the Securities Act and the Rules and Regulations. Each Preliminary Prospectus delivered to the Underwriters for use in connection with this Offering and the Prospectus was or will be identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T.

(c) The Registration Statement, when it became effective, did not contain and, as amended or supplemented, if applicable, will not contain, as of the date of such amendment or supplement, an untrue statement of a material fact or omitted or will omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading; provided, however, that this representation and warranty shall not apply to any information contained in or omitted from the Registration Statement or any amendment thereto in reliance upon and in conformity with information furnished in writing to the Company by or on behalf of any Underwriter through the Representative specifically for use therein. The parties hereto agree that such information provided by or on behalf of any Underwriter through the Representative consists solely of the material referred to in Section 19 hereof. Each “forward-looking statement” (within the meaning of Section 27A of the Securities Act or Section 21E of the Exchange Act) contained or incorporated by reference in the Registration Statement, the Preliminary Prospectus or the Prospectus has been made or reaffirmed with a reasonable basis and has been disclosed in good faith.

(d) The Pricing Disclosure Package, as of the Applicable Time, did not contain an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The Prospectus will not, as of its date, as of the Closing Date or as of any Additional Closing Date, contain an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. Each Issuer Free Writing Prospectus (i) complies in all material respects with the applicable provisions of the Securities Act and the Rules and Regulations, (ii) does not conflict with the information contained in the Registration Statement, the Pricing Disclosure Package or the Prospectus and (iii) does not contain an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances in which they were made, not misleading. No representation and warranty is made in this Section 1(d) with respect to any information contained in or omitted from the Pricing Disclosure Package or the Prospectus in reliance upon and in conformity with information furnished in writing to the Company by or on behalf of any Underwriter through the Representative specifically for use therein. The parties hereto agree that such information provided by or on behalf of any Underwriter through the Representative consists solely of the material referred to in Section 19 hereof.

(e) At the earliest time (i) after the filing of the Registration Statement that the Company or another offering participant made a bona fide offer (within the meaning of Rule 164(h)(2) of the Securities Act) of the Shares and (ii) at the date hereof, the Company was not and is not an “ineligible issuer,” as defined in Rule 405 of the Securities Act, including (but not limited to) the Company or any subsidiary in the preceding three years not having been convicted of a felony or misdemeanor or having been made the subject of a judicial or administrative decree or order as described in Rule 405 of the Securities Act.

(f) Each Issuer Free Writing Prospectus conformed or will conform in all material respects to the requirements of the Securities Act and the Rules and Regulations on the date of first use, and the Company has complied with the requirements of Rule 433 under the Securities Act with respect to each Issuer Free Writing Prospectus including, without limitation, all prospectus delivery, filing, record retention and legending requirements applicable to any such Issuer Free Writing Prospectus. The Company has not (i) distributed any offering material in connection with the Offering other than any Preliminary Prospectus, the Prospectus, and any Issuer Free Writing Prospectus set forth on Schedule II hereto, or (ii) filed, referred to, approved, used or authorized the use of any “free writing prospectus” as defined in Rule 405 under the Securities Act with respect to the Offering or the Shares, except for any Issuer Free Writing Prospectus set forth in Schedule II hereto and any electronic Road Show previously approved by the Representative. The Company has retained in accordance with the Securities Act and the Rules and Regulations all Issuer Free Writing Prospectuses that were not required to be filed pursuant to the Securities Act and the Rules and Regulations.

(g) The Company (i) has not alone engaged in any oral or written communication with potential investors undertaken in reliance on Section 5(d) of the Securities Act (“**Testing-the-Waters Communications**”), other than Testing-the-Waters Communications with the prior consent of the Representative with entities that are qualified institutional buyers within the meaning of Rule 144A under the Securities Act or institutions that are accredited investors within the meaning of Rule 501 under the Securities Act and (ii) has not authorized anyone other than the Representative to engage in Testing-the-Waters Communications. The Company reconfirms that the Representative has been authorized to act on its behalf in undertaking Testing-the-Waters Communications. The Company has not distributed any Written Testing-the-Waters Communications (as defined below) other than those listed on Schedule V hereto. “Written Testing-the-Waters Communication” means any Testing-the-Waters Communication that is a written communication within the meaning of Rule 405 under the Securities Act.

(h) PricewaterhouseCoopers LLP, which has expressed its opinion with respect to the financial statements (which term as used in this Agreement includes the related notes thereto) filed with the Commission as a part of the Registration Statement, the Pricing Disclosure Package or the Prospectus, is an independent registered public accounting firm as required by the Securities Act, the Exchange Act, and the rules of the Public Company Accounting Oversight Board (“**PCAOB**”).

(i) Except as would not, in the aggregate, reasonably be expected to have a Material Adverse Effect, since the date of the latest audited financial statements included in the Registration Statement, the Pricing Disclosure Package and the Prospectus, and, except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, neither the Company nor any of its subsidiaries listed in Exhibit A hereto (“**Subsidiaries**”) has (i) sustained any loss or interference with its business from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor dispute or court or governmental action, order or decree, (ii) issued or granted any securities (other than pursuant to employee benefit plans, qualified stock option plans or other equity compensation plans or arrangements existing on the date hereof and disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus), (iii) incurred any material liability or obligation, direct or contingent, other than liabilities and obligations that were incurred in the ordinary course of business, (iv) entered into any material transaction not in the ordinary course of business, or (v) declared or paid any dividend on its share capital; and since such date, except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there has not been any change in the share capital, long-term debt, net current assets or short-term debt of the Company or any of its Subsidiaries or any adverse change, or any development involving a prospective adverse change, in or affecting the condition (financial or otherwise), results of operations, shareholders’ equity, properties, management, business or prospects of the Company and its Subsidiaries taken as a whole. “**Material Adverse Effect**” shall mean any material adverse change or effect on or affecting (i) the business, earnings, assets, liabilities, prospects, condition (financial or otherwise), operations, general affairs, management, financial position, stockholders’ equity or results of operations of the Company and the Subsidiaries taken as a whole, or (ii) the ability of the Company to perform its obligations under this Agreement, including this issuance and sale of the Shares, or to consummate the transactions contemplated by this Agreement.

(j) The Company has an authorized capitalization as set forth in the Registration Statement, Pricing Disclosure Package and the Prospectus, and all of the issued shares of the Company have been duly authorized and validly issued, are fully paid and non-assessable, conform in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus and were not issued in violation of any preemptive right, resale right, right of first refusal or similar right. All of the Company's options, warrants and other rights to purchase or exchange any securities for shares of the Company's capital stock have been duly authorized and validly issued, and conform in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus. All of the issued shares of capital stock or other ownership interest of each subsidiary of the Company have been duly authorized and validly issued, are fully paid and non-assessable and are owned directly or indirectly by the Company, free and clear of all liens, encumbrances, equities or claims, except for such liens, encumbrances, equities or claims as would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(k) The Shares to be delivered on the Closing Date and any Additional Closing Date, if any, have been duly authorized and, when issued and delivered in accordance with this Agreement, will be validly issued, fully paid and non-assessable, will conform in all material respects to the description thereof contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus, will be issued in compliance with federal and state securities laws and will be free of statutory and contractual preemptive rights, rights of first refusal and similar rights.

(l) The Company and each of its Subsidiaries have been duly organized, validly existing as a corporation and in good standing under the laws of their respective jurisdictions of organization. The Company and each of its Subsidiaries are, and will be, duly licensed or qualified as a foreign corporation for transaction of business and in good standing under the laws of each other jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such license or qualification, and have all corporate power and authority necessary to own or hold their respective properties and to conduct their respective businesses as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, except where the failure to be so qualified or in good standing or have such power or authority would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(m) The issue and sale of the Shares, the execution, delivery and performance of this Agreement by the Company, the consummation of the transactions contemplated hereby and the application of the proceeds from the sale of the Shares as described under "Use of Proceeds" in the Registration Statement, the Pricing Disclosure Package and the Prospectus will not (i) conflict with or result in a breach or violation of any of the terms or provisions of, impose any lien, charge or encumbrance upon any property or assets of the Company and its Subsidiaries, or constitute a default under, any indenture,

mortgage, deed of trust, loan agreement, license, lease or other agreement or instrument to which the Company or any of its Subsidiaries is a party or by which the Company or any of its Subsidiaries is bound or to which any of the property or assets of the Company or any of its Subsidiaries is subject; (ii) result in any violation of the provisions of the certificate of incorporation or by-laws (or similar organizational documents) of the Company or any of its Subsidiaries; or (iii) result in any violation of any statute or any judgment, order, decree, rule or regulation of any court or governmental agency or body having jurisdiction over the Company or any of its Subsidiaries or any of their properties or assets, except, with respect to clauses (i) and (iii), for such conflicts, breaches, violations, liens, charges, encumbrances or defaults that would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(n) No consent, approval, authorization or order of, or filing, registration or qualification with, any court or governmental agency or body having jurisdiction over the Company or any of its Subsidiaries or any of their properties or assets is required for the issue and sale of the Shares, the execution, delivery and performance of this Agreement by the Company, the consummation of the transactions contemplated hereby, the application of the proceeds from the sale of the Shares as described under "Use of Proceeds" in the Registration Statement, the Pricing Disclosure Package and the Prospectus, except for (i) the registration of the Shares under the Securities Act; (ii) such consents, approvals, authorizations, orders, filings, registrations or qualifications as may be required under the Exchange Act, and applicable state or foreign securities laws and/or the bylaws and rules of the Financial Industry Regulatory Authority (the "FINRA") in connection with the sale of the Shares by the Underwriters; and (iii) the inclusion of the Shares on The Nasdaq Global Market ("Nasdaq").

(o) The Company has all requisite corporate power and authority to execute, deliver and perform its obligations under this Agreement. This Agreement has been duly and validly authorized, executed and delivered by the Company.

(p) Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, neither the Company nor any of its Subsidiaries (i) is in violation of its certificate of incorporation or by-laws (or similar organizational documents), (ii) is in default, and no event has occurred that, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant, condition or other obligation contained in any indenture, mortgage, deed of trust, loan agreement, license or other agreement or instrument to which it is a party or by which it is bound or to which any of its properties or assets is subject, or (iii) is in violation of any statute or any order, rule or regulation of any court or governmental agency or body having jurisdiction over it or its property or assets or has failed to obtain any license, permit, certificate, franchise or other governmental authorization or permit necessary to the ownership of its property or to the conduct of its business, except in the case of clauses (ii) and (iii), to the extent any such conflict, breach, violation or default would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(q) Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there are no legal or governmental proceedings pending to which the Company or any of its Subsidiaries is a party or of which any property or assets of the Company or any of its Subsidiaries is the subject that, if determined adversely to the Company, would, in the aggregate, reasonably be expected to have a Material Adverse Effect; and to the Company's knowledge, no such proceedings are threatened in writing by governmental authorities or others.

(r) The historical financial statements (including the related notes and supporting schedules) included or incorporated by reference, in the Registration Statement, the Pricing Disclosure Package, and the Prospectus comply as to form in all material respects with the requirements of Regulation S-X under the Securities Act (“**Regulation S-X**”) and present fairly in all material respects the financial condition, results of operations and cash flows of the entities purported to be shown thereby at the dates and for the periods indicated and have been prepared in conformity with generally accepted accounting principles in the United States (“**GAAP**”) applied on a consistent basis throughout the periods involved (except (i) as may be otherwise indicated in such financial statements or the notes thereto, or (ii) in the case of unaudited interim statements, to the extent they may exclude footnotes and are subject to normal and recurring year-end adjustments that are not reasonably expected to be material in amount). All disclosures contained in the Registration Statement, the Pricing Disclosure Package and Prospectus regarding “non-GAAP financial measures” (as such term is defined by the rules and regulations of the Commission) comply with Regulation G of the Exchange Act and Item 10 of Regulation S-K of the Securities Act, to the extent applicable. There are no financial statements (historical or pro forma) that are required to be included in the Registration Statement, the Pricing Disclosure Package or the Prospectus that are not so included as required. The interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus fairly present the information called for in all material respects and have been prepared in accordance with the Commission’s rules and guidelines applicable thereto.

(s) There are no contracts or other documents required to be described in the Registration Statement, the Pricing Disclosure Package or the Prospectus or to be filed as exhibits to the Registration Statement that are not described and filed as required. The statements made in the Registration Statement, the Pricing Disclosure Package and Prospectus, insofar as they purport to constitute summaries of the terms of the contracts and other documents described and filed, constitute accurate summaries of the terms of such contracts and documents in all material respects. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, neither the Company nor any of its Subsidiaries has knowledge that any other party to any such contract or other document has any intention not to render full performance as contemplated by the terms thereof.

(t) The Company and each of its Subsidiaries maintain a system of “internal controls over financial reporting” (as defined in Rule 13a-15(f) of the Exchange Act) designed to provide reasonable assurances regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP, including, but not limited to, internal accounting controls sufficient to provide reasonable assurance that (i) transactions are executed in accordance with management’s general or specific authorization, (ii) transactions are recorded as necessary to permit preparation of the Company’s financial statements in conformity with GAAP and to maintain accountability for its assets, (iii) access to the Company’s assets is permitted only in accordance with management’s general or specific authorization, (iv) the recorded accountability for the Company’s assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences, and (v) the interactive

data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus fairly present the information called for in all material respects and are prepared in accordance with the Commission's rules and guidelines applicable thereto. Except as disclosed in the Registration Statement, the Pricing Disclosure Package or the Prospectus, as of the date of the most recent balance sheet of the Company and its consolidated Subsidiaries audited by PricewaterhouseCoopers LLP, there were no "material weaknesses" (as defined by the Public Company Accounting Oversight Board) in the Company's internal controls over financial reporting, or any fraud, whether or not material, that involves management or other employees of the Company and its Subsidiaries who have a significant role in the Company's internal controls; and since the end of the latest audited fiscal year, there has been no change in the Company's internal control over financial reporting (whether or not remediated) that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting. The Company's board of directors has, subject to the exceptions, cure periods and the phase in periods specified in the Exchange rules ("**Exchange Rules**"), validly appointed an audit committee to oversee internal accounting controls whose composition satisfies the applicable requirements of the Exchange Rules and the Company's board of directors and/or the audit committee has adopted a charter that satisfies the requirements of the Exchange Rules.

(u) Except as disclosed in the Registration Statement, the Pricing Disclosure Package or the Prospectus, the Company and its Subsidiaries maintain "disclosure controls and procedures" (as defined in Rule 13a-15(e) of the Exchange Act) that comply with the requirements of the Exchange Act and that have been designed to ensure that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms, including controls and procedures designed to ensure that such information is accumulated and communicated to the Company's management as appropriate to allow timely decisions regarding required disclosure. The Company and its Subsidiaries have carried out evaluations of the effectiveness of their disclosure controls and procedures as required by Rule 13a-15 of the Exchange Act.

(v) The section entitled "Critical Accounting Policies and Significant Judgments and Estimates" incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus accurately describes in all material respects (i) the accounting policies that the Company believes are the most important in the portrayal of the Company's financial condition and results of operations and that require management's most difficult, subjective or complex judgments ("**Critical Accounting Policies**"); (ii) the judgments and uncertainties affecting the application of Critical Accounting Policies; and (iii) the likelihood that materially different amounts would be reported under different conditions or using different assumptions, and an explanation thereof.

(w) There is and has been no failure on the part of the Company or, to the knowledge of the Company, any of the Company's directors or officers, in their capacities as such, to comply with any provision of the Sarbanes-Oxley Act of 2002 and the rules and regulations promulgated in connection therewith (the "**Sarbanes Oxley Act**") that are applicable to the Company or its directors or officers in their capacities as directors or officers of the Company.

(x) The shares of Common Stock are registered pursuant to Section 12(b) of the Exchange Act and listed on Nasdaq; the Company has taken no action designed to, or reasonably likely to have the effect of, terminating the registration of the Common Stock under the Exchange Act or delisting the Common Stock from Nasdaq, nor has the Company received any notification that the Commission or Nasdaq is contemplating terminating such registration or listing.

(y) No relationship, direct or indirect, exists between or among the Company, on the one hand, and the directors, officers, shareholders, customers or suppliers of the Company, on the other hand, that is required to be described in the Registration Statement, the Pricing Disclosure Package or the Prospectus which is not so described.

(z) The Company has not taken and will not take, directly or indirectly, any action designed to, or which might reasonably be expected to cause or result in, or which constitutes: (i) the stabilization or manipulation of the price of the Common Stock or any other security of the Company to facilitate the sale or resale of the Shares, (ii) a violation of Regulation M.

(aa) The Company has not sold or issued any securities that would be integrated with the offering and sale of the Shares contemplated by this Agreement pursuant to the Securities Act or the interpretations thereof by the Commission.

(bb) All of the information provided to the Underwriters or to counsel for the Underwriters by the Company and, to the Company's knowledge, its officers, directors and the holders of any securities (debt or equity) or options to acquire any securities of the Company in connection with the offering of the Shares is true, complete and correct in all material respects and compliant with FINRA rules and, to the Company's knowledge, any letters, filings or other supplemental information provided to FINRA pursuant to FINRA Rules or NASD Conduct Rules is true, complete and correct in all material respects.

(cc) The statements set forth in the Pricing Disclosure Package and the Prospectus under the caption "Description of Capital Stock", insofar as it purports to constitute a summary of the terms of the Common Stock, and under the captions "Risk Factors" and "Underwriting", insofar as they purport to describe the provisions of the laws and documents referred to therein, are accurate and complete in all material respects.

(dd) The Company is not and, at all times up to and including consummation of the transactions contemplated by this Agreement, and after giving effect to application of the net proceeds of the Offering as described in the Pricing Disclosure Package and the Prospectus, will not be, required to register as an "investment company" under the Investment Company Act of 1940, as amended, and is not and will not be an entity "controlled" by an "investment company" within the meaning of such act.

(ee) Neither the Company nor any of its Subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against any of them or any Underwriter for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Shares.

(ff) The Company and each of its Subsidiaries have good and marketable title in fee simple to all real property and good and marketable title to all personal property owned by them, that are material to the business of the Company, in each case free and clear of all liens, encumbrances and defects, except such liens, encumbrances and defects as do not materially affect the value of such property and do not materially interfere with the use made and proposed to be made of such property by the Company and its Subsidiaries. All assets held under lease by the Company and its Subsidiaries, that are material to the business of the Company, are held by them under valid, subsisting and enforceable leases, with such exceptions as do not materially interfere with the use made and proposed to be made of such assets by the Company and its Subsidiaries.

(gg) The Company and each of its Subsidiaries owns, possesses, or can acquire on reasonable terms, all Intellectual Property necessary for the conduct of the Company's and its Subsidiaries' business as now conducted or as proposed to be conducted, as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus. Furthermore, (A) to the knowledge of the Company, there is no infringement, misappropriation or violation by third parties of any such Intellectual Property; (B) there is no pending or, to the knowledge of the Company, threatened, action, suit, proceeding or claim by others challenging the Company's or any of its Subsidiaries' rights in or to any such Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such claim; (C) the Intellectual Property owned by the Company and its Subsidiaries, and to the knowledge of the Company, the Intellectual Property licensed to the Company and its Subsidiaries, in each case that is necessary for the conduct of the Company's and its Subsidiaries' business as now conducted or as proposed to be conducted, has not been adjudged invalid or unenforceable, in whole or in part, and there is no pending or, to the knowledge of the Company, threatened action, suit, proceeding or claim by others challenging the validity or scope of any such Intellectual Property and the Company is unaware of any facts which would form a reasonable basis for any such claim; (D) there is no pending or, to the knowledge of the Company, threatened action, suit, proceeding or claim by others that the Company or any of its Subsidiaries infringes, misappropriates or otherwise violates any Intellectual Property or other proprietary rights of others, and neither the Company or any of its Subsidiaries has received any written notice of such claim and the Company is unaware of any other fact which would form a reasonable basis for any such claim; (E) to the Company's knowledge, no employee of the Company or any of its Subsidiaries is in or has ever been in material violation of any employment contract, patent disclosure agreement, invention assignment agreement, non-competition agreement, non-solicitation agreement, nondisclosure agreement or any restrictive covenant to or with a former employer where the basis of such violation relates to such employee's employment with the Company nor any of its Subsidiaries or actions undertaken by the employee while employed with the Company or any of its Subsidiaries; (F) with respect to the Intellectual Property that is necessary for the conduct of the Company's and its Subsidiaries' business as now conducted or as proposed to be conducted, there is no prior art or public or commercial activity of which the Company is aware that may render any patent included with respect to such Intellectual Property invalid or that would preclude the issuance of any patent on any patent application included in such Intellectual Property, which has not been disclosed to the U.S. Patent and Trademark Office or the relevant foreign patent authority, as the case may be; (G) to the Company's knowledge, the issued patents included in the Intellectual Property that is necessary for the conduct of the Company's and its Subsidiaries' business as now conducted or as proposed to be conducted are valid and enforceable and the Company is unaware of any facts that would preclude the issuance of a valid and enforceable patent on any pending patent application

included in such Intellectual Property; (H) with respect to the Intellectual Property that is necessary for the conduct of the Company's and its Subsidiaries' business as now conducted or proposed to be conducted and that is owned or purported to be owned by the Company, the Company has taken reasonable steps necessary to secure the interests of the Company in such Intellectual Property from all employees, consultants, agents or contractors that developed (in whole or in part) such Intellectual Property; (I) no government funding, facilities or resources of a university, college, other educational institution or research center was used in the development of any Intellectual Property necessary for the conduct of the Company's and its subsidiaries' business as now conducted or proposed to be conducted and that is owned or purported to be owned by the Company that would confer upon any governmental agency or body, university, college, other educational institution or research center any claim or right in or to any such Intellectual Property; and (J) to the Company's knowledge, none of the technology employed by the Company has been obtained or is being used by the Company in violation of the rights of any entity. "**Intellectual Property**" shall mean all patents, patent applications, trade and service marks, trade and service mark registrations, trade names, copyrights, licenses, inventions, trade secrets, domain names, technology, know-how and other intellectual property in the United States and foreign jurisdictions.

(hh) The Company has submitted and possesses, or qualifies for applicable exemptions to, such valid and current registrations, listings, approvals, clearances, licenses, certificates, authorizations or permits and supplements or amendments thereto issued or required by the appropriate state, federal or foreign regulatory agencies or bodies necessary to conduct their business ("**Permits**"), including, without limitation, all such Permits required by the U.S. Food and Drug Administration (the "**FDA**"), the U.S. Department of Health and Human Services ("**HHS**"), the U.S. Centers for Medicare & Medicaid Services ("**CMS**"), the European Medicines Agency ("**EMA**"), Health Canada or any other comparable state, federal or foreign agencies or bodies to which it is subject, and the Company has not received any notice of proceedings relating to the revocation or modification of, or non-compliance with, any such Permit, except for such Permits, the lack of which would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Effect.

(ii) The Company and, to the Company's knowledge, its directors, employees and agents (while acting in such capacity) are and at all times have been in material compliance with, all health care laws applicable to the Company, or any of its products or activities, including, but not limited to, the federal Anti-Kickback Statute (42 U.S.C. Section 1320a-7b(b)), the Anti-Inducement Law (42 U.S.C. Section 1320a-7a(a)(5)), the civil False Claims Act (31 U.S.C. Section 3729 et seq.), the administrative False Claims Law (42 U.S.C. Section 1320a-7b(a)), the Stark law (42 U.S.C. Section 1395nn), the Health Insurance Portability and Accountability Act of 1996 (42 U.S.C. Section 1320d et seq.) as amended by the Health Information Technology for Economic and Clinical Health Act (42 U.S.C. Section 17921 et seq.), the exclusion laws (42 U.S.C. Section 1320a-7), the Federal Food, Drug, and Cosmetic Act (21 U.S.C. Section 301 et seq.), the Controlled Substances Act (21 U.S.C. Section 801 et seq.), the Public Health Service Act (42 U.S.C. Section 201 et seq.), the Clinical Laboratory Improvement Amendments of 1988 (42 U.S.C. Section 263a), Medicare (Title XVIII of the Social Security Act), Medicaid (Title XIX of the Social Security Act), and the Patient Protection and Affordable Care Act of 2010, as amended by the Health Care and Education Reconciliation Act of 2010, the regulations promulgated pursuant to such laws, and any other state, federal or foreign law, accreditation standards, regulation,

memorandum, opinion letter, or other issuance which imposes legally binding requirements on manufacturing, development, testing, labeling, advertising, marketing, promotion, distribution, reporting, kickbacks, patient or program charges, recordkeeping, claims process, documentation requirements, medical necessity, referrals, the hiring of employees or acquisition of services or supplies from those who have been excluded from government health care programs, quality, safety, privacy, security, licensure, accreditation or any other aspect of providing health care, clinical laboratory or diagnostics products or services (collectively, “**Health Care Laws**”). The Company has not received any notification, correspondence or any other written or oral communication, including notification of any pending or threatened claim, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from any governmental authority, including, without limitation, the FDA, the EMA, Health Canada, the U.S. Federal Trade Commission, the U.S. Drug Enforcement Administration, CMS, HHS’s Office of Inspector General, the U.S. Department of Justice and state Attorneys General or similar agencies of potential or actual non-compliance by, or liability of, the Company under any Health Care Laws, except, with respect to any of the foregoing, such as would not, individually or in the aggregate, result in a Material Adverse Effect. To the Company’s knowledge, there are no facts or circumstances that would reasonably be expected to give rise to material liability of the Company under any Health Care Laws. The statements with respect to Health Care Laws and the Company’s compliance therewith included in the Registration Statement, the Pricing Disclosure Package and the Prospectus fairly summarize the matters therein described.

(jj) The studies, tests and preclinical and clinical trials conducted by or on behalf of, or sponsored by, the Company, or in which the Company has participated, that are described in the Registration Statement, the Pricing Disclosure Package or the Prospectus, or the results of which are referred to in the Registration Statement, the Pricing Disclosure Package or the Prospectus, were and, if still pending, are being conducted in all material respects in accordance with protocols, procedures and controls pursuant to, where applicable, accepted professional and scientific standards for products or product candidates comparable to those being developed by the Company and all applicable statutes, rules and regulations of the FDA, the EMA, Health Canada and other comparable regulatory agencies outside of the U.S. to which they are subject, including, without limitation, 21 C.F.R. Parts 50, 54, 56, 58, 312, and 812; the descriptions of the results of such studies, tests and trials contained in the Registration Statement, the Pricing Disclosure Package or the Prospectus do not contain any misstatement of a material fact or omit a material fact necessary to make such statements not misleading; the Company has no knowledge of any studies, tests or trials not described in the Registration Statement, the Pricing Disclosure Package or the Prospectus the results of which reasonably call into question in any material respect the results of the studies, tests and trials described in the Registration Statement, the Pricing Disclosure Package or Prospectus; and the Company has not received any notices or other correspondence from the FDA, EMA, Health Canada or any other foreign, state or local governmental body exercising comparable authority or any Institutional Review Board or comparable authority requiring or threatening the termination, suspension or material modification of any studies, tests or preclinical or clinical trials conducted by or on behalf of, or sponsored by, the Company or in which the Company has participated, and, to the Company’s knowledge, there are no reasonable grounds for the same. Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there has not been any violation of law or regulation by the Company in its respective product development efforts, submissions or reports to any regulatory authority that could reasonably be expected to require investigation, corrective action or enforcement action.

(kk) The Company and its Subsidiaries' information technology assets and equipment, computers, systems, networks, hardware, software, websites, applications, and databases (collectively, "**IT Systems**") are adequate for, and operate and perform in all material respects as required in connection with the operation of the business of the Company and its Subsidiaries as currently conducted, free and clear of all material bugs, errors, defects, Trojan horses, time bombs, malware and other corruptants. The Company and its Subsidiaries have implemented and maintained commercially reasonable physical, technical and administrative controls, policies, procedures, and safeguards to maintain and protect their material confidential information and the integrity, continuous operation, redundancy and security of all IT Systems and data, including "Personal Data," used in connection with their businesses. "**Personal Data**" means (i) a natural person's name, street address, telephone number, e-mail address, photograph, social security number or tax identification number, driver's license number, passport number, credit card number, bank information, or customer or account number; (ii) any information which would qualify as "personally identifying information" under the Federal Trade Commission Act, as amended; (iii) "personal data" as defined by GDPR (as defined below); (iv) any information which would qualify as "protected health information" under the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act (collectively, "**HIPAA**"); and (v) any other piece of information that allows the identification of such natural person, or his or her family, or permits the collection or analysis of any data related to an identified person's health or sexual orientation. There have been no breaches, violations, outages or unauthorized uses of or accesses to same, except for those that have been remedied without material cost or liability or the duty to notify any other person, nor any incidents under internal review or investigations relating to the same. The Company and its Subsidiaries are presently in material compliance with all applicable laws or statutes and all judgments, orders, rules and regulations of any court or arbitrator or governmental or regulatory authority, internal policies and contractual obligations relating to the privacy and security of IT Systems and Personal Data and to the protection of such IT Systems and Personal Data from unauthorized use, access, misappropriation or modification.

(ll) The Company and its Subsidiaries are, and at all prior times were, in material compliance with all applicable state and federal data privacy and security laws and regulations, including without limitation HIPAA, and the Company and its Subsidiaries have taken commercially reasonable actions to prepare to comply with, and since May 25, 2018, have been and currently are in compliance with, the European Union General Data Protection Regulation ("**GDPR**") (EU 2016/679) (collectively, the "**Privacy Laws**"). To ensure compliance with the Privacy Laws, the Company and its Subsidiaries have in place, comply with, and take appropriate steps reasonably designed to ensure compliance in all material respects with their policies and procedures relating to data privacy and security and the collection, storage, use, disclosure, handling, and analysis of Personal Data (the "**Policies**"). The Company and its Subsidiaries have at all times made all disclosures to users or customers required by applicable laws and regulatory rules or requirements, and none of such disclosures made or contained in any Policy have, to the knowledge of the Company, been inaccurate or in violation of any applicable laws and regulatory rules or requirements in any material respect. The Company further certifies that neither it nor any of its Subsidiary: (i) has received notice of any actual or potential liability under or relating to, or actual or potential violation of, any of the Privacy Laws, and has no knowledge of any event or condition that would reasonably be expected to result in any such notice; (ii) is currently conducting or paying for, in whole or in part, any investigation, remediation, or other corrective action pursuant to any Privacy Law; or (iii) is a party to any order, decree, or agreement that imposes any obligation or liability under any Privacy Law.

(mm) The Company has not had any product, clinical laboratory or manufacturing site (whether Company-owned or, to the Company's knowledge, that of a third party manufacturer for the Company's products) subject to a governmental authority (including FDA) shutdown or import or export prohibition, nor received any FDA Form 483 or other governmental authority notice of inspectional observations, "warning letters," "untitled letters," requests to make changes to the Company's products, processes or operations, or similar correspondence or notice from the FDA or other governmental authority alleging or asserting material noncompliance with any applicable Health Care Laws. To the Company's knowledge, neither the FDA nor any other governmental authority is considering such action.

(nn) (A) Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, there have been no recalls, field notifications, field corrections, market withdrawals or replacements, warnings, "dear doctor" letters, investigator notices, safety alerts or other notice of action relating to an alleged lack of safety, efficacy, or regulatory compliance of the Company's products ("**Safety Notices**") and (B) to the Company's knowledge, there are no facts that would be reasonably likely to result in (x) a Safety Notice with respect to the Company's products or services, (y) a change in labeling of any of the Company's respective products or services, or (z) a termination or suspension of marketing or testing of any of the Company's products or services.

(oo) The Company and each of its Subsidiaries maintain insurance from insurers of recognized financial responsibility in such amounts and covering such risks is commercially reasonable in accordance with customary practices for companies engaged in similar businesses and similar industries for the conduct of their respective businesses and the value of their respective properties and as is customary for companies engaged in similar businesses in similar industries. All policies of insurance of the Company and its subsidiaries are in full force and effect; the Company and each of its Subsidiaries are in compliance with the terms of such policies in all material respects; neither the Company nor any of its Subsidiaries has received notice from any insurer or agent of such insurer that capital improvements or other expenditures are required or necessary to be made in order to continue such insurance; there are no material claims by the Company or any of its Subsidiaries under any such policy or instrument as to which any insurance company is denying liability or defending under a reservation of rights clause; and neither the Company nor any such Subsidiary has any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business at a cost that would not reasonably be expected to have a Material Adverse Effect.

(pp) The Company and each of its Subsidiaries have filed all federal, state, local and foreign tax returns required to be filed through the date hereof, subject to permitted extensions, and have paid all taxes due except where the failure to file or pay would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect, and no tax deficiency has been determined adversely to the Company or any of its Subsidiaries, nor does the Company have any knowledge of any tax deficiencies that have been, or would reasonably be expected to be asserted against the Company, that would, in the aggregate, reasonably be expected to have a Material Adverse Effect.

(qq) No labor disturbance or dispute with the employees of the Company or any of its Subsidiaries exists or, to the knowledge of the Company, is imminent that could reasonably be expected to have a Material Adverse Effect.

(rr) (i) Each “employee benefit plan” (within the meaning of Section 3(3) of the Employee Retirement Security Act of 1974, as amended (“ERISA”)) for which the Company or any member of its “Controlled Group” (defined as any organization which is a member of a controlled group of corporations within the meaning of Section 414 of the Internal Revenue Code of 1986, as amended (the “Code”)) would have any liability (each a “Plan”) has been maintained in compliance in all material respects with its terms and with the requirements of all applicable statutes, rules and regulations including ERISA and the Code; (ii) no prohibited transaction, within the meaning of Section 406 of ERISA or Section 4975 of the Code, has occurred with respect to any Plan excluding transactions effected pursuant to a statutory or administrative exemption; (iii) with respect to each Plan subject to Title IV of ERISA (A) no “reportable event” (within the meaning of Section 4043(c) of ERISA) has occurred or is reasonably expected to occur that would result in a material loss to the Company, (B) no “accumulated funding deficiency” (within the meaning of Section 302 of ERISA or Section 412 of the Code), whether or not waived, has occurred or is reasonably expected to occur, (C) the fair market value of the assets under each Plan that is required to be funded exceeds the present value of all benefits accrued under such Plan (determined based on those assumptions used to fund such Plan), and (D) neither the Company or any member of its Controlled Group has incurred, or reasonably expects to incur, any liability under Title IV of ERISA (other than contributions to the Plan or premiums to the Pension Benefit Guaranty Corporation in the ordinary course and without default) in respect of a Plan (including a “multiemployer plan”, within the meaning of Section 4001(c)(3) of ERISA); and (iv) each Plan that is intended to be qualified under Section 401(a) of the Code is so qualified and nothing has occurred, to the Company’s knowledge, whether by action or by failure to act, which would cause the loss of such qualification.

(ss) Except as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company and each of its Subsidiaries (i) are, and at all times prior hereto were, in compliance with all laws, regulations, ordinances, rules, orders, judgments, decrees, permits or other legal requirements of any governmental authority, including without limitation any international, foreign, national, state, provincial, regional, or local authority, relating to pollution, the protection of human health or safety, the environment, or natural resources, or to use, handling, storage, manufacturing, transportation, treatment, discharge, disposal or release of hazardous or toxic substances or wastes, pollutants or contaminants (“Environmental Laws”) applicable to such entity, which compliance includes, without limitation, obtaining, maintaining and complying with all permits and authorizations and approvals required by Environmental Laws to conduct their respective businesses, and (ii) have not received written notice or otherwise have knowledge of any actual or alleged violation of Environmental Laws, or of any actual or potential liability for or other obligation concerning the presence, disposal or release of hazardous or toxic substances or wastes, pollutants or contaminants, except in the case of clauses (i) and (ii), to the extent any such non-compliance, violation, liability or other obligation would not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect. Except as described

in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (x) there are no proceedings that are pending, or to the Company's knowledge, threatened, against the Company or any of its Subsidiaries under Environmental Laws in which a governmental authority is also a party, other than such proceedings regarding which it is reasonably believed no monetary sanctions of \$100,000 or more will be imposed, (y) the Company and its Subsidiaries are not aware of any issues regarding compliance with Environmental Laws, including any pending or proposed Environmental Laws, or liabilities or other obligations under Environmental Laws or concerning hazardous or toxic substances or wastes, pollutants or contaminants, that would reasonably be expected to have a Material Adverse Effect, and (z) none of the Company and its Subsidiaries anticipates material capital expenditures relating to Environmental Laws.

(tt) Neither the Company nor any Subsidiary nor, to the Company's knowledge, any director, officer, agent, employee, affiliate or other person acting on behalf of the Company or any Subsidiary, has authorized the giving of, offer or promise to give or (i) made any unlawful contribution, gift, entertainment or other unlawful expense relating to political activity; (ii) made any direct or indirect unlawful payment to any domestic governmental official, "foreign official" (as defined in the U.S. Foreign Corrupt Practices Act of 1977, as amended, and the rules and regulations thereunder (collectively, the "**FCPA**")) or employee; (iii) violated or is in violation of any provision of the FCPA, UK Bribery Act, any applicable non-U.S. anti-bribery statute or regulation or any locally applicable corruption laws; (iv) made any bribe, rebate, payoff, influence payment, kickback or other unlawful payment; or (v) received notice of any investigation, proceeding or inquiry by any governmental agency, authority or body regarding any of the matters in clauses (i)-(iv) above; and the Company and the Subsidiaries and, to the Company's knowledge, the Company's affiliates have conducted their respective businesses in compliance with the FCPA and have instituted and maintain policies and procedures designed to ensure, and which are reasonably expected to continue to ensure, continued compliance therewith.

(uu) The operations of the Company and the Subsidiaries are and have been conducted at all times in compliance with applicable financial record-keeping and reporting requirements, including those of the Bank Secrecy Act, as amended by Title III of the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (USA PATRIOT Act) (Title III of Pub. L. 107-56 (signed into law 18 October 26, 2001)) (the "USA Patriot Act"), and those of the Currency and Foreign Transactions Reporting Act of 1970, as amended, and the money laundering statutes of all applicable jurisdictions, the rules and regulations thereunder and any related or similar rules, regulations or guidelines issued, administered or enforced by any governmental agency (collectively, the "**Money Laundering Laws**") and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or the Subsidiaries with respect to the Money Laundering Laws is pending or, to the Company's knowledge, threatened.

(vv) None of the Company nor any Subsidiary nor, to the knowledge of the Company, any officer, director, agent, employee, affiliate or any person acting on behalf of the Company or any Subsidiary is or, in the past five years, has been (A) engaged in any services (including financial services), transfers of goods, software, or technology, or any other business activity related to (i) Cuba, Iran, North Korea, Sudan, Syria or the Crimea region of Ukraine claimed by Russia ("**Sanctioned Countries**"), (ii) the government of any Sanctioned Country, (iii) any

person, entity or organization located in, resident in, formed under the laws of, or owned or controlled by the government of, any Sanctioned Country, or (iv) any person, entity or organization made subject or target of any sanctions administered or enforced by the United States Government (including the US Department of Treasury, Office of Foreign Assets Control and the US Department of State), including, without limitation, the list of Specially Designated Nationals (“**SDN List**”) of the Office of Foreign Assets Control of the U.S. Treasury Department (“**OFAC**”), or by the United Nations Security Council, the European Union, Her Majesty’s Treasury-UK, or other relevant sanctions authority (collectively, “**Sanctions**”) and the Company will not directly or indirectly use the proceeds of this offering, or lend, contribute or otherwise make available such proceeds to any of its Subsidiaries, or any joint venture partner or other person or entity, for the purpose of financing the activities of or business with any person, or in any country or territory, that currently is the subject to any U.S. sanctions administered by OFAC or in any other manner that will result in a violation by any person (including any person participating in the transaction whether as underwriter, advisor, investor or otherwise) of U.S. sanctions administered by OFAC; (B) engaged in any transfers of goods, technologies or services (including financial services) that may assist the governments of Sanctioned Countries or facilitate money laundering or other activities proscribed by United States laws, rules or regulations; (C) is a person, entity or organization currently the subject of any Sanctions; or (D) located, organized or resident in any Sanctioned Country.

(ww) The Company (i) does not have any material lending or other relationship with any bank or lending affiliate of any Underwriter and (ii) does not intend to use any of the proceeds from the sale of the Shares to repay any outstanding debt owed to any affiliate of any Underwriter.

Any certificate signed by or on behalf of the Company and delivered to the Representative or to counsel for the Underwriters shall be deemed to be a representation and warranty by the Company to each Underwriter as to the matters covered thereby.

## 2. Purchase, Sale and Delivery of the Shares.

(a) On the basis of the representations, warranties, covenants and agreements herein contained, and subject to the terms and conditions herein set forth, the Company agrees to sell to each Underwriter and each Underwriter, severally and not jointly, agrees to purchase from the Company, at a purchase price per share of \$2.961, the number of Firm Shares set forth opposite their respective names on Schedule I hereto together with any additional number of Shares which such Underwriter may become obligated to purchase pursuant to the provisions of Section 10 hereof, subject, however, to such adjustments to eliminate fractional shares as the Representative in its sole discretion shall make.

(b) The closing of the issuance of the Firm Shares shall be held at the office of Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. (“**Underwriters’ Counsel**”), or at such other place as shall be agreed upon by the Representative and the Company, at 10:00 a.m., New York City time, on September 16, 2022, or such other time and date as the Representative and the Company may agree upon in writing (such time and date of payment and delivery being herein called the “**Closing Date**”). Payment of the purchase price for the Firm Shares

shall be made by wire transfer in same day funds to the accounts specified by the Company upon delivery of the Firm Shares to the Representative. Delivery of the Firm Shares shall be made to the Representative through the facilities of The Depository Trust Company (“DTC”) for the respective accounts of the several Underwriters. The Firm Shares shall be registered in such name or names and shall be in such denominations as the Representative may request in writing not later than the business day immediately prior to the Closing Date.

(c) In addition, the Company hereby grants to the Underwriters the option, solely to cover over-allotments, to purchase up to 3,333,750 Additional Shares at the same purchase price per share to be paid by the Underwriters for the Firm Shares as set forth in Section 2(a) above. This option may be exercised at any time and from time to time, in whole or in part on one or more occasions, on or before the thirtieth day following the date of the Prospectus, by written notice from the Representative to the Company. Such notice shall set forth the aggregate number of Additional Shares as to which the option is being exercised and the date and time, as reasonably determined by the Representative, when the Additional Shares are to be delivered (any such date and time being herein sometimes referred to as an “**Additional Closing Date**”); *provided, however*, that no Additional Closing Date shall occur earlier than the Closing Date or earlier than the second full business day after the date on which the option shall have been exercised nor later than the eighth full business day after the date on which the option shall have been exercised. On the basis of the representations, warranties, covenants and agreements herein contained, but subject to the terms and conditions herein set forth, upon any exercise of the option as to all or any portion of the Additional Shares, each Underwriter, acting severally and not jointly, agrees to purchase from the Company the number of Additional Shares that bears the same proportion of the total number of Additional Shares then being purchased as the number of Firm Shares set forth opposite the name of such Underwriter in Schedule I hereto (or such number increased as set forth in Section 10 hereof) bears to the total number of Firm Shares that the Underwriters have agreed to purchase hereunder, subject, however, to such adjustments to eliminate fractional shares as the Representative in its sole discretion shall make. In the event that the Underwriters exercise less than their full option to purchase Additional Shares, the number of Additional Shares to be sold by the Company shall be, as nearly as practicable, in the same proportion as the maximum number of Additional Shares to be sold by the Company and the number of Additional Shares to be sold.

(d) The closing of the issuance of the Additional Shares shall be held at the office of Underwriters’ Counsel, or at such other place as shall be agreed upon by the Representative and the Company, at 10:00 a.m., New York City time, on any Additional Closing Date, or such other time as shall be agreed upon by the Representative and the Company. Payment of the purchase price for the Additional Shares shall be made by wire transfer in same day funds to the account specified by the Company delivery of the Additional Shares to the Representative. Delivery of the Additional Shares shall be made to the Representative through the facilities of DTC for the respective accounts of the several Underwriters. The Additional Shares shall be registered in such name or names and shall be in such denominations as the Representative may request in writing not later than the business day immediately prior to the Additional Closing Date.

3. Offering. Upon authorization of the release of the Firm Shares by the Representative, the Underwriters propose to offer the Shares for sale upon the terms and conditions set forth in the Prospectus.

4. Covenants of the Company. In addition to the other covenants and agreements of the Company contained herein, the Company further covenants and agrees with each of the Underwriters that:

(a) The Company shall prepare the Prospectus in a form approved by the Representative and file such Prospectus pursuant to, and within the time period specified in, Rule 424(b) and Rule 430B under the Securities Act; prior to the last date on which an Additional Closing Date, if any, may occur, the Company shall file no further amendment to the Registration Statement or amendment or supplement to the Prospectus to which the Representative objects in writing after being furnished in advance a copy thereof and given a reasonable opportunity to review and comment thereon; the Company shall notify the Representative promptly (and, if requested by the Representative, confirm such notice in writing) (i) when the Registration Statement and any amendments thereto become effective, (ii) of any request by the Commission for any amendment of or supplement to the Registration Statement or the Prospectus, including any document incorporated by reference therein or for any additional information, (iii) of the Company's intention to file, or prepare any supplement or amendment to, the Registration Statement, any Preliminary Prospectus or the Prospectus, (iv) of the mailing or the delivery to the Commission for filing of any amendment of or supplement to the Registration Statement or the Prospectus, including but not limited to Rule 462(b) under the Securities Act, (v) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto, or suspending the use of any Preliminary Prospectus or the Prospectus or, in each case, of the initiation or threatening of any proceedings therefore, (vi) of the receipt of any comments from the Commission, and (vii) of the receipt by the Company of any notification with respect to the suspension of the qualification of the Shares for sale in any jurisdiction or the initiation or threatening of any proceeding for that purpose. If the Commission shall propose or enter a stop order at any time, the Company will make every reasonable effort to prevent the issuance of any such stop order and, if issued, to obtain the lifting of such order as soon as possible.

(b) If at any time when a prospectus relating to the Shares (or, in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act) is required to be delivered under the Securities Act, any event shall have occurred as a result of which the Pricing Disclosure Package (prior to the availability of the Prospectus) or the Prospectus as then amended or supplemented would, in the judgment of the Underwriters or the Company, include an untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances existing at the time of delivery of such Pricing Disclosure Package or Prospectus (or, in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act) to the purchaser, not misleading, or if to comply with the Securities Act, the Exchange Act or the Rules and Regulations it shall be necessary at any time to amend or supplement the Pricing Disclosure Package, the Prospectus or the Registration

Statement, or to file any document incorporated by reference in the Registration Statement or the Prospectus or in any amendment thereof or supplement thereto, the Company will notify the Representative promptly and prepare and file with the Commission an appropriate amendment, supplement or document (in form and substance satisfactory to the Representative) that will correct such statement or omission or effect such compliance, and will use its reasonable best efforts to have any amendment to the Registration Statement declared effective as soon as possible.

(c) The Company will not, without the prior consent of the Representative, (i) make any offer relating to the Shares that would constitute a “free writing prospectus” as defined in Rule 405 under the Securities Act, except for any Issuer Free Writing Prospectus set forth in Schedule II hereto and any electronic Road Show previously approved by the Representative, or (ii) file, refer to, approve, use or authorize the use of any “free writing prospectus” as defined in Rule 405 under the Securities Act with respect to the Offering or the Shares. If at any time any event shall have occurred as a result of which any Issuer Free Writing Prospectus as then amended or supplemented would, in the judgment of the Underwriters or the Company, conflict with the information in the Registration Statement, the Pricing Disclosure Package or the Prospectus as then amended or supplemented or would, in the judgment of the Underwriters or the Company, include an untrue statement of a material fact or omit to state any material necessary in order to make the statements therein, in the light of the circumstances existing at the time of delivery to the purchaser, not misleading, or if to comply with the Securities Act or the Rules and Regulations it shall be necessary at any time to amend or supplement any Issuer Free Writing Prospectus, the Company will notify the Representative promptly and, if requested by the Representative, prepare and furnish without charge to each Underwriter an appropriate amendment or supplement (in form and substance satisfactory to the Representative) that will correct such statement, omission or conflict or effect such compliance.

(d) The Company will comply with the requirements of Rule 433 with respect to each Issuer Free Writing Prospectus including, without limitation, all prospectus delivery, filing, record retention and legending requirements applicable to each such Issuer Free Writing Prospectus.

(e) At the request of the Representative, the Company will promptly deliver to each of the Representative and Underwriters’ Counsel a signed copy of the Registration Statement, as initially filed and all amendments thereto, including all consents and exhibits filed therewith. At the request of the Representative, the Company will promptly deliver to each of the Underwriters such number of copies of any Preliminary Prospectus, the Prospectus, the Registration Statement, all amendments of and supplements to such documents, if any, and all documents incorporated by reference in the Registration Statement and Prospectus or any amendment thereof or supplement thereto, as the Representative may reasonably request. Prior to 10:00 a.m., New York City time, on the business day next succeeding the date of this Agreement and from time to time thereafter, at the request of the Representative, the Company will furnish the Underwriters with copies of the Prospectus in New York City in such quantities as the Representative may reasonably request.

(f) Promptly from time to time, the Company will use its reasonable best efforts, in cooperation with the Representative, to qualify the Shares for offering and sale under the securities laws relating to the offering or sale of the Shares of such jurisdictions, domestic or foreign, as the Representative may reasonably request and to maintain such qualification in effect for so long as required for the distribution thereof; except that in no event shall the Company be obligated in connection therewith to (i) qualify as a foreign corporation, (ii) to execute a general consent to service of process or (iii) subject itself to taxation in any jurisdiction where it is not otherwise so subject.

(g) The Company will make generally available to its security holders and to the Representative as soon as practicable an earnings statement of the Company and the Subsidiaries (which need not be audited) covering a period of at least twelve months beginning with the first fiscal quarter of the Company commencing after the date of this Agreement that will satisfy the provisions of Section 11(a) of the Securities Act and the Rules and Regulations (including, at the option of the Company, Rule 158).

(h) During the period of 90 days from the date of the Prospectus (the “**Lock-Up Period**”), without the prior written consent of Guggenheim Securities, the Company (i) will not, directly or indirectly, issue, offer, sell, agree to issue, offer or sell, solicit offers to purchase, grant any call option, warrant or other right to purchase, purchase any put option or other right to sell, pledge, borrow or otherwise dispose of any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock, or make any public announcement of any of the foregoing, (ii) will not establish or increase any “put equivalent position” or liquidate or decrease any “call equivalent position” (in each case within the meaning of Section 16 of the Exchange Act and the rules and regulations thereunder) with respect to any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock, and (iii) will not otherwise enter into any swap, derivative or other transaction or arrangement that transfers to another, in whole or in part, any economic consequence of ownership of any shares of Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock, whether or not such transaction is to be settled by delivery of any shares of Common Stock, securities convertible into or exercisable or exchangeable for Common Stock, other securities, cash or other consideration, other than (A) the Shares to be sold hereunder, (B) upon the exercise of an option or warrant, the vesting of restricted stock units, performance stock units or deferred stock units or the conversion or exchange of a security outstanding on the date hereof as referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (C) pursuant to the stock-based compensation plans of the Company and the Subsidiaries as referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus, or pursuant to any qualifying inducement award under Nasdaq Listing Rule 5635(c)(4), (D) shares of Common Stock or other securities issued in connection with a transaction with an unaffiliated third party that includes a bona fide commercial relationship (including joint ventures, marketing or distribution arrangements, collaboration agreements or intellectual property license agreements) or any acquisition of assets of not less than a majority or controlling portion of the equity of another entity, provided that the aggregate number of shares of Common Stock that the Company may sell or issue or agree to sell or issue shall not exceed 5% of the total number of shares of Common Stock issued and outstanding on a fully-diluted basis as of the date of this Agreement and after giving effect to the consummation of the offering contemplated by this Agreement, (E) the filing of any registration statement on Form S-8 or a successor form thereto relating to the shares of Common Stock granted pursuant to or reserved for issuance under the stock-based compensation plans of the Company and the Subsidiary referred to in clause (C), and (F)

assisting any stockholder of the Company in the establishment of a trading plan by such stockholder pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of Common Stock, provided that such plan does not provide for the transfer of shares of Common Stock during the Lock-Up Period, and the establishment of such plan does not require or otherwise result in any public filings or other public announcement of such plan during such Lock-Up Period and such plan is otherwise permitted to be implemented during the Lock-up Period pursuant to the terms of any applicable lock-up agreement between such stockholder and the Underwriters in connection with the offering contemplated by this Agreement.

(i) During the period of two years from the Effective Date of the Registration Statement, the Company will furnish to the Representative copies of all reports or other communications (financial or other) furnished to security holders or from time to time published or publicly disseminated by the Company, and will deliver to the Representative as soon as they are available, copies of any reports, financial statements and proxy or information statements furnished to or filed with the Commission or any national securities exchange on which any class of securities of the Company is listed; provided, that the Company will be deemed to have furnished such reports, other communications, financial statements and proxy or information statements to the Representative to the extent they are filed on EDGAR.

(j) The Company will use its best efforts to maintain the listing of its Common Stock (including the Shares) on Nasdaq following the issuance of the Shares pursuant to this Agreement provided; however that this covenant shall not prevent a sale, merger or similar transaction involving the Company.

(k) The Company will apply the net proceeds from the sale of the Shares as set forth under the caption "Use of Proceeds" in the Pricing Disclosure Package and the Prospectus.

(l) The Company, during the period when a prospectus (or, in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act) is required to be delivered under the Securities Act in connection with the offer or sale of the Shares, will file all reports and other documents required to be filed by the Company with the Commission pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act and the Rules and Regulations within the time periods required thereby.

(m) If the Company elects to rely upon Rule 462(b) under the Securities Act, the Company shall file a Rule 462(b) Registration Statement with the Commission in compliance with Rule 462(b) by 10:00 p.m. (New York City time), on the date of this Agreement, and the Company shall at the time of filing either pay to the Commission the filing fee for the Rule 462(b) Registration Statement or give irrevocable instructions for the payment of such fee pursuant to Rule 111(b) under the Securities Act.

(n) The Company will not take, and will cause its affiliates (within the meaning of Rule 144 under the Securities Act) not to take, directly or indirectly, any action which constitutes or is designed to cause or result in, or which would reasonably be expected to constitute, cause or result in, the stabilization or manipulation of the price of any security to facilitate the sale or resale of the Shares or to result in a violation of Regulation M under the Exchange Act.

(o) The Company will do and perform all things required or necessary to be done and performed under this Agreement by it prior to each Closing Date, and to satisfy all conditions precedent to the Underwriters' obligations hereunder to purchase the Shares.

5. Covenant of the Underwriters. Each Underwriter, severally and not jointly, covenants and agrees with the Company that such Underwriter will not use or refer to any "free writing prospectus" (as defined in Rule 405 under the Securities Act) without the prior written consent of the Company if such Underwriter's use of or reference to such "free writing prospectus" would require the Company to file with the Commission any "issuer information" (as defined in Rule 433 under the Securities Act).

6. Payment of Expenses. Whether or not the transactions contemplated by this Agreement, the Registration Statement and the Prospectus are consummated or this Agreement is terminated provided, however, the Company shall have no obligation to reimburse any defaulting Underwriter pursuant to Section 10 hereof, the Company hereby agrees to pay all costs and expenses incident to the performance of its obligations hereunder, including the following: (i) all expenses in connection with the preparation, **printing and filing** of the Registration Statement, any Preliminary Prospectus, any Issuer Free Writing Prospectus, the Prospectus and any and all amendments and supplements thereto and the mailing and delivering of copies thereof to the Underwriters and dealers; (ii) the fees, disbursements and expenses of the Company's counsel and accountants in connection with the registration of the Shares under the Securities Act and the Offering; (iii) the cost of producing this Agreement and any agreement among Underwriters, blue sky survey, closing documents and other instruments, agreements or documents (including any compilations thereof) in connection with the Offering; (iv) all expenses in connection with the qualification of the Shares for offering and sale under state or foreign securities or blue sky laws as provided in Section 4(f) hereof, including the reasonable and documented fees and disbursements of counsel for the Underwriters in connection with such qualification or offering and in connection with any blue sky survey; (v) all fees and expenses in connection with listing the Shares on Nasdaq and with any filings required to be made with FINRA; (vi) the costs and expenses of the Company relating to investor presentations on any Road Show undertaken in connection with the marketing of the Shares, including without limitation, expenses associated with the production and distribution (including electronic) of Road Show slides and graphics, fees and expenses of any consultants engaged in connection with the Road Show presentations, travel and lodging expenses of the representatives and officers of the Company in connection with the Road Show; (vii) any stock transfer taxes incurred in connection with this Agreement or the Offering; and (viii) the reasonable and documented fees and expenses incident to the performance of the obligations of the Representative (including reasonable and documented fees, disbursements and expenses of counsel for the Underwriters, which shall be inclusive of amounts paid pursuant to 6(iv) and 6(v)) in an aggregate amount not to exceed \$75,000. The Company also will pay or cause to be paid: (x) the cost of preparing stock certificates representing the Shares; and (y) the cost and charges of any transfer agent or registrar for the Shares. Except as provided in this Section 6, the Underwriters will pay all of their own costs and expenses, including the fees and disbursements of their counsel, stock transfer taxes payable on the resale of any of the Securities by them and any advertising expenses connected with any offers they may make.

**7. Conditions of Underwriters' Obligations.** The several obligations of the Underwriters to purchase and pay for the Firm Shares and the Additional Shares, as provided herein, shall be subject to the accuracy of the representations and warranties of the Company herein contained, as of the date hereof and as of the applicable Closing Date (for purposes of this Section 7, "**Closing Date**" shall refer to the Closing Date for the Firm Shares and any Additional Closing Date, if different, for the Additional Shares), to the performance by the Company of all of its obligations hereunder, and to each of the following additional conditions:

(a) The Prospectus shall have been filed with the Commission in a timely fashion in accordance with Section 4(a) hereof; no stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto, and no stop order suspending or preventing the use of any Preliminary Prospectus, any Issuer Free Writing Prospectus, or the Prospectus, shall have been issued by the Commission and no proceedings therefor shall have been initiated or threatened by the Commission; all requests for additional information on the part of the Commission shall have been complied with to the Representative's reasonable satisfaction; if the Company has elected to rely on Rule 462(b) under the Securities Act, the Rule 462(b) Registration Statement shall have become effective by 10:00 p.m. (New York City time) on the date of this Agreement; and all necessary regulatory or stock exchange approvals shall have been received.

(b) At the Closing Date, the Representative shall have received the written opinion and negative assurance statement of Troutman Pepper Hamilton Sanders LLP, counsel for the Company, dated the Closing Date and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representative.

(c) At the Closing Date, the Representative shall have received the written opinion of McCarter & English, LLP, intellectual property counsel for the Company, dated the Closing Date and addressed to the Underwriters, in form and substance reasonably satisfactory to the Representative.

(d) At the Closing Date, the Representative shall have received the written opinion and negative assurance statement of Underwriters' Counsel, dated the Closing Date and addressed to the Underwriters, in form and substance satisfactory to the Representative, with respect to the issuance and sale of the Shares, the Registration Statement, the Pricing Disclosure Package, the Prospectus and such other matters as the Representative may require, and the Company shall have furnished to Underwriters' Counsel such documents as they may reasonably request for the purpose of enabling them to pass upon such matters.

(e) At the Closing Date, the Representative shall have received a certificate of the Chief Executive Officer and Chief Financial Officer of the Company, dated the Closing Date, in form and substance satisfactory to the Representative as to the accuracy of the representations and warranties of the Company set forth in Section 1 hereof as of the date hereof and as of the Closing Date, as to the performance by the Company of all of its obligations hereunder to be performed at or prior to the Closing Date, as to the matters set forth in subsections (a) and (h) of this Section 7, and as to such other matters as the Representative may reasonably request.

(f) At the time this Agreement is executed and at the Closing Date, the Representative shall have received a comfort letter, from PricewaterhouseCoopers LLP, independent registered public auditing firm for the Company, dated, respectively, as of the date of this Agreement and as of the Closing Date, addressed to the Underwriters and in form and substance satisfactory to the Underwriters and Underwriters' Counsel, containing statements and information of the type ordinarily included in accountants' "comfort letters" to underwriters with respect to the financial statements and certain financial information contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus.

(g) Reserved.

(h) Neither the Company nor any Subsidiary shall have sustained, (i) since the date of the latest audited financial statements included or incorporated by reference in the Registration Statement, the Pricing Disclosure Package and the Prospectus, any material loss or interference with its business or properties from fire, explosion, flood, earthquake, hurricane, accident or other calamity, whether or not covered by insurance, or from any labor dispute or any legal or governmental proceeding, other than as set forth in the Registration Statement, the Pricing Disclosure Package and the Prospectus (exclusive of any supplement thereto); and (ii) subsequent to the dates as of which information is given in the Registration Statement (exclusive of any amendment thereto subsequent to the date hereof) and the Pricing Disclosure Package and the Prospectus (exclusive of any supplement thereto), there shall not have been any change in the capital stock or long-term or short-term debt of the Company or the Subsidiaries or any change or any development involving a change, whether or not arising from transactions in the ordinary course of business, in the business, general affairs, management, condition (financial or otherwise), results of operations, stockholders' equity, properties or prospects of the Company and the Subsidiaries, individually or taken as a whole, the effect of which, in any such case described above, is, in the judgment of the Representative, so material and adverse as to make it impracticable or inadvisable to proceed with the Offering on the terms and in the manner contemplated in the Registration Statement, the Pricing Disclosure Package and the Prospectus (exclusive of any such supplement).

(i) No Underwriter shall have discovered and disclosed to the Company on or prior to such Closing Date that any of the Registration Statement, the Pricing Disclosure Package or the Prospectus, or any amendment or supplement thereto, contains an untrue statement of a fact which, in the opinion of Underwriters' Counsel, is material or omits to state a fact which, in the opinion of such counsel, is material and is required to be stated therein or is necessary to make the statements therein not misleading.

(j) As of the date of this Agreement, the Representative shall have received a duly executed lock-up agreement substantially in the form of Exhibit B hereto (a "**Lock-Up Agreement**") from each person who is a director or executive officer of the Company and each shareholder and other person or entity listed on Schedule IV hereto, in each case substantially in the form attached hereto as Exhibit B.

(k) At the Closing Date, the Shares shall have been approved for listing on Nasdaq, subject only to official notice of issuance.

(l) FINRA shall not have raised any objection with respect to the fairness and reasonableness of the underwriting terms and arrangements relating to the Offering of the Shares.

(m) The Company shall have furnished the Underwriters and Underwriters' Counsel with such other certificates, opinions or other documents as they may have reasonably requested.

If any of the conditions specified in this Section 7 shall not have been fulfilled when and as required by this Agreement, or if any of the certificates, opinions, written statements or letters furnished to the Representative or to Underwriters' Counsel pursuant to this Section 7 shall not be satisfactory in form and substance to the Representative and to Underwriters' Counsel, all obligations of the Underwriters hereunder may be cancelled by the Representative at, or at any time prior to, the Closing Date and the obligations of the Underwriters to purchase the Additional Shares may be cancelled by the Representative at, or at any time prior to, any Additional Closing Date. Notice of such cancellation shall be given to the Company in writing or by telephone. Any such telephone notice shall be confirmed promptly thereafter in writing.

#### 8. Indemnification.

(a) The Company shall indemnify and hold harmless each Underwriter, its affiliates, directors, officers, employees and each person, if any, who controls any Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, against any and all losses, liabilities, claims, damages and expenses whatsoever as incurred (including but not limited to attorneys' fees and any and all expenses whatsoever incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, and any and all amounts paid in settlement of any claim or litigation), joint or several, to which they or any of them may become subject under the Securities Act, the Exchange Act or otherwise, insofar as such losses, liabilities, claims, damages or expenses (or actions in respect thereof) arise out of or are based upon (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, or the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading; or (ii) any untrue statement or alleged untrue statement of a material fact included (A) in any Preliminary Prospectus or the Prospectus, or in any supplement thereto or amendment thereof, or in any Issuer Free Writing Prospectus, or in any "issuer information" (as defined in Rule 433(h)(2) under the Securities Act) filed or required to be filed pursuant to Rule 433(d) under the Securities Act, or (B) in any other materials or information provided to investors by, or with the approval of, the Company in connection with the Offering, including in any Road Show for the Offering ("**Marketing Materials**"), or the omission or alleged omission to state in any Preliminary Prospectus or the Prospectus, or in any supplement thereto or amendment thereof, or in any Issuer Free Writing Prospectus, or in any "issuer information" (as defined in Rule 433(h)(2) under the Securities Act) filed or required to be filed pursuant to Rule 433(d) under the Securities Act, or in any Marketing Materials, a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided, however, that the Company will not be liable in any such case to the extent but only to the extent

that any such loss, liability, claim, damage or expense arises out of or is based upon any such untrue statement or alleged untrue statement or omission or alleged omission made therein in reliance upon and in conformity with written information furnished to the Company by or on behalf of any Underwriter through the Representative expressly for use therein. The parties agree that such information provided by or on behalf of any Underwriter through the Representative consists solely of the material referred to in Section 19 hereof. This indemnity agreement will be in addition to any liability which the Company may otherwise have, including but not limited to other liability under this Agreement.

(b) Each Underwriter, severally and not jointly, shall indemnify and hold harmless the Company, each of the directors of the Company, each of the officers of the Company who shall have signed the Registration Statement, and each other person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, against any losses, liabilities, claims, damages and expenses whatsoever as incurred (including but not limited to attorneys' fees and any and all expenses whatsoever incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, and any and all amounts paid in settlement of any claim or litigation), joint or several, to which they or any of them may become subject under the Securities Act, the Exchange Act or otherwise, insofar as such losses, liabilities, claims, damages or expenses (or actions in respect thereof) arise out of or are based upon (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, or the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading or (ii) any untrue statement or alleged untrue statement of a material fact contained in any related Preliminary Prospectus or the Prospectus, or in any amendment thereof or supplement thereto, or arise out of or are based upon the omission or alleged omission to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading, in each case to the extent, but only to the extent, that any such loss, liability, claim, damage or expense arises out of or is based upon any such untrue statement or alleged untrue statement or omission or alleged omission made therein in reliance upon and in conformity with information furnished in writing to the Company by or on behalf of any Underwriter through the Representative specifically for use therein; provided, however, that in no case shall any Underwriter be liable or responsible for any amount in excess of the underwriting discount applicable to the Shares to be purchased by such Underwriter hereunder. The parties agree that such information provided by or on behalf of any Underwriter through the Representative consists solely of the material referred to in Section 19 hereof.

(c) Promptly after receipt by an indemnified party under subsection (a) or (b) above of notice of any claims or the commencement of any action, such indemnified party shall, if a claim in respect thereof is to be made against the indemnifying party under such subsection, notify each party against whom indemnification is to be sought in writing of the claim or the commencement thereof (but the failure so to notify an indemnifying party shall not relieve the indemnifying party from any liability which it may have under this Section 8 to the extent that it is not materially prejudiced as a result thereof or otherwise has notice of any such action, and in any event shall not relieve it from any liability that such indemnifying party may have otherwise than on account of the indemnity agreement hereunder). In case any such claim or action is brought against any indemnified party, and it notifies an indemnifying party of the commencement thereof, the indemnifying party will be entitled to participate, at its own expense in the defense of such action,

and to the extent it may elect by written notice delivered to the indemnified party promptly after receiving the aforesaid notice from such indemnified party, to assume the defense thereof with counsel satisfactory to such indemnified party; provided however, that counsel to the indemnifying party shall not (except with the written consent of the indemnified party) also be counsel to the indemnified party. Notwithstanding the foregoing, the indemnified party or parties shall have the right to employ its or their own counsel in any such case, but the fees and expenses of such counsel shall be at the expense of such indemnified party or parties unless (i) the employment of such counsel shall have been authorized in writing by one of the indemnifying parties in connection with the defense of such action, (ii) the indemnifying parties shall not have employed counsel to have charge of the defense of such action within a reasonable time after notice of commencement of the action, (iii) the indemnifying party does not diligently defend the action after assumption of the defense, or (iv) such indemnified party or parties shall have reasonably concluded that there may be defenses available to it or them which are different from or additional to those available to one or all of the indemnifying parties (in which case the indemnifying parties shall not have the right to direct the defense of such action on behalf of the indemnified party or parties), in any of which events such fees and expenses shall be borne by the indemnifying parties hereof, then, in addition to the fees and expenses of such counsel for the indemnified parties, the indemnifying party shall be liable for the reasonable fees and expenses of not more than one counsel (in addition to any local counsel) separate from its own counsel. No indemnifying party shall, without the prior written consent of the indemnified parties, effect any settlement or compromise of, or consent to the entry of judgment with respect to, any pending or threatened claim, investigation, action or proceeding in respect of which indemnity or contribution may be or could have been sought by an indemnified party under this Section 8 or Section 9 hereof (whether or not the indemnified party is an actual or potential party thereto), unless such settlement, compromise or judgment (i) includes an unconditional release of the indemnified party from all liability arising out of such claim, investigation, action or proceeding and (ii) does not include a statement as to or an admission of fault, culpability or any failure to act, by or on behalf of the indemnified party.

9. Contribution. In order to provide for contribution in circumstances in which the indemnification provided for in Section 8 hereof is for any reason held to be unavailable from any indemnifying party or is insufficient to hold harmless a party indemnified thereunder, the Company and the Underwriters severally shall contribute to the aggregate losses, claims, damages, liabilities and expenses of the nature contemplated by such indemnification provision (including any investigation, legal and other expenses incurred in connection with, and any amount paid in settlement of, any action, suit or proceeding or any claims asserted, but after deducting in the case of losses, claims, damages, liabilities and expenses suffered by the Company, any contribution received by the Company from persons, other than the Underwriters, who may also be liable for contribution, including persons who control the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, officers of the Company who signed the Registration Statement and directors of the Company) as incurred to which the Company and one or more of the Underwriters may be subject, in such proportions as is appropriate to reflect the relative benefits received by the Company and by the Underwriters from the Offering or, if such allocation is not permitted by applicable law, in such proportions as are appropriate to reflect not only the relative benefits referred to above but also the relative fault of the Company and the Underwriters in connection with the statements or omissions which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative benefits received by the Company and the Underwriters shall be deemed to be in the same

proportion as the total proceeds from the Offering (net of underwriting discounts and commissions but before deducting expenses) received by the Company, on the one hand, and the underwriting discount and commissions received by the Underwriters, on the other hand, in each case as set forth in the table on the cover page of the Prospectus, bear to the aggregate initial public offering price of the Shares as set in the table on the cover page of the Prospectus. The relative fault of each of the Company and of the Underwriters shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or the Underwriters and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission. The Company and the Underwriters agree that it would not be just and equitable if contribution pursuant to this Section 9 were determined by pro rata allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation which does not take account of the equitable considerations referred to above in this Section 9. The aggregate amount of losses, liabilities, claims, damages and expenses incurred by an indemnified party and referred to above in this Section 9 shall be deemed to include any legal or other expenses reasonably incurred by such indemnified party in investigating, preparing or defending against any litigation, or any investigation or proceeding by any judicial, regulatory or other legal or governmental agency or body, commenced or threatened, or any claim whatsoever based upon any such untrue or alleged untrue statement or omission or alleged omission. Notwithstanding the provisions of this Section 9, (i) no Underwriter shall be required to contribute any amount in excess of the amount by which the discounts and commissions applicable to the Shares underwritten by it and distributed to the public exceeds the amount of any damages which such Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission and (ii) no person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. For purposes of this Section 9, each of the Underwriters' affiliates, directors, officers, employees and each person, if any, who controls any Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act shall have the same rights to contribution as such Underwriter, and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, each officer of the Company who shall have signed the Registration Statement and each director of the Company shall have the same rights to contribution as the Company, subject in each case to clauses (i) and (ii) of the immediately preceding sentence. Any party entitled to contribution will, promptly after receipt of notice of commencement of any action, suit or proceeding against such party in respect of which a claim for contribution may be made against another party or parties, notify each party or parties from whom contribution may be sought, but the omission to so notify such party or parties shall not relieve the party or parties from whom contribution may be sought from any obligation it or they may have under this Section 9 or otherwise. The obligations of the Underwriters to contribute pursuant to this Section 9 are several in proportion to the respective number of Shares to be purchased by each of the Underwriters hereunder and not joint.

#### 10. Underwriter Default.

(a) If any Underwriter or Underwriters shall default in its or their obligation to purchase Firm Shares or Additional Shares hereunder, and if the Firm Shares or Additional Shares with respect to which such default relates (the “**Default Shares**”) do not (after giving effect to arrangements, if any, made by the Representative pursuant to subsection (b) below) exceed in the aggregate 10% of the number of Firm Shares or Additional Shares, each non-defaulting Underwriter, acting severally and not jointly, agrees to purchase from the Company that number of Default Shares that bears the same proportion of the total number of Default Shares then being purchased as the number of Firm Shares set forth opposite the name of such Underwriter in Schedule I hereto bears to the aggregate number of Firm Shares set forth opposite the names of the non-defaulting Underwriters, subject, however, to such adjustments to eliminate fractional shares as the Representative in its sole discretion shall make.

(b) In the event that the aggregate number of Default Shares exceeds 10% of the number of Firm Shares or Additional Shares, as the case may be, the Representative may in its discretion arrange for itself or for another party or parties (including any non-defaulting Underwriter or Underwriters who so agree) to purchase the Default Shares on the terms contained herein. In the event that within five calendar days after such a default the Representative does not arrange for the purchase of the Default Shares as provided in this Section 10, this Agreement or, in the case of a default with respect to the Additional Shares, the obligations of the Underwriters to purchase and of the Company to sell the Additional Shares shall thereupon terminate, without liability on the part of the Company with respect thereto (except in each case as provided in Sections 6, 8, 9, 11 and 12(d)) or the Underwriters, but nothing in this Agreement shall relieve a defaulting Underwriter or Underwriters of its or their liability, if any, to the other Underwriters and the Company for damages occasioned by its or their default hereunder.

(c) In the event that any Default Shares are to be purchased by the non-defaulting Underwriters, or are to be purchased by another party or parties as aforesaid, the Representative or the Company shall have the right to postpone the Closing Date or Additional Closing Date, as the case may be for a period, not exceeding five business days, in order to effect whatever changes may thereby be made necessary in the Registration Statement or the Prospectus or in any other documents and arrangements, and the Company agrees to file promptly any amendment or supplement to the Registration Statement or the Prospectus which, in the opinion of Underwriters’ Counsel, may thereby be made necessary or advisable. The term “**Underwriter**” as used in this Agreement shall include any party substituted under this Section 10 with like effect as if it had originally been a party to this Agreement with respect to such Firm Shares and Additional Shares.

11. Survival of Representations and Agreements. All representations and warranties, covenants and agreements of the Underwriters and the Company contained in this Agreement or in certificates of officers of the Company submitted pursuant hereto, including the agreements contained in Section 6, the indemnity agreements contained in Section 8 and the contribution agreements contained in Section 9, shall remain operative and in full force and effect regardless of any investigation made by or on behalf of any Underwriter or any controlling person thereof or by or on behalf of the Company, any of its officers and directors or any controlling person thereof, and shall survive delivery of and payment for the Shares to and by the Underwriters. The representations contained in Section 1 and the agreements contained in Sections 6, 8, 9, 11, 12 and 18 hereof shall survive any termination of this Agreement, including termination pursuant to Section 10 or 12 hereof.

12. Effective Date of Agreement; Termination.

(a) This Agreement shall become effective when the parties hereto have executed and delivered this Agreement.

(b) The Representative shall have the right to terminate this Agreement at any time prior to the Closing Date or to terminate the obligations of the Underwriters to purchase the Additional Shares at any time prior to any Additional Closing Date, as the case may be, if, at or after the Applicable Time, (i) any domestic or international event or act or occurrence has materially disrupted, or in the opinion of the Representative will in the immediate future materially disrupt, the market for the Company's securities or securities in general; or (ii) trading on The New York Stock Exchange ("NYSE") or Nasdaq shall have been suspended or been made subject to material limitations, or minimum or maximum prices for trading shall have been fixed, or maximum ranges for prices for securities shall have been required, on the NYSE or Nasdaq or by order of the Commission or any other governmental authority having jurisdiction; or (iii) a banking moratorium has been declared by any state or federal authority or any material disruption in commercial banking or securities settlement or clearance services shall have occurred; or (iv) (A) there shall have occurred any outbreak or escalation of hostilities or acts of terrorism involving the United States or there is a declaration of a national emergency or war by the United States or (B) there shall have been any other calamity or crisis or any change in political, financial or economic conditions if the effect of any such event in (A) or (B), in the judgment of the Representative, makes it impracticable or inadvisable to proceed with the offering, sale and delivery of the Firm Shares or the Additional Shares, as the case may be, on the terms and in the manner contemplated by the Prospectus; or (v) any of the events described in Section 7(h) shall have occurred or the Underwriters shall decline to purchase the Shares for any reason permitted under this Agreement.

(c) Any notice of termination pursuant to this Section 12 shall be in writing.

(d) If this Agreement shall be terminated pursuant to any of the provisions hereof, or if the sale of the Shares provided for herein is not consummated because any condition to the obligations of the Underwriters set forth herein is not satisfied or because of any refusal, inability or failure on the part of the Company to perform any agreement herein or comply with any provision hereof, the Company will, subject to demand by the Representative, reimburse the Underwriters for all reasonable out-of-pocket expenses (including the reasonable and documented fees and expenses of their counsel, subject to the \$75,000 limitation set forth in Section 6) incurred by the Underwriters in connection herewith; provided, however, that in the event of a termination pursuant to Section 10 hereof, only the non-defaulting Underwriters shall be entitled to receive such reimbursement.

13. Research Analyst Independence. The Company acknowledges that the Underwriters' research analysts and research departments are required to be independent from their respective investment banking divisions and are subject to certain regulations and internal policies, and that such Underwriters' research analysts may hold views and make statements or investment

recommendations and/or publish research reports with respect to the Company and/or the Offering that differ from the views of personnel in their respective investment banking divisions. The Company hereby waives and releases, to the fullest extent permitted by law, any claims that the Company may have against the Underwriters with respect to any conflict of interest that may arise from the fact that the views expressed by their independent research analysts and research departments may be different from or inconsistent with the views or advice communicated to the Company by personnel in such Underwriters' investment banking divisions. The Company acknowledges that each of the Underwriters is a full service securities firm and as such from time to time, subject to applicable securities laws, may effect transactions for its own account or the account of its customers and hold long or short positions in debt or equity securities of the companies that may be the subject of the transactions contemplated by this Agreement.

14. No Advisory or Fiduciary Relationship. The Company acknowledges and agrees that (a) the Company is a sophisticated institution capable of exercising independent judgment and independently evaluating the risks and merits of transactions it enters into (including the Offering), (b) the purchase and sale of the Shares pursuant to this Agreement, including the determination of the offering price of the Shares and any related discounts and commissions, is an arm's-length commercial transaction between the Company, on the one hand, and the several Underwriters, on the other hand, (c) in connection with the Offering and the process leading thereto, each Underwriter is and has been acting solely as a principal and is not the agent or fiduciary of the Company, the Subsidiaries or their respective stockholders, creditors, employees or any other party, (d) no Underwriter has assumed or will assume an advisory or fiduciary responsibility in favor of the Company with respect to the Offering or the process leading thereto (irrespective of whether such Underwriter has advised or is currently advising the Company or the Subsidiaries on other matters) and no Underwriter has any obligation to the Company with respect to the Offering except the obligations expressly set forth in this Agreement, (e) the Underwriters and their respective affiliates may be engaged in a broad range of transactions that involve interests that differ from those of the Company, (f) any duties and obligations that the Underwriters may have to the Company shall be limited to those duties and obligations specifically stated herein and (g) the Underwriters have not provided any legal, accounting, regulatory or tax advice with respect to the Offering and the Company has consulted its own respective legal, accounting, regulatory and tax advisors to the extent it deemed appropriate.

15. Recognition of the U.S. Special Resolution Regimes.

(a) In the event that any Underwriter that is a Covered Entity becomes subject to a proceeding under a U.S. Special Resolution Regime, the transfer from such Underwriter of this Agreement, and any interest and obligation in or under this Agreement, will be effective to the same extent as the transfer would be effective under the U.S. Special Resolution Regime if this Agreement, and any such interest and obligation, were governed by the laws of the United States or a state of the United States.

(b) In the event that any Underwriter that is a Covered Entity or a BHC Act Affiliate of such Underwriter becomes subject to a proceeding under a U.S. Special Resolution Regime, Default Rights under this Agreement that may be exercised against such Underwriter are permitted to be exercised to no greater extent than such Default Rights could be exercised under the U.S. Special Resolution Regime if this Agreement were governed by the laws of the United States or a state of the United States.

As used in this Section 15:

“**BHC Act Affiliate**” has the meaning assigned to the term “affiliate” in, and shall be interpreted in accordance with, 12 U.S.C. § 1841(k).

“**Covered Entity**” means any of the following: (i) a “covered entity” as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 252.82(b); (ii) a “covered bank” as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 47.3(b); or (iii) a “covered FSI” as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 382.2(b).

“**Default Right**” has the meaning assigned to that term in, and shall be interpreted in accordance with, 12 C.F.R. §§ 252.81, 47.2 or 382.1, as applicable.

“**U.S. Special Resolution Regime**” means each of (i) the Federal Deposit Insurance Act and the regulations promulgated thereunder and (ii) Title II of the Dodd-Frank Wall Street Reform and Consumer Protection Act and the regulations promulgated thereunder.

16. Notices. All communications hereunder, except as may be otherwise specifically provided herein, shall be in writing, and:

(a) if sent to any Underwriter, shall be mailed, delivered, or faxed and confirmed in writing, to such Underwriter c/o Guggenheim Securities, LLC, 330 Madison Avenue, New York, New York 10017, Fax (212) 658-9689, Attention: Head of Equity Capital Markets, with copies to the General Counsel and Underwriter’s Counsel at Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., One Financial Center, Boston, Massachusetts 02111, Attention: William Hicks, Esq.;

(b) if sent to the Company, shall be mailed, delivered, or faxed and confirmed in writing to the Company at Larimar Therapeutics, Inc., Three Bala Plaza East, Suite 506, Bala Cynwyd, PA 19004, Attention: Chief Executive Officer, with a copy to its counsel at Troutman Pepper Hamilton Sanders LLP, 3000 Two Logan Square, Eighteenth and Arch Streets, Philadelphia, PA 19103, Attention: Rachael Bushey, Esq. and Jennifer Porter, Esq.; *provided, however*, that any notice to an Underwriter pursuant to Section 8 shall be delivered or sent by mail or facsimile transmission to such Underwriter at its address set forth in its acceptance facsimile to Guggenheim Securities, which address will be supplied to any other party hereto by Guggenheim Securities upon request. Any such notices and other communications shall take effect at the time of receipt thereof.

17. Parties. This Agreement shall insure solely to the benefit of, and shall be binding upon, the Underwriters and the Company and the controlling persons, affiliates, directors, officers, employees and agents referred to in Section 8 and Section 9 hereof, and their respective successors and assigns, and no other person shall have or be construed to have any legal or equitable right, remedy or claim under or in respect of or by virtue of this Agreement or any provision herein

contained. This Agreement and all conditions and provisions hereof are intended to be for the sole and exclusive benefit of the parties hereto and said controlling persons and their respective successors, officers, directors, heirs and legal representatives, and it is not for the benefit of any other person, firm or corporation. The term “successors and assigns” shall not include a purchaser, in its capacity as such, of Shares from any of the Underwriters.

18. Governing Law and Jurisdiction; Waiver of Jury Trial. **This Agreement shall be governed by and construed in accordance with the laws of the State of New York.** The Company irrevocably (a) submits to the jurisdiction of any court of the State of New York located in the City and County of New York, Borough of Manhattan or any federal courts of the United States of America located in the City and County of New York, Borough of Manhattan for the purpose of any suit, action, or other proceeding arising out of this Agreement, or any of the agreements or transactions contemplated by this Agreement, the Registration Statement and the Prospectus (each, a “**Proceeding**”), (b) agrees that all claims in respect of any Proceeding may be heard and determined in any such court, (c) waives, to the fullest extent permitted by law, any immunity from jurisdiction of any such court or from any legal process therein, (d) agrees not to commence any Proceeding other than in such courts, and (e) waives, to the fullest extent permitted by law, any claim that such Proceeding is brought in an inconvenient forum. THE COMPANY (ON BEHALF OF ITSELF AND, TO THE FULLEST EXTENT PERMITTED BY LAW, ON BEHALF OF ITS RESPECTIVE EQUITY HOLDERS AND CREDITORS) HEREBY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY CLAIM BASED UPON, ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT AND THE TRANSACTIONS CONTEMPLATED BY THIS AGREEMENT, THE REGISTRATION STATEMENT AND THE PROSPECTUS.

19. The parties acknowledge and agree that, for purposes of Sections 1(c), 1(d), 1(e) and 8 hereof, the information provided by or on behalf of any Underwriter consists solely of the material included under the captions: “Underwriting—Commissions and Discounts; Expenses” (concerning the selling concession amount) in the Prospectus, the first and second paragraphs under the caption “Underwriting—Price Stabilization and Short Positions” in the Prospectus and the paragraph under the caption “Underwriting—Passive Market Making” in the Prospectus.

20. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original, but all such counterparts shall together constitute one and the same instrument. Delivery of a signed counterpart of this Agreement by facsimile or other electronic transmission shall constitute valid and sufficient delivery thereof.

21. Headings. The headings herein are inserted for convenience of reference only and are not intended to be part of, or to affect the meaning or interpretation of, this Agreement.

22. Time is of the Essence. Time shall be of the essence of this Agreement. As used herein, the term “**business day**” shall mean any day when the Commission’s office in Washington, D.C. is open for business.

[Signature page follows]

If the foregoing correctly sets forth your understanding, please so indicate in the space provided below for that purpose, whereupon this letter shall constitute a binding agreement among us.

Very truly yours,

**LARIMAR THERAPEUTICS, INC.**

By: /s/ Michael Celano  
Name: Michael Celano  
Title: Chief Financial Officer

Accepted as of the date first above written

**GUGGENHEIM SECURITIES, LLC**

By: /s/ Jordan Bliss  
Name: Jordan Bliss  
Title: Senior Managing Director

On behalf of itself and the other Underwriters named in Schedule I hereto.

*[Signature Page to Underwriting Agreement]*

SCHEDULE I

<u>Underwriter</u>	<u>Total Number of Firm Shares to be Purchased</u>	<u>Total Number of Additional Shares to be Purchased if Option is Fully Exercised</u>
Guggenheim Securities, LLC	13,557,250	2,033,588
William Blair & Company, L.L.C.	4,000,500	600,075
LifeSci Capital LLC	2,444,750	366,712
JMP Securities LLC	2,222,500	33,375
<b>Total</b>	<b>22,225,000</b>	<b>3,333,750</b>

Schedule I

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SCHEDULE II

Issuer Free Writing Prospectuses included in the Pricing Disclosure Package

None

Schedule II

SCHEDULE III

1. The Company is selling 22,225,000 shares of Common Stock.
2. The Company has granted an option, solely to cover over-allotments, to the Underwriters, severally and not jointly, to purchase up to an additional 3,333,750 shares of Common Stock.
3. The offering price per share of Common Stock shall be \$3.15.

Schedule III

SCHEDULE IV

Signatories to Lock-Up Agreements

Carole S. Ben-Maimon, M.D.  
Michael Celano  
Peter Barrett, Ph.D.  
Frank E. Thomas  
Thomas E. Hamilton  
Jonathan Leff  
Joseph Truitt  
Entities affiliated with Deerfield Management

Schedule IV

SCHEDULE V

Written Testing-the-Waters Communications

None

Schedule V

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EXHIBIT A

Subsidiaries

Zafgen Australia Pty Limited

Exhibit A

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EXHIBIT B

Form of Lock-Up Agreement

Exhibit B

Form of Lock-Up Agreement

Guggenheim Securities, LLC  
As Representative of the several  
Underwriters referred to below

c/o Guggenheim Securities, LLC  
330 Madison Avenue  
New York, New York 10017

Larimar Therapeutics, Inc. - Lock-Up Agreement

Ladies and Gentlemen:

This letter agreement (this "Agreement") relates to the proposed public offering (the "Offering") by Larimar Therapeutics, Inc., a Delaware corporation (the "Company"), of its common stock, \$0.001 par value (the "Stock"), pursuant to an Underwriting Agreement (the "Underwriting Agreement") to be entered into between the Company and Guggenheim Securities, LLC ("Guggenheim"), as representative of the several underwriters named therein (the "Underwriters").

In order to induce you and the other Underwriters to underwrite the Offering, the undersigned hereby agrees that, without the prior written consent of Guggenheim, during the period from the date hereof until 90 days from the date of the final prospectus supplement for the Offering (the "Lock-Up Period"), the undersigned (a) will not, directly or indirectly, offer, sell, agree to offer or sell, solicit offers to purchase, grant any call option or purchase any put option with respect to, pledge, borrow or otherwise dispose of, any Relevant Security (as defined below), and (b) will not establish or increase any "put equivalent position" or liquidate or decrease any "call equivalent position" with respect to any Relevant Security (in each case within the meaning of Section 16 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and the rules and regulations promulgated thereunder), or otherwise enter into any swap, derivative or other transaction or arrangement that transfers to another, in whole or in part, any economic consequence of ownership of a Relevant Security, whether or not such transaction is to be settled by delivery of Relevant Securities, other securities, cash or other consideration. As used herein "Relevant Security" means the Stock, any other equity security of the Company or any of its subsidiaries and any security convertible into, or exercisable or exchangeable for, any Stock or other such equity security.

The foregoing restrictions in this Agreement shall not apply to:

- a) the transfer of Relevant Securities (i) as a bona fide gift or gifts, (ii) by will, other testamentary document or intestate succession, (iii) to a Family Member (as defined below), (iv) to a trust for the direct or indirect benefit of the undersigned and/or one or more Family Members, (v) by operation of law, including pursuant to a domestic order, divorce settlement, divorce decree, separation agreement or pursuant to an order of a court of competent jurisdiction enforcing such agreement, (vi) to a charitable trust or (vii) to a corporation, limited liability company or partnership wholly owned by the undersigned

and/or one or more Family Members, (viii) to the undersigned's direct or indirect affiliates or to any investment fund or other entity controlled or managed by, controlling or managing, or under common control with, the undersigned (including, for the avoidance of doubt, where the undersigned is a partnership, to its general partner or a successor partnership or fund or any other funds managed by such partnership), or (ix) if the undersigned is a trust, to the beneficiary of such trust;

- b) the transfer of Relevant Securities (i) as forfeitures to satisfy tax withholding obligations of the undersigned existing as of the date of the final prospectus supplement in connection with the vesting or exercise of equity awards by the undersigned, (ii) pursuant to a net exercise or cashless exercise (to satisfy exercise price or related withholding obligations) by the undersigned of outstanding equity awards existing as of the date of the final prospectus supplement, provided that any shares of Stock acquired upon the net exercise or cashless exercise of equity awards described in this clause (b) shall be subject to the restrictions set forth in this Agreement, or (iii) transfers of the Relevant Securities to the Company by an executive officer upon death, disability or termination of employment, in each case, of such executive officer;
- c) distributions of Relevant Securities to limited partners, members or stockholders of the undersigned;
- d) transactions relating to Relevant Securities acquired in the Offering or in open market transactions after the closing of the Offering; and
- e) the transfer of Relevant Securities pursuant to a bona fide third-party tender offer for all outstanding shares of the Company, merger, consolidation or other similar transaction made to all holders of the Company's securities involving a change of control of the Company (including, without limitation, the entering into of any lock-up, voting or similar agreement pursuant to which the undersigned may agree to transfer, sell, tender or otherwise dispose of Relevant Securities in connection with such transaction, or vote any Relevant Securities in favor of any transaction), provided that in the event that such tender offer, merger, consolidation or other such transaction is not completed, such securities held by the undersigned shall remain subject to the provisions of this Agreement.

It shall be a further condition to any transfer or distribution pursuant to the preceding clauses (a), (b), (c), or (d) that no public disclosure or filing by any party (donor, donee, transferor or transferee) under the Exchange Act, or other public announcement shall be required or shall be made voluntarily in connection with such transfer or distribution (other than a filing on Form 5 made after the expiration of the Lock-up Period); provided, however, that in the case of any transfer or distribution pursuant to clauses (a), (b) or (c), to the extent the undersigned is required to file a report under Section 16 of the Exchange Act, the undersigned shall be permitted to file such report provided the report clearly indicates in the footnotes thereto the nature of the transfer.

It shall be a condition to any transfer or distribution pursuant to each of the preceding clauses (a) or (c) that (x) any such transfer shall not involve a disposition for value and (y) each resulting transferee or donee of Relevant Securities executes and delivers to you an agreement satisfactory to you in which such transferee agrees to be bound by the terms of this Agreement for the remainder of the Lock-Up Period.

For purposes of this Agreement, the term “Family Member” shall mean any relationship by blood, domestic partnership, marriage or adoption not more remote than first cousin.

In addition, the restrictions described in this Agreement shall not apply to the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act, provided that no transfers occur under such plan during the Lock-up Period and no public announcement or filing shall be required or voluntarily made by any person in connection therewith other than general disclosure in Company periodic reports to the effect that the Company directors and officers may enter into such trading plans from time to time.

The undersigned hereby authorizes the Company during the Lock-Up Period to cause any transfer agent for the Relevant Securities to decline to transfer, and to note stop transfer restrictions on the stock register and other records relating to, Relevant Securities for which the undersigned is the record holder and, in the case of Relevant Securities for which the undersigned is the beneficial but not the record holder, agrees during the Lock-Up Period to cause the record holder to cause the relevant transfer agent to decline to transfer, and to note stop transfer restrictions on the stock register and other records relating to, such Relevant Securities. The undersigned hereby further agrees that, without the prior written consent of Guggenheim, during the Lock-Up Period the undersigned (x) will not file or participate in the filing with the U.S. Securities and Exchange Commission (the “SEC”) of any registration statement, or circulate or participate in the circulation of any preliminary or final prospectus supplement or other disclosure document with respect to any proposed offering or sale of a Relevant Security and (y) will not exercise any rights the undersigned may have to require registration with the SEC of any proposed offering or sale of a Relevant Security.

It is understood that, if (i) the Company notifies the Underwriters that it does not intend to proceed with the Offering, (ii) the Underwriting Agreement does not become effective, (iii) the Underwriting Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated prior to payment for and delivery of the Stock, or (iv) the closing of the Offering pursuant to the Underwriting Agreement has not occurred by October 31, 2022, the undersigned will be released from its obligations under this Agreement.

The undersigned understands that the Company and the Underwriters will proceed with the Offering in reliance on this Agreement.

Whether or not the Offering actually occurs depends on a number of factors, including market conditions. Any Offering will only be made pursuant to the Underwriting Agreement, the terms of which are subject to negotiation between the Company and the Underwriters.

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this Agreement and that this Agreement constitutes the legal, valid and binding obligation of the undersigned, enforceable in accordance with its terms. Upon request, the undersigned will execute any additional documents necessary in connection with enforcement hereof. Any obligations of the undersigned shall be binding upon the successors and assigns of the undersigned from the date first above written.

This Agreement shall be governed by and construed in accordance with the laws of the State of New York. Delivery of a signed copy of this letter by electronic or facsimile transmission shall be effective as delivery of the original hereof.

Very truly yours,

By: \_\_\_\_\_

Print Name: \_\_\_\_\_

Troutman Pepper Hamilton Sanders LLP  
3000 Two Logan Square, Eighteenth and Arch Streets  
Philadelphia, PA 19103-2799



troutman.com

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September 14, 2022

Larimar Therapeutics, Inc.  
Three Bala Plaza East, Suite 506  
Bala Cynwyd, PA 19004

Ladies and Gentlemen:

We have acted as counsel to Larimar Therapeutics, Inc., a Delaware corporation (the “**Company**”), in connection with the public offering of 22,225,000 shares of common stock, par value \$0.001 per share (the “**Common Stock**”), of the Company (the “**Shares**”) to be sold by the Company pursuant to a prospectus supplement, dated September 13, 2022, and the accompanying base prospectus, dated September 1, 2020 (such documents, collectively, the “**Prospectus**”) that form part of the Company’s effective registration statement on Form S-3 (File No. 333-246370) (the “**Registration Statement**”). You have requested that we render the opinion set forth in this letter and we are furnishing this opinion to you pursuant to the requirements of Item 601(b)(5) of Regulation S-K, in connection with the Registration Statement.

For purposes of this opinion letter, we have examined copies of such agreements, instruments and documents as we have deemed an appropriate basis on which to render the opinion hereinafter expressed. In rendering this opinion, we have assumed: the genuineness and authenticity of all signatures on original documents; the legal capacity of all natural persons; the authenticity of all documents submitted to us as originals; the conformity to originals of all documents submitted to us as certified or photocopies; the accuracy and completeness of all documents and records reviewed by us; the accuracy, completeness and authenticity of certificates issued by any governmental official, office or agency and the absence of change in the information contained therein from the effective date of any such certificate; and the due authorization, execution and delivery of all documents where authorization, execution and delivery are prerequisites to the effectiveness of such documents. As to all matters of fact, we have relied on the representations and statements of fact made in the documents so reviewed, and we have not independently established the facts so relied on. This opinion letter is based as to matters of law solely on the General Corporation Law of the State of Delaware. We express no opinion herein as to any other statutes, rules or regulations. This opinion letter is given, and all statements herein are made, in the context of the foregoing.

Based upon, subject to and limited by the foregoing, we are of the opinion that as of the date hereof following (i) issuance of the Shares pursuant to the terms of the Underwriting Agreement, dated September 14, 2022, by and between the Company and Guggenheim Securities, LLC, as representative of the several underwriters named in Schedule I thereto (the “**Underwriting Agreement**”) and the due registration on the books of the transfer agent and registrar therefor in the name or on behalf of the purchasers and (ii) receipt by the Company of the consideration for the Shares (not less than par value) in the circumstances contemplated by the Underwriting Agreement, the Shares will be validly issued, fully paid, and nonassessable.

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This opinion letter is given as of the date hereof, and we assume no obligation to supplement this opinion if any applicable law changes after the date hereof or if we become aware of any facts or circumstances that may change the opinions expressed herein after the date hereof.

We hereby consent to the filing of this opinion as an exhibit to the Current Report on Form 8-K and to the reference to this firm under the heading "Legal Matters" in the Prospectus. In rendering this opinion and giving this consent, we do not admit that we are an "expert" within the meaning of the Securities Act of 1933, as amended.

Very truly yours,  
/s/ Troutman Pepper Hamilton Sanders LLP  
Troutman Pepper Hamilton Sanders LLP