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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
Center for Devices and
Radiological Health
2098 Gaither Road
Rockville, MD 20850

DEC 11 2002

WARNING LETTER

VIA FACSIMILE
VIA FEDERAL EXPRESS

Elizabeth H. Davila
President and Chief Executive
Officer
VISX, Inc.
3400 Central Expressway
Santa Clara, California 95051-0703

Re: WavePrint System (VISX STAR S3 Excimer Laser System and the WaveScan Wavefront System)

Dear Ms. Davila:

The Food and Drug Administration (FDA) has reviewed promotional materials for the VISX WavePrint System, which is being promoted as consisting of the VISX STAR S3 Excimer Laser System and the WaveScan Wavefront System. These products are devices within the meaning of section 201(h) of the Federal Food, Drug, and Cosmetic Act (the Act).

APPROVED AND CLEARED VISX DEVICES

The VISX STAR S3 Excimer Laser (STAR S3) received PMA approvals (P930016 and P990010) for phototherapeutic keratectomy (PTK), photorefractive keratectomy (PRK) and laser assisted in-situ keratomileusis (LASIK). The WaveScan Wavefront System (WaveScan) has a cleared premarket notification (510(k) K000327) for use as a diagnostic instrument indicated for the automated measurement and analysis of refractive errors of the eye, including hyperopia and myopia from +6.00 to –8.00 diopters spherical and astigmatism from 0.00 to –6.00 diopters. The 510(k) Summary states that the device utilizes "the element of wavefront measurements from the refractive elements of the eye, the lens and cornea as light interference changes the wavefront as affected by the elements. ...The output measures for each instrument consist of the spherical, cylindrical and axis of the subject's refractive error which are provided in a printed read-out format."

The cleared WaveScan only provides sphere and cylinder information to the user. It can be used in the same manner as any other refractometer to measure spherical and cylindrical errors, which can then be entered by hand into the STAR S3 computer. The WaveScan's 510(k) clearance does not cover its use as an accessory to an excimer laser for the purpose of surgically correcting any refractive abnormalities other than spherical and cylindrical errors. Indeed, the 510(k) substantial equivalence letter specifically states that the Office of Device Evaluation (ODE) determined that there was a reasonable likelihood that the WaveScan would be used for an intended use not identified in the proposed labeling and that such use could cause harm. Therefore, in accordance with section 513(i)(1)(E) of the Act, ODE required that a limitation appear in the "Warnings" section of the device's labeling, stating that "[t]he safety and effectiveness of the WaveScan™ Wavefront System have not been established for use of the device as an accessory interfaced to a refractive laser for the treatment of higher order aberrations of the eye by photorefractive keratectomy (PRK), phototherapeutic keratectomy (PTK) or laser-assisted in situ keratomileusis (LASIK)." Currently, there are no laser manufacturers who have FDA clearance or approval to correct higher order aberrations.

PENDING 510(k) AND INVESTIGATIONAL DEVICE EXEMPTIONS

PROMOTIONAL MATERIALS

CLAIMS OF HIGHER ORDER ABERRATION CAPABILITY

We recently reviewed promotional material from the All About Vision (http://www.allaboutvision.com) and VISX (http://www.visx.com) Internet sites. There are numerous representations made in the VISX-

sponsored section of the All About Vision website and on VISX's own website that promote the WavePrint System, consisting of the STAR S3 and the WaveScan, for higher order aberration capability. The WaveScan is also promoted for higher order aberration capability alone.

For example, the WavePrint is promoted as a system that "...measures higher-order distortions with amazing accuracy" (http://www.allaboutvision.com/waveprint/). A similar claim is found in the "Custom Laser Vision Correction: Early Results" section of the website (http://www.allaboutvision.com/waveprint/custom_laser_vision_correction.htm): "...[T]he WavePrint information – everything about the patient's refractive error and so-called 'higher order' optical aberrations contributing to blurry vision – is entered into a custom software program that then determines the proper number, location and size of laser pulses." Similar claims are also found in the "What Surgeons Say About WavePrint™" section of the website (http://www.allaboutvision.com/waveprint/waveprint_doctors.htm):

> What the WavePrint allows us to do, when we combine it with the VISX STAR S3 ActiveTrak laser, is a very precise correction at each point on the eye, so that each point on the eye gets the correction it needs... We get a complex, three-dimensional image of the cornea with WavePrint. You put that into a computer software program that computes the number of pulses to create the proper surface ... [The WavePrint] also gives us ... a picture of the visual system that might show higher-order aberrations that would otherwise be undetected ... When we're talking about higher-order aberrations, we're talking about three-dimensional shapes that get extremely odd....

In the "Products and Services" section of VISX's website, you promote the WavePrint System as consisting of the STAR S3 and the WaveScan (http://www.visx.com/about/products.php and http://www.visx.com/eye/products.php). The following claims appear on your website: "The VISX WaveScan Wavefront™ System measures both spherocylindrical refractive errors and higher order aberrations throughout the entire optical pathway. Researchers who are studying the use of STAR S3™ and WaveScan™ Systems for customized treatments believe they have the potential to provide visual results superior to those routinely achieved today" (http://www.visx.com/about/history.php). "...Wavefront refractive technology provides a WavePrint™ Map—a unique fingerprint of the patient's vision. Giving the doctor a precise, more detailed visual analysis that can help provide a personalized Laser Vision Correction treatment." (http://www.visx.com/about/products.php and http://www.visx.com/eye/products.php).

It is ODE's position that saying that there is a unique fingerprint or special quality about the output of the WaveScan implies higher order aberration capability. The VISX website (http://www.visx.com/eye/products.php and http://www.visx.com/laser/visx/visx_wave.php) and the VISX-sponsored section of the All About Vision website (http://www.allaboutvision.com/waveprint/custom_laser_vision_correction.htm) contain references to customized laser vision correction, procedure, and outcome, and unique fingerprint using the unapproved combination of WaveScan and STAR S3. Additionally, references are made to analysis of the entire optical/visual system, the eye from cornea to retina including the tear film, and the entire eye's optical distortions, which also imply higher order aberration capability.

CLAIMS REGARDING DATA NOT REVIEWED BY FDA

The "All About Vision" website link to "Custom Laser Vision Correction: Early Results" (http://www.allaboutvision.com/waveprint/custom_laser_vision_correction.htm) discusses a five-center study that is underway at major eye centers throughout the United States "to determine the effectiveness of WavePrint-guided laser vision correction...." The website states that a single eye surgeon's pilot study of 17 patients has already yielded "outstanding" outcomes and cites study results including 20/20 uncorrected

vision, and "more impressively, after three months 81 percent had 20/16 or better uncorrected vision, and 31 percent of the total were 20/12.5 or better." The section "What Surgeons Say About WavePrint™" (http://www.allaboutvision.com/waveprint/waveprint_doctors.htm) also provides clinical experiences and "study" findings by several doctors. These data have not been reviewed or approved by FDA.

Additional claims promote the WavePrint System as providing unsubstantiated superior performance and superior vision outcomes to conventional laser vision correction. The following claims appear in the "What Is It?" section (http://www.allaboutvision.com/waveprint/): "The more these individual variations can be quantified – as with the WavePrint map – the greater the potential for a truly custom, individualized laser vision correction procedure that specifically addresses the physical shortcomings of your particular eyes ... Doctors can now use WavePrint information along with the usual refractive data collected during an eye exam, and they can perform laser vision correction more precisely than ever before ... [T]he WavePrint System will alter the way doctors approach corrective eye surgery. Some believe greater numbers of patients will achieve better than 20/20 vision ..." In the "How It Works" section (http://www.allaboutvision.com/waveprint/waveprint_lasik.htm), the following claims are made: "Based on the information captured by the WavePrint System and depicted in your WavePrint map, the eye surgeon can make subtle changes in treatment settings to the VISX STAR S3™ excimer laser, to reshape the corneal curvature with greater precision than has been possible up to now ... Other technical features of the WavePrint System also help to improve surgical outcomes."

CLAIMS OF THERAPEUTIC AND RE-TREATMENT USES

The VISX-sponsored section of the All About Vision website makes claims of therapeutic and re-treatment applications for the WavePrint System. For example, in the "Laser Vision Correction Customized for Your Eyes" section (http://www.allaboutvision.com/waveprint), it is claimed that "[u]se of the WavePrint System also opens the path to therapeutic application of laser vision correction technology. It gives doctors the ability to correct more complex visual conditions, and treat patients whose previous laser vision procedures didn't produce the desired refractive results." In the "What Surgeons Say About WavePrint™" section (http://www.allaboutvision.com/waveprint/waveprint_doctors.htm), a doctor is quoted saying, "I think we're going to continue to find ways to utilize this technology in what we do diagnostically and also therapeutically."

Promoting the WavePrint for therapeutic applications and re-treatment (enhancement surgery) use is promotion of the device for unapproved uses.

CLAIMS THAT WAVEPRINT IS COMMERCIALLY AVAILABLE

In addition to the above-cited claims that promote the WavePrint as being commercially available, there are other website pages specifically promoting the WavePrint System as being commercially available. For example, under the section "Find a Doctor with The WavePrint System" (http://www.allaboutvision.com/waveprint/waveprint_find_a_doctor.htm), the reader is directed to surgeons who use the WavePrint System for personalized laser vision correction and told, "If you don't see a surgeon near you, please visit the VISX Incorporated website for a list of doctors who are certified to use the VISX STAR S3 Excimer Laser, a major part of the WavePrint System." Morever, the mere title of the section "Tomorrow's Technology Here Today" (http://www.allaboutvision.com/waveprint/waveprint_lasik.htm) indicates that the WavePrint is commercially available.

FDA'S CONCERNS

We believe that the above-cited claims, among others, made on the VISX-sponsored section of the All About Vision website and on the VISX website concerning the WavePrint System constitute changes in the safety and effectiveness of the STAR S3 and a modification of the intended use of the WaveScan. The

Agency's regulations at 21 CFR 814.39(a) require that, after FDA approval of a device, applicants submit a PMA supplement for review and approval by FDA before making a change affecting the safety and effectiveness of the device for which the applicant has an approved PMA, unless the change is of a type for which FDA has advised that an alternate submission is permitted.

Additionally, sponsors are prohibited by 21 CFR 812.7(a), from promoting an investigational device until after FDA has approved the device for commercial distribution, and by 21 CFR 812.7(d), from representing that an investigation device is safe and effective for the purposes for which it is being investigated. Promotion of an investigational product is allowed only to attract potential clinical investigators and/or study subjects. The information we reviewed did not appear to fit these criteria. For additional guidance, we refer you to the Division of Bioresearch Monitoring at 301-594-4718 and to http://www.fda.gov/cdrh/comp/2229.html.

We have previously notified VISX of impermissible product claims. This office issued letters dated February 21, 2001 and April 20, 2001, concerning inappropriate promotion of the WaveScan and Variable Spot Scanning, respectively. Our office received no response to the February 21, 2001, letter (attached), which discussed the impermissible promotion of the WaveScan.

The STAR S3 and the WaveScan are adulterated within the meaning of section 501(f)(1)(B) of the Act, in that they are Class III devices under section 513(f), and do not have approved applications for premarket approval (PMAs) in effect pursuant to section 515(a), or approved applications for investigational device exemption (IDE) under section 520(g).

The STAR S3 and the WaveScan are also misbranded within the meaning of section 502(o) of the Act, in that notices or other information respecting the modification in the intended use of the devices were not provided to FDA as required by 21 CFR 807.81(a)(3)(ii), and the devices were not found to be substantially equivalent to a predicate device. They are also misbranded within the meaning of section 502(a) of the Act, in that the information about their use as the WavePrint System is misleading.

This letter is not intended to be an all-inclusive list of deficiencies associated with your devices. It is your responsibility to ensure adherence to each requirement of the Act and Federal regulations. The specific violations noted in this letter may represent practices used in other promotion or advertising materials used by your firm. You are responsible for investigating and reviewing these materials to assure compliance with applicable regulations.

You should take prompt action to correct these violations. Failure to promptly correct these deviations may result in regulatory action being initiated by FDA without further notice. These actions include, but are not limited to, seizure, injunction, and/or civil penalties.

Please notify this office, in writing, within 15 working days of receipt of this letter, outlining the specific steps you have taken to correct the cited violations. Your response should also include all steps being taken to address misleading information currently in the marketplace and actions to prevent similar violations in the future. If corrective action cannot be completed within 15 working days, state the reason for the delay and the time within which the corrections will be completed.

Your response should be sent to Ms. Patricia L. Jahnes, Consumer Safety Officer, Promotion and Advertising Policy Staff (HFZ-300), Office of Compliance, Center for Devices and Radiological Health, 2098 Gaither Road, Rockville, Maryland 20850.

A copy of this letter is being sent to FDA's Los Angeles District Office. Please send a copy of your response to the District Director, Food and Drug Administration, Los Angeles District Office, 19900 MacArthur, Suite 300, Irvine, California 92612.

Sincerely yours,

Larry D. Spears for

Philip J. Frappaolo
Acting Director
Office of Compliance
Center for Devices and
Radiological Health

Enclosure