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April 4, 2016

Ms. Giulia Giannangeli  
Legislative Clerk  
Committee on Energy and Commerce  
2125 Rayburn House Office Building  
Washington, DC 20515

Dear Ms. Giannangeli:

Attached please find my responses to the written questions posed by Chairman Burgess and Congressman Harper relative to the Subcommittee's March 3 hearing on wearable technology.

I thank the Subcommittee for the opportunity to testify and present the views of Zebra Technologies Corporation on this very important issue. My company and I look forward to continuing to work with the Subcommittee on issues of mutual interest and I invite you to be in contact anytime we may be of assistance.

Sincerely,

A handwritten signature in black ink, appearing to read 'Thomas D. Bianculli', written in a cursive style.

Thomas D. Bianculli  
Vice President, Emerging Technology Office  
Zebra Technologies Corporation

**The Honorable Michael C. Burgess, M.D.**

**1. *Currently, are there any regulatory challenges at the Federal, State, or local level facing businesses that impede the use of wearables in workplace?***

The primary challenge we believe policymakers face is to foster an environment that supports the rapid development, deployment and subsequent advancement of wearables in a manner that simultaneously addresses concerns over data security, encryption and privacy. The goal must be to encourage technologies which provide enhanced, secure and real-time visibility and access to information in a way that empowers workers to undertake more effective and timely decisions and actions. It is for this reason that we urge Congress and the Administration to take a light touch where wearable technology is concerned – for the same reasons that many in industry as well as in Congress and the Administration have advocated for a light regulatory approach to the Internet of Things (IoT).

Inherent in our view is our appreciation for the fact that issues attendant to Business-to-Business (B2B) and Business-to-Government (B2G) applications of wearable technologies can differ – in some or many instances – from the issues which arise in a Business-to-Consumer (B2C) setting or context. This means that policymakers can benefit from viewing IoT-based technologies like wearables in all settings, whether B2B, B2C or B2G.

Zebra's suite of enterprise wearable technologies represents a series of solutions purposely built to solve complex problems in the B2B and B2G space. We deliver design innovations driven by deep customer insight. We have an unmatched research and study capabilities which enable us to immerse ourselves deeply into the B2B and B2G end user experience and help guide how users engage technology and receive information. Real-world analysis, a vast collection of field research, deep experiential immersion, and voice of customer insights all represent key front-end parameters of our design research approach. Ergonomics, cognitive and clinical psychology, and physical and cultural anthropology are integrated into design process to deliver intuitive user experiences in the B2B and B2G spaces that enhance situational awareness and provide critical info for improved decision making. We match the design approach with engineering regulatory and industry standards and practices to deliver best-in-class enterprise tools. Our "outside-in" perspective is crucial; we conduct focused B2B and B2G customer research, trials and pilots by immersing our teams into our customers' worlds to prove the safety and efficacy of not just our wearable but our entire line of technology solutions we deliver to market.

**2. *How reliable are wearable devices in gathering information and presenting an accurate picture of the individual's performance or job execution?***

Enterprise wearable devices are purpose-built B2B and B2G devices designed to solve specific business and operational problems. For example, in the B2B space, customers have deployed Zebra's wearable devices to reliably find, route and track packages through global supply chains, bringing products to our stores and doorsteps. Zebra is currently exploring new and emerging component technologies to bring a new batch of wearable technologies to market – ones that help bring eye-level business-critical information to a worker without interrupting workflow. Zebra feels these newer technologies help create a frictionless experience which helps improve both individual performance efficiency and overall macroeconomic productivity.

By way of background, Zebra pioneered the industrial B2B wearable product category back in 1992 with

the introduction of a wrist mounted computer and finger ring scanner accessory for the logistics and transportation industry as an easier way to find and pick parcels faster in warehouses. We reduced friction in the workflow which has helped save businesses time and money while automating tasks for those on the front line. Fast forwarding to today, hundreds of thousands of these devices are helping to ship and track our online orders to our homes.

Moving forward, we see an ever-growing need for future global workforces to operate in a hands-free environment, literally focusing on the task at hand. It is for this reason that we launched our hands-free, head-mounted computer in 2013. It provides a wireless, hands-free wearable mobile computer that uses simple voice commands and head gesture controls to access complex data, video and voice and is geared towards field technicians using it for real-world business applications in tough environments – whether they're in a tight space, in a remote location or working high above the ground.

**3. *What types of information can business collect from wearables in manufacturing? And how would a business turn that information into actionable data that can help them improve workflows either in the factory or in a remote location to increase productivity?***

Wearable technology represents explosive future growth in manufacturing, both in terms of final products and ingredient technology components. This means that supply chains will grow with the availability and introduction of more innovative and new wearable technologies that solve end-user problems across the B2B, B2G and B2C sectors. Wearable technology will also grow with the continued availability and accessibility of affordable 3D printing, micro computing components, and open development platforms.

All of this reflects the fact that people across many different industries need the use of their hands to fix machines, heal patients and help customers and taxpayers. Many companies see users of wearable technology as warehouse workers picking real-time orders; field technicians responsible for the maintenance and repair of complex machines and vehicles; construction managers and architects who access schematics, building plans and maps; and military, medical and public safety teams who practice simulated training, live events and crisis scenarios.

In essence, wearable technology enhances situational awareness by giving people access to critical data and real-time video at the point of work. Imagine having full access to your business critical data – maps, grid schematics, and work tickets – as well as key engineers and experts – in full view whenever you need it with a simple verbal command. And then using another verbal command, you will be responding to and transmitting pictures or data updates back to the main office. Now imagine having that ability while suspended high above the ground repairing live electrical wires or working inside an airplane engine. No hands required. Wearable technology makes it happen.

**4. *What kinds of cost savings can manufacturers achieve through employee use of wearable devices and in what areas of a manufacturer's operational responsibilities do you tend to see most of those savings? How do those cost savings achieved through wearable devices translate into economic benefits for the U.S. economy at large?***

Manufacturing and field service will experience a significant and positive increase in performance from wearable technology adoption. Enhancing an already highly-skilled, technical workforce with tools that bring greater value to professional services and service-level agreements will, in turn, yield macroeconomic gains in productivity that will help contribute to enhanced national prosperity.

These benefits occur because wearable technology enables real-time collaboration that, in turn, reduces costs and improves operational quality. Wireless technology is making it easier for enterprises to change how they work, particularly in manufacturing and field service. The ability to communicate instantly and hands-free with subject matter experts regardless of location helps mobile workers increase productivity and resolve issues quickly and cost-effectively. It allows people to work smarter and safer; to keep their eyes literally focused on the task at hand. With full voice, audio, video, wireless and PC networking capabilities, Zebra's wearable technology portfolio gives enterprise users powerful new tools to transform how work gets done.

For example, when on a job site, enterprise workers need access to critical information and the ability to connect to subject matter experts at various locations in real-time to solve issues at the point of work. This is particularly important in environments where response time, accuracy and safety are key business factors. In the automotive manufacturing, the nuclear and utility industries, work protocols require a concise list of safety checks that must be completed on a daily basis. The steps are so important that they must be viewed and verified by at least two technicians. Mobile computing solutions that allow workers to collaborate easily, complete tasks accurately and keep their risk of exposure to a minimum can also eliminate the need for two additional technicians to be onsite. Real-time video gives them the ability to see what a worker sees and immediately verify job performance from anywhere. Every day, EMTs require direct communication with doctors and specialists at surrounding hospitals, to help care for critically injured or ill patients. Collaborating hands-free reduces errors and saves valuable time. Wearable technology devices in this environment need to enable reliable, interactive communications and stand up to the rigors of both indoor and outdoor use.

## **The Honorable Gregg Harper**

### ***1. What enhanced capabilities do you see wearable devices providing in the next five to 10 years, beyond what they are providing to consumers and businesses today?***

Future wearable computing in the B2B and B2G space will evolve into both all-in-one computing solutions and distributed solutions. As a result, they will be more reliant on both personal and body-area networks. For example, future hazard or safety sensors worn on equipment such as utility worker vests and scanner gun holsters may migrate away from being individual devices and become incorporated into a field engineer's and first responder's everyday gear and clothing so that frontline personnel are not encumbered by the technology. Visual computing, or the ability to work hands-free while receiving eye-level information, will be an impactful paradigm shift in how we, as humans, directly interface with computers. Visual computing delivering hands-free, eye-level information will enable frictionless, uninterrupted workflow.

Over the next few years, wearable devices will get smaller with miniaturization and technological improvements in battery technologies. It may be too early to see biologically embedded or implantable devices, but more integrated devices using sensors that can enhance, monitor or tap into body signs are on the horizon. Many companies will create their own wearable technologies, creating a variety of different technology platforms and user experiences. The use of standard protocols such as Bluetooth and Wi-Fi will enable more wearable devices and peripherals to more easily talk to each other.

We see computing, in general, moving faster into cloud-based networks. Future wearable devices will become more about context and situational awareness – autonomously gathering visual and audio data – synthesized in the cloud and relaying back relevant information to the wearable technology user. Today's devices will become more integrated, giving rise to unique and highly personalized systems. Wearables will become pervasive in the future, from conformable displays and eye-level user interfaces to self-forming sensor networks. The ecosystem created by wearables will require robust secure communications and power management needs. New security methods will also be necessary to keep hackers from controlling home appliances and business machines and devices.

Looking forward into the distant future, Zebra anticipates even more integration between man and machine. Brain to computer interfaces will open new possibilities to amputees controlling smart prosthetics, even ways for patients with no motor physical skills to communicate and be part of our connected world. Future battery technologies will harvest energy from our bodies, ambient noise, Wi-Fi, and air, powering next-gen bionics as well as other wearable, implantable devices.

**2. *What does this fast pace of innovation mean for policymakers in terms of how we should be thinking about the technology?***

The Internet of Things (IoT) is all around us. Wearable technologies, like all other technologies, will need to take advantage of the connectivity that the IoT provides. Zebra has created an IoT application enablement platform that allows organizations to easily and securely connect all types of devices, equipment and sensors to the Internet. Our company's platform approach helps organizations achieve economies of scale by taking full advantage of the data and information they generate to grow their operations, increase efficiency and drive productivity.

Most immediately, we urge Congress and the Administration to avoid ad hoc action that burdens the development and deployment of the IoT – and related IoT-technologies such as wearables – until a coordinated approach across the Administration has been developed. We respect why many in government want to make sure that subject-specific concerns are addressed as IoT-based technologies like wearables are developed and deployed but we believe a coordinated, government-wide approach would be far more efficient and supportive of the proper development of IoT-based technologies.

Crucial factors are at play that will radically transform the face of today's government and business workforces, including:

- The ability to coordinate mission-critical and business-critical communications within and across organizations;
- A flood of information available to individuals for better decision making; and
- The need to do more with less and do it in a manner that is better, faster and smarter.

We must continue innovating for the next generation of needs and opportunities in the B2B, B2G and B2C markets, working with customers and technology partners to develop meaningful solutions that elevate the user experience and help American workers to be the best at what they do. We must continue our deep commitment to research and development, strengthening our position at the forefront of technology to guide future innovations like wearable technology and, ultimately, transform the industries of the future. Congress' permanent extension of the R&D Tax Credit last year was very much a step in the right direction.