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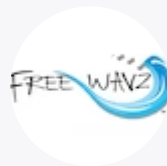
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FreeWavz: Smart Earphones with Built-in Fitness Monitoring

HIMPP 1014



FreeWavz provide complete freedom from wires, have a naturally perfect fit and deliver the fitness metrics you want, when you want them



Created by

[FreeWavz](#)

1,591 backers pledged \$325,208 to help bring this project to life.

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UPDATE #33

Update #33 Pulse Oximetry Success + FreeWavz Testing + Factory Preparation

FreeWavz **Creator**

September 10, 2015

Good day to all FreeWavz supporters,

We recognize and understand that this update was late getting out to you. We are sorry for the limited communication since our last update. There has been a lot of developments and changes. Firstly, allow us to confirm that FreeWavz are not vaporware. They are real and we are in the homestretch; aiming for final release of “Golden Sample” which will be our benchmark beta for mass production and factory online date. We still are not there yet. But, we continue to move in the right direction. More about that later...but first we would like to clear the air about a couple of things to make sure that we are all on the same page.

When we launched our Kickstarter Campaign about a year ago, we believed that the early beta samples that our original engineering team had created were nearly ready to move out of development stages and into production stages. That is why we launched our Kickstarter campaign. Your contribution is supporting our drive to produce this innovative product, not a retail sale of a product. Every dime of KS contributions plus another 300% more cash from private investors has been applied towards realizing the engineering and development of FreeWavz. We are developing exciting, ground-breaking technology; from our unique application of wire-free BT ear-to-ear to our on-ear absorption pulse ox, our new, award-winning technology is truly cutting-edge.

However, we have not been without our share of setbacks and delays. Unfortunately, these are fairly standard when you're an early stage technology start-up. We are not pleased with the delays, we have learned from everyone. Yes, with the benefit of hindsight our original

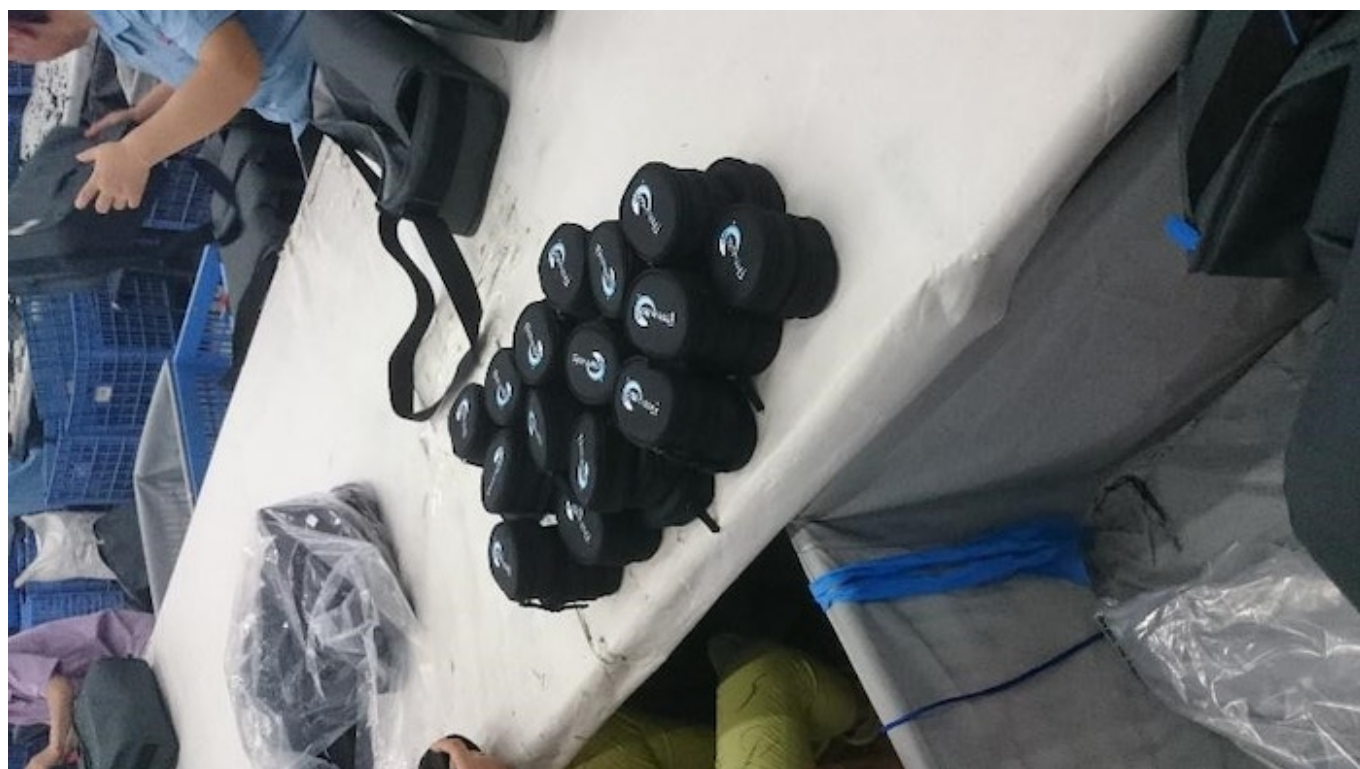
timetable was inaccurate. And while we believe we are very close to realizing the successful production of the FreeWavz, there still could be some unanticipated issues. We understand your frustration and many of you let your feelings be known on Kickstarter pages. We share your frustration. Constructive criticism is always welcome; albeit not easy to hear sometimes. All we ask is that your comments be productive. Be part of the team and we promise to continue to read and consider all commentary from our backers.

We have worked long hours and are very excited to bring you the latest update. The good news is that we are moving from product development to testing. We just got back from several weeks at our overseas factory and vendors finalizing all agreements. Production is now ready to proceed. We are sharing images from those meetings and progress here for the first time outside the company.

There was very sensitive engineering design implementations that needed patent submission before we could make any details public. We are now able to share with you a very detailed update on manufacturing, testing, and design. We certainly have a lot of news to share so on with the update!

Site Inspection of Manufactures + Vendors + Factory Lines

We recently returned from China to meet with our manufacturers, vendors, and factory partners. Preparation is going well and we feel great that our manufacturers will be ready to begin production as soon as we release the final beta, "Golden Sample." We want to share some images of the progress here. This first image is of the custom-made battery design. These batteries are in the process of being analyzed in our first article betas. We are targeting 5 hours nominal use. ROHS, UN and CE certifications are progressing and we fully expect complete sign off for North American retail shortly.



FreeWavz travel cases are ready to go - now we just need the FreeWavz earphones!

Our primary factory and assembly line is in Shenzhen with 20 work stations from start to finish employing 40 workers. We are expecting to eventually ramp the production line up to a maximum output of 700 units per day.



Above Mike Kahn with Head of Factory Operations and Quality Control.



Mike Kahn inspects the SMT clean room which houses the advance computer controlled robotic machinery which places the individual chips onto the FreeWavz Printed Circuit Boards, or PCB. These machines are so efficient that the accuracy is checked via computerized machine vision cameras.



We are in the midst of injection molding machinery that uses molds to make mass quantities of over 25 plastic parts that make up the outside of the FreeWavz Shells. The heat coming off the machines was staggering.



This is one of several quality control testing rooms. Here our factory will test everything from exposure to the elements like moisture, heat, and salt. Sound quality and plastic durability

are also checked and rechecked here.

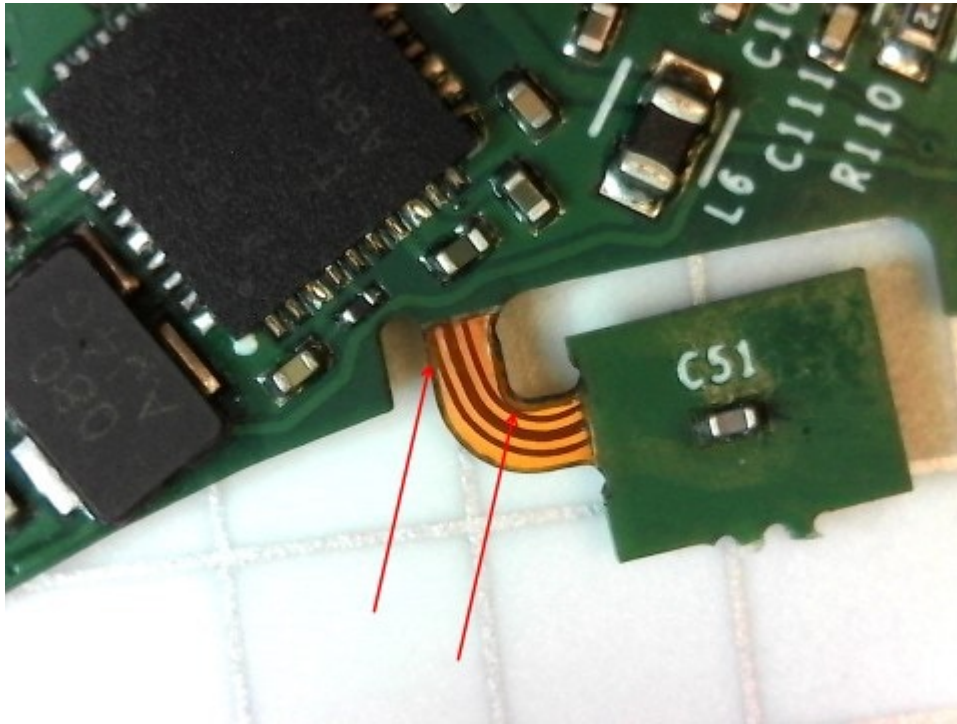


Here's the senior management factory team meeting with Mike Kahn.

Printed Circuit Board (PCB) Fabrication and Testing + Optimization

Last month, we received the “First Article” of what we had hoped would be the final PCB Prototype of the “Golden Sample” for Mass Production Benchmarking (GS to MP). Our PCB is very complex with more than 10 layers. This means that fabrication of PCB takes time; especially in the testing phases. We ran into a problem with fabrication of the PCBs. Our engineers and manufacturers are working tirelessly to ensure that the antenna is positioned on our PCB board properly to eliminate any audio “drop outs” or nulls. We are currently not satisfied with the PCB Trace Antenna performance as it is causing drop outs. We were able to test out to a maximum of 27 feet but want to hit 33 feet to conform to the BT spec. Also, the consistency due the antenna performance was not at production readiness. Some testers were able to get stable ear-to-ear testing, while others had significant loss of signal. We went back to the Electrical Engineers and made design tuning adjustments to the trace antennas that should eliminate the drop outs. This is our single biggest headache. We can't achieve stereo sound sync between the master and slave earphones without consistent RF

response around the head. We fully believe that the errors on our PCB around the trace antenna are causing this problem.



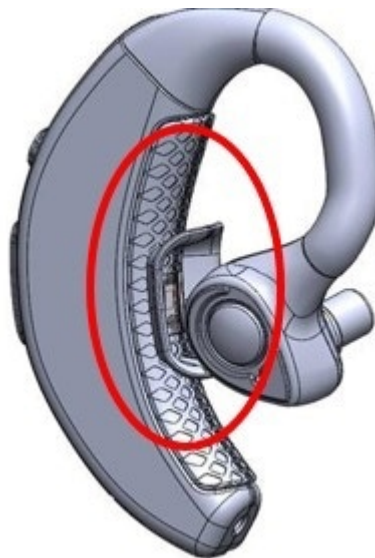
During fabrication of the 1st article beta prototype boards, a manufacturing error made the antenna run too close on the copper edge of the board. You can see where the red arrows are pointing.

The solution? We have to re-order new PCBs to be fabricated. Unfortunately, they will not be ready until end of October. We expect these to be completed and installed in new housings by the beginning of November. We will need 2 weeks for complete evaluation testing and hopefully, approval of these “Golden Samples” before moving to mass production stage. With parts lead time, we should be able to begin shipping mass production around Thanksgiving. We are giving first production priority to our Kickstarter supporters orders and hope to have all orders shipped shortly after mass production begins.

Pulse Oximeter Testing & Results

One feature that makes FreeWavz so unique is the Pulse Oximeter. Being founded by an ENT surgeon, FreeWavz needed to have the most reliable method of obtaining heart rate and oxygen saturation. During our testing, we weren't getting consistent and reliable samples. All of our evaluation pointed to a need to reduce light interference for the transmission of

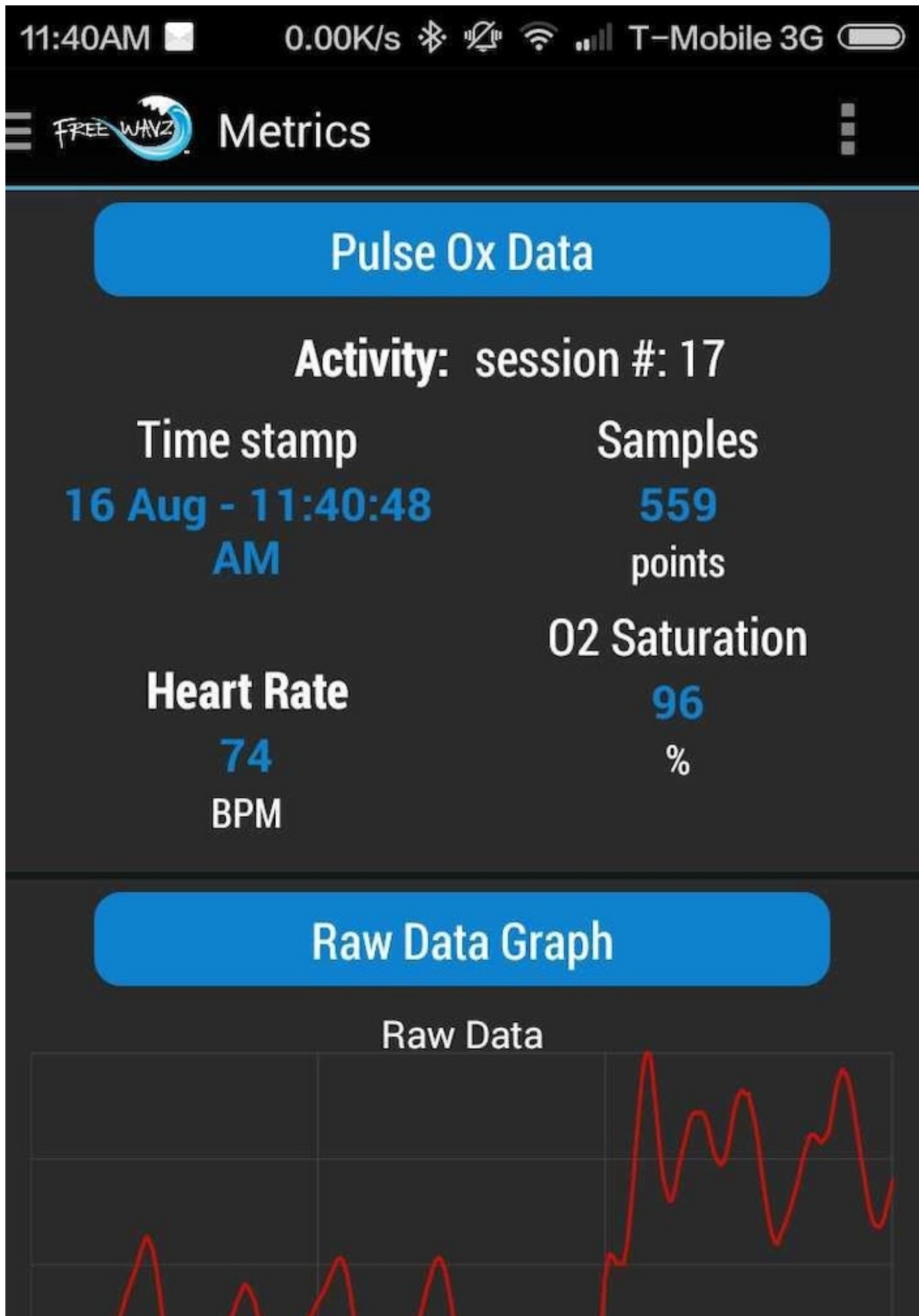
the pulse ox through the ear. We needed to make a design change to the FreeWavz to ensure that the infrared /red light was not being impacted by ambient light and sunlight. After months of testing and tweaking a combination of transmitter intensity and mathematical formulas called algorithms for filtering “light noise,” we still determined that an extra shroud would be our best solution. The solution was a newly designed and patented addition to the FreeWavz that is both functional and comfortable.

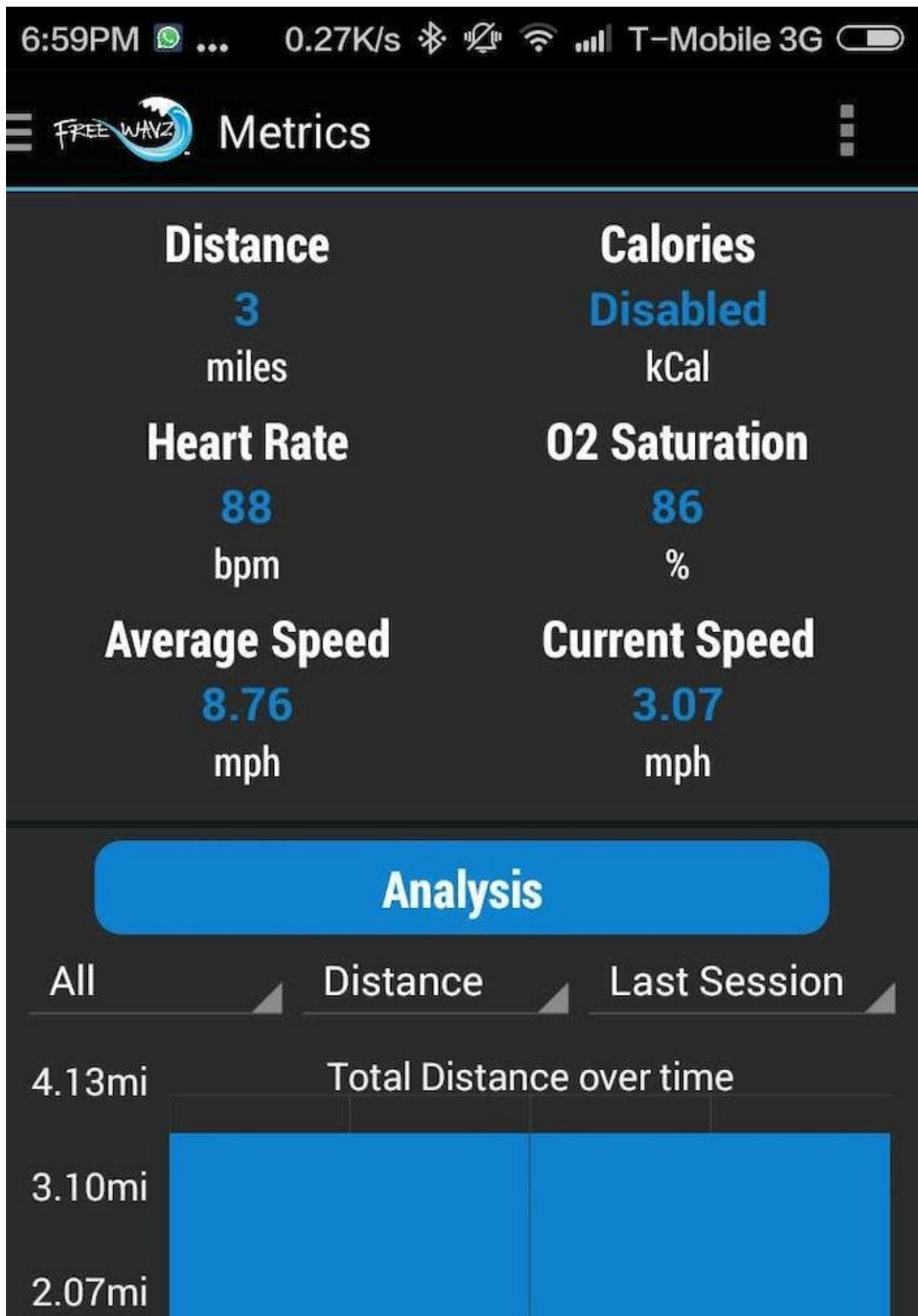


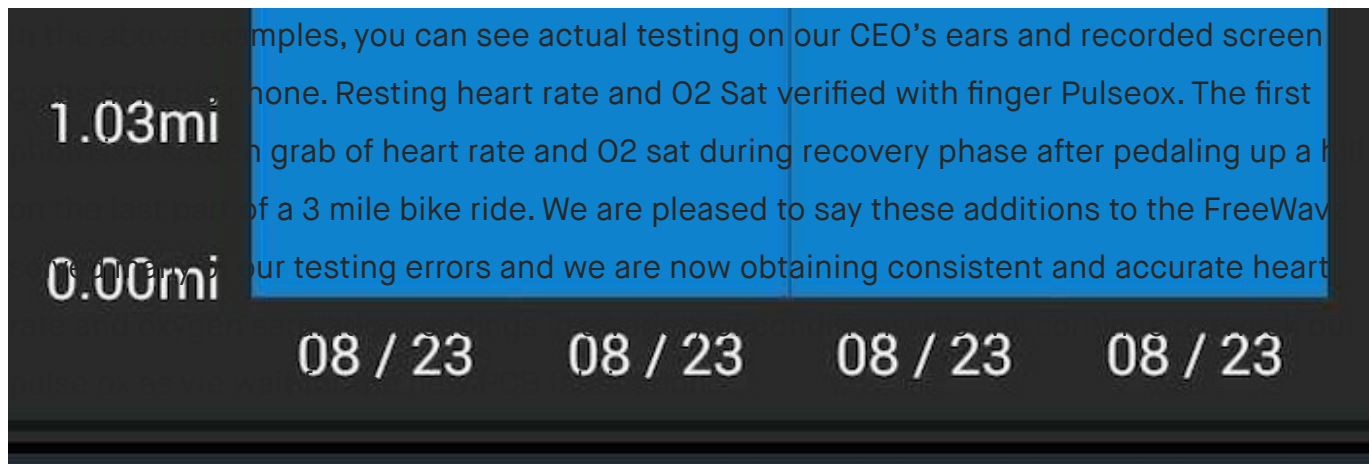


We have designed and patented a newly created shroud which is cleverly and comfortably incorporated into the FreeWavz earphones to insure good readings even in environments with bright light.

In conjunction with this newly designed shroud, we are also refining our patented pulse ox algorithms. These are the proprietary mathematical formulas that take our sampling of hemoglobin and heart pulsations to report heart rate and O2 saturation levels via the app in your phone as well as spoken through the FreeWavz themselves.







Demo Video



Here is inventor, Dr. Hensen, demoing the FreeWavz units.

Packaging

While our engineers are putting the finishing touches on our FreeWavz, the creative team has been designing the packaging for FreeWavz. Here is a sneak peek. Not finalized yet but getting very close.



New Production Timeline

Our production schedule has been pushed out to approximately end of November. We are very disappointed with this delay, but will not compromise on the quality of the FreeWavz. We are close and while something unexpected could arise, we believe that we are through the major technology hurdles now.

The FreeWavz Team



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