

**DATE: 24-JULY-2018**

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

**In the Matter of**

<b>Spectrum Horizons</b>	)	<b>ET Docket No. 18-21</b>
<b>James Edwin Whedbee Petition for</b>	)	<b>RM-11795</b>
<b>Rulemaking</b>	)	
<b>to Allow Unlicensed Operation in the</b>	)	
<b>95-1,000 GHz Band</b>	)	
	)	

**REPLY COMMENTS OF  
NETEERA TECHNOLOGIES LTD**

To whom it may concern,

We appreciate the opportunity to comment on the FCC petition.

**ABOUT:**

Neteera Technologies LTD is an Israeli deep-tech technology company that is leading a revolution in the radar usage in sub-terahertz frequencies.

Neteera is developing a range of high frequency micro-radar-on-chip systems for the detection of human vital signs and objects with a short range from the transmission source (up to 10 meters). The 1st generation 140 GHz system is intended for in-vehicle use for human vital signs detection, with a very short range, not transmitting beyond the confines of the vehicle.

The monitoring of a vehicle's occupants' vital signs has been a sought-after application for more than a decade. The challenge is to provide an optimal solution that can combine the following aspects:

1. Maintain privacy
2. Low energy consumption
3. Very low radiation transmission
4. No false reading from other occupants in the vehicle
5. The capability to penetrate clothes and furniture
6. Provision of high resolution indicators like HRI, HRV, RRV and Pulse Wave Velocity
7. The capability of compensation for the motion of the subject and the NVH (Noise Vibration Harshness) transmitted through vehicle
8. Low cost

Neteera has addressed this challenge and developed a CMOS based chip for Sub-Terahertz detection and emissions. These new components have allowed for the development and production of instruments able to measure the micro-motions of the skin through furniture and clothing at a high resolution thus allowing for multiple indicators to be detected (respiration, HR, HR Interval, HR Variability, Respiration variability, pulse wave velocity and more). The ability to monitor a number of previously unavailable indicators provides the ability to perform data interpretation for the detection of fatigue, sleep, stress etc. Currently Neteera's solution can meet most of the above requirements and we are working on solving the motion and NVH challenge. We consider this challenge achievable through the correct combination of hardware, algorithm and optics.

### **THE TECHNOLOGY:**

A unique physical phenomenon in thin semiconductor layers combined with integrated antennas integrated to the sensor chip that enables high responsivity and small form factor detection. In order to achieve the full performance, the sensor chip is connected to a custom designed analog front end chip.

The sensor comes with all advantages of standard CMOS and SOI (Silicon On Insulator) technology: ready for mass production, quality control, straightforward PCB layout, standard voltages and SPI control interface.

Neteera has integrated these sensors to proprietary self-contained engineering units which include a sub-THz generator, a sub-THz interferometer, accompanying electronics and data analysis algorithms and SW. These units have been tested for the Proof of Concept of the technology and are the basis of Neteera's future technology, that is being developed at this time, which is a System-on-Chip concept that includes all of the aspects of the prototype including the source, sensor and optics.

### **OUR PERSPECTIVE ON SUB TERAHERTZ USAGE:**

With regard to the petition from to amend part 15 to allow operation in the 95-1,000 GHz band, we would like to bring a few points to your attention for information or action as appropriate:

In order to achieve this goal we would like the Commission to allocate the band between 135 GHz to 140 GHz (inclusive) for short and mid range radars. When compared to the bands below 95 GHz, the spectrum horizons' bands can offer greatly improved spectrum utilization and sharing using the revolutionary technologies and deployment models discussed above. This frequency also provide specific advantages as penetration into the human skin is more limited than lower frequencies but it is still low enough to penetrate an array of opaque materials (mainly fabric and clothing) - the combination will allow for an accurate measurement of micro-skin motions (as the penetration to the skin is negligible) with the advantage of performing the measurement through the clothing (which might be more challenging with higher frequencies). Another advantage of the 140 GHz band is that it is within an atmospheric window with low attenuation so the same technology can be used for outdoor sensing for autonomous vehicles. Today one of the major challenges of sensing in autonomous vehicles is that current radar resolution is low with large-form factor, high radiation and relatively poor detection of soft materials (humans) - at 140

GHz a high resolution radar can provide a much better understanding of the environment for this important need.

Neteera will require additional unlicensed and shared spectrum to support the growing demands for enhanced mobile broadband, massive IoT, and mission critical services. Neteera is very excited by the possibilities of using the bands between 135 GHz to 140 GHz because we believe they can serve a critical role in providing non-invasive solutions for detection and monitoring vital signs of a variety of populations in different environments. This will further enable real time life saving technology establishment.

**Respectfully submitted,**



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