1572-EX-ST-2026
Exhibit 1
Narrative
Description

This STA application is furthering work begun under a currently effective experimental license (Call Sign WP2XSR). The application would expand the testing area used in the existing experimental license using the same power, bandwidth, and emission characteristics as already authorized in portions of the 1-30 MHz bands. The technical parameters are unchanged from the existing conventional experimental license, and Ionoterra is committed to continued cooperation with licensees and agencies that have interests in the HF frequency bands. Ionoterra has not received any complaints of interference to any FCC licensees or to any federal government agencies from its operations under the STA or the existing experimental license that the FCC has previously granted.

Research Program

On a global scale, over the past 20 years, earthquakes have caused over 750,000 deaths, injured tens of millions, and caused billions in damage that could have been reduced if there had been a longer early warning. Existing Early Warning Systems provide at best a few tens of seconds of warning before an earthquake strikes.

In theoretical scientific research conducted by our CTO Prof. Nathan Blaunstein for three decades, he proved that earthquakes can be predicted by a set of certain phenomena in the ionosphere measured algorithmically hours before the earthquake using several ionosondes arranged in a certain configuration. In an initial limited proof of concept we conducted in 2019, we showed that we can predict earthquakes hours in advance. We obtained several patents for our technology in the US (# US 11,822,028 B2 dated Nov. 21, 2023, and # US 12,298,456 dated May 13, 2025), Japan (7364271 dated Oct. 10, 2023), Argentina (AR125696B1 dated March 28, 2025), and Taiwan (1899462 dated October 1 2025).

Our proposed research is developing the ability to predict earthquakes hours in advance, and will provide the opportunity to react and prepare in a timely manner in order to evacuate the population (buildings, schools, etc.), cut off gas and electricity, warn and stop trains, airports, traffic on bridges and in tunnels, initiate emergency protocols at nuclear facilities, etc. We have started generating live predictions for our experiment and just recently started to share these with the Civil and Environmental Engineering department at UCLA.

To date, using its existing experimental license, Ionoterra has successfully observed and internally predicted several hundreds of seismic events, and has typically been able to make such predictions 5 to 6 hours in advance of the occurrence of the actual event. For the first time ever globally, Ionoterra has also shared five LIVE predictions in real time with external interested parties including UCLA. hours in advance of the actual event. The recent predictions shared were all within expected margins of error demonstrating promising results.

Necessary Frequency Range and Need to Minimize Discontinuities

HF spectrum in the range of 1 to 30 MHz is typically used to measure ionosphere related parameters. The high effectiveness of using LFM ionosondes in the HF frequency band allows for monitoring changes in the ionospheric phenomena mentioned above.

The primary requirement for the ionosonde apparatus is the spectral purity of the generated Linear Frequency Modulation (LFM) signal and the frequency stability of the LFM signal synthesizer reference.

In addition, LFM-based ionosonde uses instantaneous frequency (a swept CW signal, but with no instantaneous bandwidth) and derivatives of the modulated phase in its measurements and calculations. Discontinuities in the frequency range, however, are not preferred because such discontinuities prevent using derivatives. The operation of noise filtering is also affected by discontinuities in the frequency range, causing more pronounced noise each time a frequency "jump" occurs. A segmented spectrum also leads to inaccuracies of the frequency generator due to its continuous operation manner, causing inaccuracies of measured parameters which are at the heart of our measurements. We are aware of the requirements that NTIA has applied to federal agency use of Ionosphere sounders, and our application includes avoiding those frequencies indicated in Section 8.2.21 of the NTIA Manual. The frequencies in the 1-30 MHz range have been coordinated with NTIA and already are being used under the pre-existing experimental license without any complaints of interference from federal government agencies. W e request that notching additional frequencies be avoided to the extent possible in order to preserve the integrity of the measurements we hope to perform. Below we provide a description of our testing parameters that will minimize any possible impact on incumbent users within the HF bands. Thus, given the significant public interest benefits of our proposed research, we are seeking frequency blocks that are as continuous as possible to enable our equipment to operate as needed.

Protecting Other Users from Interference

Other users of the instant spectrum typically use small bandwidths for voice or data signals such as the 2.8 kHz bandwidth often used by Amateur radio operators. Our LFM ionosonde equipment sweeps its frequency at a rate of 100 kHz per second. With this frequency sweep rate, the **overlap** between the LFM signal and such typical Amateur radio channels does not exceed $2.8kHz/100kHz/s = 28$ ms. In case of wider bands used by others, e.g., 4.5 kHz, the **partial overlap** increases yet not exceeding 45 ms. Likewise, a typical AM receiver bandwidth is between 6 to 10 kHz, meaning that the overlap is 6kHz/100kHz/s = 60 ms to 10kHz/100kHz/s = 100 ms.

The Ionoterra ionosonde transmits only once every 15 minutes (i.e., 900 seconds), so the long-term overlap with existing HF channels is $28\text{ms}/900s \cdot 100\% \approx 0.0031\%$, and in case of 4.5kHz bandwidth it increases to 0.005%. In the case of an AM receiver the overlap is 0.0067% to 0.011%.

The transmission power is low compared to many other HF transmitters (never exceeding 100W) so it does not interfere with other FM transmissions, and for AM receivers our transmission will be considered as negligible temporal noise at most, which in both modulations (FM & AM) is inaudible to the human ear.

By keeping the LFM signals low in power, short in duration, and infrequent in repetition, we will remain practically invisible to other HF users and thus will not cause harmful interference to any of those users.