

**NARRATIVE STATEMENT**

Pursuant to Section 5.61 of the Commission's rules, 47 C.F.R. §5.61 (2016), Viziv Technologies LLC hereby respectfully requests special temporary authority ("STA") beginning October 15, 2018 to conduct experiments to validate the performance and operating characteristics of a prototype wave-launching apparatus that will produce a type of guided electromagnetic surface wave known as a Zenneck surface wave ("ZSW") (not Norton ground waves) at or near an operating frequency of 18 kHz. A primary objective of the experimental tests will be to validate the hypothesis and predicted results that a ZSW will provide global signal coverage at the selected frequency of operation.

This STA will build on the existing work to test and validate the utility of ZSWs being conducted under existing experimental radio licenses, call signs WI2XTH and WJ2XGB.<sup>1</sup>

**1) Testing will be done under the control of:**

Randall Jean, Ph.D  
James Lilly

**2) Stop Buzzer Point of Contact:**

Mr. Tim Lougheed  
E-mail: [tlougheed@vizivtech.com](mailto:tlougheed@vizivtech.com)

**3) Description of Operation and Purpose of Test:**

The purpose of the test will be to confirm effective launching of a Zenneck surface wave and to measure its propagation and attenuation characteristics on a global scale. More specifically, the operation of the system will demonstrate and prove that a ZSW can be preferentially produced by a novel launch-probe apparatus and that the generated wave will propagate with sufficiently low attenuation to provide global coverage.

Test measurements of signal strength will be taken at a minimum of 40 locations around the globe. The test instrumentation will be of two types, each measuring the magnetic field within approximately one meter or less

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<sup>1</sup> Viziv has undergone a name change – it was formerly known as Texzon Technologies.

from the surface of the earth. Maximum signal strength for a ZSW occurs at the earth's surface.

One measurement system will measure a single horizontal axis, amplitude-only value of magnetic field strength using an ETS Lindgren single loop antenna connected to the input of a Rohde & Schwarz Spectrum Rider RPH spectrum analyzer.

A second measurement system will provide a three-axis measurement of both amplitude and phase using a proprietary tuned receiver system manufactured for Viziv by Q-Track Incorporated of Huntsville, Alabama.

Importantly, as has been shown by Viziv's testing under FCC Experimental Licenses, call signs WI2XTH and WJ2XGB, the testing will be non-radiating – which will limit the interference effects to any other party in the spectrum band under test.

**4) Need for an STA:**

The STA is necessary for Viziv to conduct experiments at 18 kHz and thereby continue its ground breaking ZSW work being conducted at 1710 kHz and 100 kHz under FCC Experimental Licenses, call signs WI2XTH and WJ2XGB.

**5) Dates of Operation:**

Operation is requested for the 6 month period beginning October 15, 2018 through April 14, 2019.

**6) Class of Station:**

There will be a single fixed transmitter.

**7) Location of Proposed Operations:**

1130 Dale Acres Road  
Milford, Texas 76670

The specific coordinates of the launch probe mechanism are 32° 08' 57.5" N; 96° 56' 32.1" W.

**8) Equipment To Be Used:**

The tests will employ a single prototype vertical wave-launching probe apparatus designed and built by Viziv Technologies LLC, comprising a phase-shifting coil/air-core transformer at the base of the structure that is connected to an elevated charge terminal.

The transmitter, manufactured by Continental Electronics of Dallas, Texas, is a model Continental Electronics Model D120R Amplifier. The signal will be unmodulated.

**9) Frequencies Desired:**

Viziv requests to operate on a single frequency within the band from 17.4 kHz to 18 kHz.

**10) Power Levels:**

Viziv will operate at the lowest power level required to verify global propagation and to effectively measure wave characteristics. The transmitter has a maximum mean output power of 500 kW. The launch probe is designed to launch a guided surface wave and to minimize the amount of radiated power. For the prototype design, we estimate that at maximum transmitter output, the maximum worst case mean EIRP will be 1410 W.

**11) Type of Emission, Modulation Technique, and Bandwidth Required:**

The emitted signal will be unmodulated, corresponding to emission designator NON. The signal bandwidth will be less than 10 Hz.

**12) Overall Height of Antenna(s) Above Ground/Orientation:**

The launch probe structure is omnidirectional and is 60.7 meters (199 feet) tall (above ground level). The launch probe has received a "Notice of No Obstruction" from the FAA (see attachment).

**13) Protection Against Causing Harmful Interference:**

Viziv is requesting a single frequency from within the 17.4-18 kHz band. That band is allocated for Fixed service (federal primary and non-federal secondary) and Maritime Mobile service (federal primary). The band is also used by electric utilities for power line carrier systems on an unprotected basis. The properties of ZSWs (as opposed to Norton waves) of producing no radiation and propagating low to the ground as well as the low power density will act to minimize the potential for causing harmful interference to any authorized service. Under Viziv's existing and previous experimental licenses for testing ZSWs, there have been no reported instances of harmful interference.

Viziv understands that it must accept any interference from any users of this band and that all operations by Viziv will be on a non-interference basis. Viziv has established a point of contact identified above with "kill switch" authority should any interference occur to stations of authorized services. Should interference occur, Viziv will take immediate steps to

resolve the interference, including, if necessary, arranging for the discontinuance of operation.

**14) Compliance with International Radio Regulations:**

Viziv is aware that the propagation characteristics of the Very Low Frequency (VLF) band will result in very long transmission distances which span the globe. In fact, Viziv's premise in conducting this test is to do just that to prove that a single probe can provide global coverage. Internationally, the 17.4-18 kHz band is allocated for Fixed and Maritime Mobile service on a primary basis in all three regions.

Under the proposed demonstration, Viziv will not be communicating with any station located in another administration as the extent of its operations will be to only take measurements of the ZSW at various locations across the earth. The International Radio Regulations ("IRR") do not preclude tests of this type. In fact, the IRR, contemplate that tests spanning international boundaries will occur and have developed protocols and contingencies.

Under Article 15 of the IRR, "Interferences," Section IV, "Tests", prescribes that when authorizing experiments, each administration shall take all possible precautions, including suppressing radiation (Section 15.14). The same characteristics described above for minimizing the potential for harmful interference to domestic stations will also minimize the potential for harmful interference to stations of other administrations. Sections V, "Reports of Infringement" and VI, "Procedure in a case of harmful interference" set out the reporting mechanisms between administrations should harmful interference occur.

Also, under Article 27 of the IRR, "Experimental Stations," Section 27.5 provides that, "experimental stations shall comply with the technical conditions imposed upon transmitters operating in the same frequency bands, except where the technical principles of the experiments prevent this. In such a case, the administration which authorizes the operation of these stations may grant a dispensation in an appropriate form." Because Viziv will be transmitting an unmodulated carrier incapable of carrying information, the technical principles of the experiment will preclude it from transmitting any identifying information, such as a call sign, as generally required under Section 27.6 of the IRR. However, because the ZSW has an extremely low probability of causing harmful interference, the Commission should exercise its authority under Section 27.5 and not impose such a requirement.

**15) Contact Information**

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