

**EXHIBIT TO STA APPLICATION**

By this application, and pursuant to Section 5.3(d) and (e) and Section 5.61 of the Federal Communications Commission (“FCC” or “Commission”) rules, 47 C.F.R. §§ 5.3(d), (e), 5.61 (2012), TransCore, LP respectfully requests special temporary authority (“STA”), beginning **October 1, 2014**, and continuing through **December 31, 2014**, to test a non-multilateration vehicle identification tag reader system under development by the company for operation overseas in the 865 - 875 MHz band. Specifically, the system is being developed and manufactured for export and deployment in Europe to support the rail industry and will not be marketed for use in the United States.

The proposed experimental operation is similar to those previously authorized by the Commission to TransCore under call signs WF2XFC, WC9XMK and WC9XXG. TransCore respectfully requests agency action so that it may begin experimentation on October 1. It has scheduled the tests for this period to meet user requirements, including product delivery requirements.

TransCore submits this application for STA, including the information in this Exhibit, in support of its request.

**A. Purpose and Description of Operations:**

TransCore is a leading developer and manufacturer of radio frequency identification (“RFID”) technology in the United States and around the world. By this request, TransCore seeks experimental; authorization to test a special export version of the TransCore Encompass™ 4 Multi-Protocol reader system in a configuration which is intended to simulate its deployment in a rail environment. Specifically, the system will separately transmit a carrier signal and a modulated signal on four discrete 800 MHz channels listed in Section C below. Readers will be installed in a parking lot and a tag will be mounted on a vehicle to simulate a rail car that will pass near the reader. The reader will transmit a carrier to illuminate the tag as well as a modulated signal to write data to the tag using backscatter techniques. The signal that the tag reflects back to the reader will be approximately 40 dB below the power transmitted toward the tag by the reader. The tag is passive in the sense that it lacks a battery or other independent power source; it simply imposes modulation on the reflected carrier, but does not generate an intentionally radiated signal.

The technology being employed has been used for years in the United States in the non-multilateration sub-bands of the Location and Monitoring Service operating in the 902 - 928 MHz band. As such, much of the testing has been carried out based on data gathered from operation in the 902 - 928 MHz band. TransCore and its overseas customers, however, need TransCore to conduct final design verification using signals emitted in the spectrum in which the system will operate overseas, in the 865 - 875 MHz band.

**B. Proposed Testing Locations:**

TransCore proposes to conduct the majority of its tests at a remote site outside of Albuquerque, NM, known as Balloon Fiesta Park, which is distant from roads and businesses. It also seeks authorization to conduct secondary tests near its engineering and production facilities in Albuquerque, NM. No more than one tag reader operating simultaneously will be set up within 0.2 kilometers of these locations. The coordinates for the locations are as follows:

Balloon Fiesta Parkway Albuquerque, NM 87113 North Latitude: 35-12-04 West Longitude: 106-35-36 Datum: NAD83	8600 Jefferson Street, NE Albuquerque, NM 87113 Latitude: 35-10-56 West Longitude: 106-35-24 Datum: NAD83
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**C. Technical Specifications:**

<b>Frequency</b> (frequency stability will be maintained within $\pm 2.5$ PPM)	865.7 MHz 866.3 MHz 866.9 MHz 867.5 MHz
<b>Station Power</b> (power levels will comply with FCC limits relating to human exposure to radiation)	36 dBm EIRP 2.5 Watts ERP
<b>Bandwidth</b>	0.100 kHz maximum for the carrier signal; 333 kHz or 515 kHz for the modulated signal
<b>Modulation</b>	The carrier signal has no modulation; The modulated backscatter signal will carry Manchester encoded data, with a 35 dB depth of modulation
<b>Emission Designators</b>	0K10N0N for the carrier signal; 333KL1D or 515KL1D for the modulated backscatter signal
<b>Station Antennas</b>	Directional up to 11 dBi Gain (Additional information is provided below)

TransCore requests a waiver of the station identification requirements set forth in Section 5.115 of the Commission's rules, 47 C.F.R. § 5.115 (2012).

**D. Interference Protection:**

For purposes of the experimental activities conducted under the authority requested in this application, TransCore proposes to place the carrier and modulated signals and the orientation of antennas (*i.e.*, a low side fire where the antenna mounted at most 1 meter above the ground, and is horizontally illuminating the side of a vehicle as it passes by) so as to avoid causing interference to any licensee. Furthermore, operations will occur at a low power (*i.e.*, 2.5 Watts effective radiated power (“ERP”)) and frequency hop on only four frequencies with a maximum bandwidth of 515 kHz.

In addition, TransCore will restrict its operations to the minimum period needed to complete its tests. Specifically, it will conduct tests only during a limited number of days (*i.e.*, approximately 21 days during the term of the STA) and will limit the dwell time of the transmissions from the readers to when a test vehicle is near the reader. As a result, the reader will typically transmit only for approximately one second, and then discontinue operation for a minute or more until the test vehicle returns to the reader location.

TransCore recognizes that the band is used for licensed operations. As such TransCore would coordinate with these licensees and take steps to reduce the likelihood of any harmful interference. All operation will be under the control of TransCore personnel. In the event that interference is experienced, the TransCore contact named on page 4 below will have the testing shut down immediately.

**E. Antenna Information:**

TransCore will be testing a single antenna. The principal plane radiation patterns is provided on pages 5 and 6 of this Exhibit. The antenna gain is approximately 11 dBi. TransCore will control the RF power fed into the antenna to ensure that the maximum equivalent isotropically radiated power (“EIRP”) does not exceed 36 dBm.

The antennas will be no higher than six (6) meters above the ground. As such, no FAA coordination is required.

The horizon patterns are the same as the principal patterns because the antenna main beams are pointing toward the horizon.

**F. Types and Number of Units To Be Tested:**

TransCore requires one reader and up to three tags at each site to obtain valid data and present an accurate demonstration of real-world operations. The installations will be temporary fixed facilities that direct their signal toward a tag mounted on a passing vehicle that will move within several meters of the reader’s antenna.

**G. Restrictions on Operation:**

The equipment to be used in this testing is being developed solely for export outside the United States as part of a TransCore arrangement to develop a system of asset identification and location in Europe. The equipment under test will be labeled as follows:

**FCC STATEMENT**

Permission to operate this device has been granted under experimental authority issued by the Federal Communications Commission to TransCore, is strictly temporary and may be cancelled at any time. Operation is subject to the condition that it not cause harmful interference. This device has been developed solely for export outside the United States. It may not be offered for sale or use or sold for delivery in the United States unless and until the approval of the FCC has been obtained.

**H. Public Interest Statement:**

TransCore submits that issuance of special temporary authority is in the public interest, convenience, and necessity. Grant of the authority will permit TransCore to develop innovative equipment that will promote safe and efficient operations in the rail industry.

**I. Contact Information:**

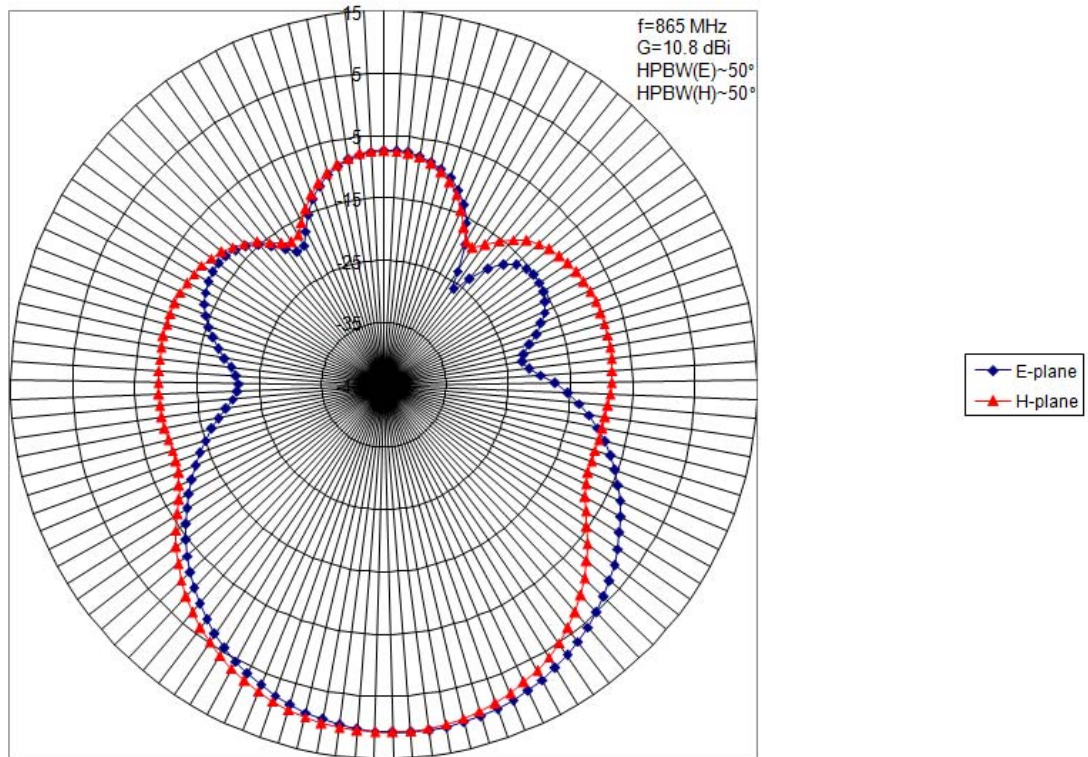
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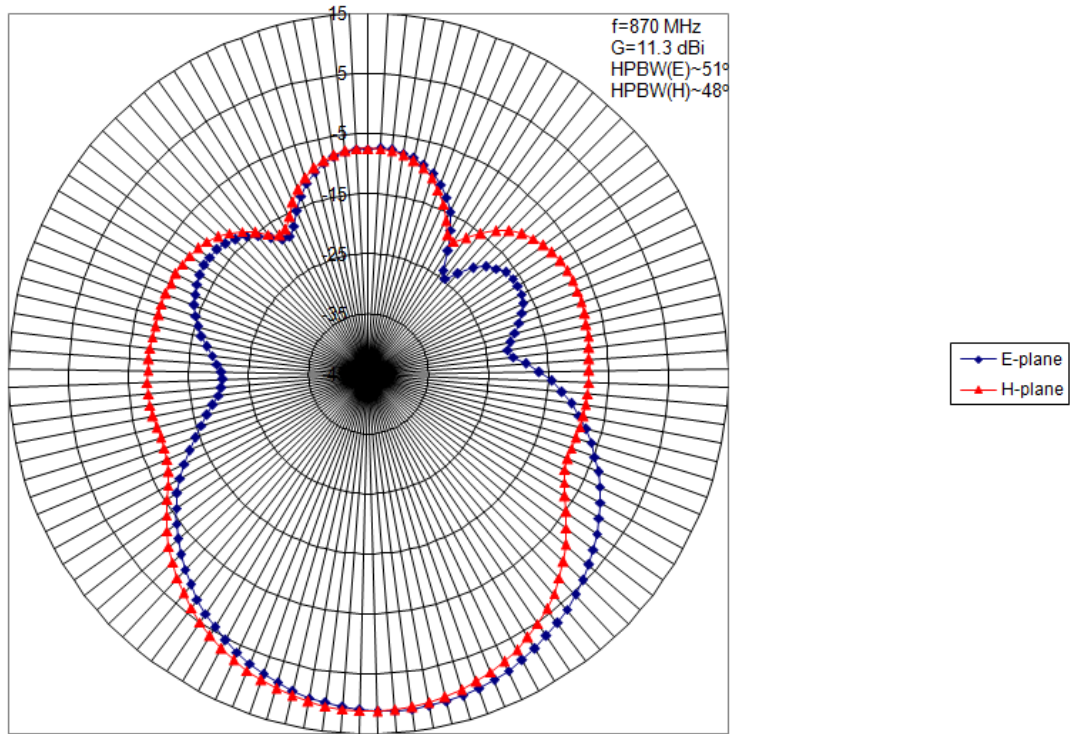
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Principal plane patterns E4 870MHz band antenna



Principal plane and horizon patterns at 865 MHz.

Principal plane patterns, E4 870MHz band Antenna



Principal plane and horizon patterns at 870 MHz.