

Immersion Entertainment, L.L.C.
Narrative Progress Report
FCC Experimental License, WB2XDN
FCC File No. 0205-EX-PL-1999

This report is provided to the Commission pursuant to Special Condition #7 incorporated in the above-referenced experimental authorization, which was issued by the Commission October 29, 1999, and which is scheduled to expire November 1, 2000. A copy of this progress report will be tendered together with an application for extension of the experimental authorization for an initial period.

I. Introduction

As per the Form 442 application for this experimental facility, Immersion Entertainment, L.L.C. is a telecommunications research and development firm which developed a proprietary system for gathering and distribution of video and audio signals for viewing by subscribers at a motorsporting or other live sporting event using Head Mounted Displays (HMDs). The system involves the combining of multiple audio signals with selected television camera video mounted at various locations during the event. The experimental authorization addresses the wireless distribution of the video and audio feeds to the subscribers in the stands at the race course or other sporting event.

II. The System Configuration

The system combines various automobile racing audio feeds, such as broadcast audio, certain Part 90 two-way radio communications concerning the event which are subject to reception and disclosure, and other inputs with the in-car camera video signal. This is made available to viewers in the stands via stereo headphones and an HMD via a single, low-power UHF television transmitter operating on unused UHF television channels, so as to enhance the event for spectators. The wireless distribution system, from the single transmitter to the subscriber's HMDs requires experimental authorization due to the use of Part 73 television channels. Within the motorsports track area, the video and audio signals to be distributed are fed into a low-power UHF television broadcast transmitter and small antenna, which transmits the combined signal to subscribers within the confines of the track. The HMD is connected to a battery-operated receiver acting as a TV tuner which de-multiplexes the signal for viewing on the HMD.

The experimental operation involves the use of a single, low-power transmitter, with a broadband, type-accepted amplifier on unused UHF television channels. The channel selected is, in each case, not less than 70 miles distant from the nearest co-channel NTSC or DTV broadcast facility, including low-power television stations and translators. Transmitter power within the racetrack area will be not more than 20 watts TPO, or 50 watts ERP. A certificated broadband amplifier is used, and the system is capable of station identification. The transmitting antenna is an omnidirectional dipole, ground-mounted near the center of the racecourse. Transmissions from any location are temporary, limited at each racecourse to the duration of the race, save for brief, necessary pre-race testing of

facilities.

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This experimental authorization, and the continuation of it, is necessary for development of the system and testing of the concept, as per Section 5.202(i) and in order to gather information preparatory to the filing of a rulemaking petition to permit permanent, licensed operation of these facilities for the benefit of fans of outdoor sporting events, especially motorsports events.

III. Results of Experiments Conducted To Date

There have been four experimental operations conducted to date, following the grant of the experimental license on October 29, 1999. These took place at Bristol Motor Speedway, Bristol, TN; Charlotte Motor Speedway, Charlotte, NC; Texas Motor Speedway, Fort Worth, TX; and Atlanta Motor Speedway, Hampton, GA. In each case, operations were coordinated in advance with the local Society of Broadcast Engineers volunteer frequency coordinators, and there were no reported instances of interference from the experimental facility to any users in the area.

The system as implemented during these experiments included the following equipment:

Amplifier Research Model 100W1000M3 Broadband Amplifier
Omnidirectional Dipole Antenna
9 Blonder Tongue Frequency Agile Modulators
1 Holland Combiner
Numerous head-mounted display optics and TV tuner devices.

In-car camera video and race video feeds were obtained from broadcast networks, typically ESPN or TNN. These were fed to the modulators and combiner and then broadcast at 10-20 Watts ERP within the confines of the track, using the broadband amplifier and omnidirectional antenna. Nine signals were transmitted on standard carrier frequencies within the prescribed bandwidth. Channels were selected to ensure a minimum of two channel separation from any licensed station within 70 miles of the venue.

Frequency coordination was maintained with all other broadcast activities at the venue to ensure that no interference was generated with other equipment within the band in use. Since there are extensive RF operations conducted at any televised motorsports activity, identification of interference-free channels was done well in advance of the race period.

Video and audio signals were received to distances of 300-400 meters without

signal degradation. Signal began to roll at greater distances or when receivers were located behind glass in skyboxes or suites. Post-test analysis of the system components indicated that the selected TV tuner had a poorly designed and insensitive sync discrimination circuit that required signal strengths in excess of -12dBmV to maintain video sync. A new receiver has recently been

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identified with a much more representative sync discriminator circuit (which holds sync to -28dBmV that will provide sufficient range at lower power (600-700 meters) to encompass the entire venue. A new headset concept has been developed and will be tested shortly.

Fan and racing organization acceptance of the receivers and the concept was very high, with great anticipation of full operational introduction of the system at all venues in which tests were conducted. Additional demonstrations at smaller venues will be ongoing beginning this month (October, 2000). Based on the results thus far, it is the intention of the licensee to prepare and file within one year a petition for rule making

It will be necessary to conduct additional tests, and to refine the system, and especially to investigate market demand for the system. In this connection, it is impossible to finalize the experimental operation without some market testing. Condition #6 of the experimental license states that no market testing is permitted, and that no service can be sold or leased. It is not the intention of the licensee to conduct extensive market testing of this system, and it is not the intention of the licensee to sell or lease the headsets. However, as stated in a letter dated November 22, 1999 from counsel for the licensee to the Chief, Experimental Licensing Branch, it is necessary in order to determine consumer interest and marketability of this unusual concept, the Licensee requires authorization to rent out the headsets for single events only, to be returned to the Licensee at the end of each event. Limited market testing is typically permitted by Section 5.202(j) of the rules, and no justification was stated for Condition #6 in the initial authorization. It is therefore requested that the condition be deleted from the renewed or extended authorization. This deletion was requested in the November 22, 1999 letter from counsel, but no response was received thereto from the Commission.

The technical contact person involved in this project continues to be Mr. Mark Wood, who can be reached at (770) 368-2488, or by e-mail at markalanwood@worldnet.att.net. Other inquiries should be addressed to communications counsel, Christopher D. Imlay, at (202) 686-9600, or by e-mail at bfitpc@aol.com.