1. Please explain in detail why the Special Temporary Authority is necessary.

Pursuant to § 5.61 of the Commission's Rules and Regulations, Rockwell Collins, Inc. (Rockwell Collins) hereby requests a Special Temporary Authorization to perform testing of a wireless networked system; it is composed of a variety of terminals capable of transmitting and receiving radio frequencies in the range of 476 MHz – 494 MHz. 752 – 794 MHz (TV channels 15 – 17, 61 – 67) at effective radiated power levels of up to 20 Watts. The terminals will be capable of transmitting and receiving data on a variety of frequencies and protocols by self organizing a set of frequencies and timing of information. This STA is to verify system operation in a live radio frequency environment to substantiate simulation and lab data.

This STA is needed to allow these tests and demonstrations to proceed using the frequency bands of unused television channels.

2. Please explain in detail the type of operation that will be performed as a result of the STA grant.

Operations under the requested STA will consist of testing a wireless networked system composed of a variety of terminals capable of transmitting and receiving radio frequencies in the range of 476 MHz – 494 MHz. 752 – 794 MHz (TV channels 15 – 17, 61 – 67) at effective radiated power levels of up to 20 Watts. The terminals will be capable of transmitting and receiving data on a variety of frequencies and protocols by self organizing a set of frequencies and timing of information.

The purpose for requesting use of vacant TV channels is to provide multiple frequencies for test and evaluation of a new wideband spread spectrum adaptive frequencies communications network. The system was developed under a combination of Rockwell Collins, Communications Electronics Command ("CECOM"), and Defense Advanced Research Project Agency ("DARPA") funding, contract number DAAB07-01-3-L533. The testing program relies on transceivers that will quickly tune between 20 and 2500 MHz, and is intended for military use only where global deployment into unknown spectral conditions and occupancy is required. The adaptive frequency selection algorithms used in this system may be constrained to any degree required by local spectrum rules, and indeed that scenario is the reason for requesting the use of multiple, dispersed TV channels. A second purpose of the adaptive frequency algorithm is to avoid interference and jamming, and to optimize communications capacity as a function of the local geophysical environment (e.g., urban, forest, mountainous, etc.) under widely varying propagation conditions. The test is to verify the capability of automatically and adaptively seeking the optimum communications channels from the frequency spectrum allocated to it, similar to HF Automatic Link Establishment ("ALE"). However, our proposed system will operate in the VHF/UHF line-of-sight (LOS) bands and propagation environment.

The system will utilize a maximum of 10 watts output power, with a wideband solid-state power amplifier designed and built by Rockwell Collins. Harmonics are attenuated a minimum of 55db. Adaptive power control is also used, so that the power is usually significantly less than 10 watts output. The antennas are omni-directional (in azimuth), with approximately 3db of gain and a pattern parallel to the horizon.

Rockwell Collins is aware of the sensitivity of broadcast service allocations and is committed to eliminating any potential interference. We are also aware that vacant "guard channels" are used between active channels to prevent co-channel television interference to relatively non-selective consumer television receivers. We are confident our proposed experimental allocations will not cause any local interference to TV reception for the following reasons:

1. We are using a maximum of 20 watts EIRP, with adaptive power control down to more typical levels of 1-2 watts. This is far less than local telecommunications television transmitters, on the order of 30-60db.
2. We have self-imposed a vacant guard-channel adjacent to each local channel in order to further avoid potential interference.
3. The harmonics of our transmissions are attenuated below any interfering levels.
4. Actual transmit time is anticipated to be approximately 25% of the operating time, scattered across multiple channels. The experimental network operates with 12 millisecond packet slots, with 0.5 to 11 milliseconds of each slot occupied by a transmitted signal depending upon the instantaneous traffic load.
5. The signal density will be low, as the modulation is a Binary Phase-Shift Key ("BPSK") spread spectrum signal with a fixed 6.4 MHz chip rate, and variable data rates from 1.6 Mbps down to 0.2 Mbps. The signal envelope is fixed at 12.8 MHz bandwidth. The second lobe is -60 dBc, employing wave-shaping.

In order to eliminate interference effects, the chief engineers of local television broadcast stations within or adjacent to the proposed transmit frequency range will be notified, in writing, of our planned testing periods. Each television station will be given an emergency cell phone number at our operating location, which can be used to advise us of any interference condition. If Rockwell Collins receives such notice, we will immediately cease operation on one or all of the operational channels, depending upon the nature of the problem.

The TV channel allocation chart for the Greater Dallas/Fort Worth are is provided in an attached pdf spreadsheet file.