Description of Experiment – 0780-EX-PL-2013
Basic Commerce and Industries, Inc.
303 Harper Drive, Moorestown, NJ 08057

a. The complete program of research and experimentation proposed including description of equipment and theory of operation.

The experimental license being applied for under 0780-EX-PL-2013 will be used for a phased-array weather radar research and development program being conducted by Basic Commerce and Industries (BCI) of Moorestown, NJ. BCI is developing a commercial weather radar system operating in the X-band (9300 MHz to 9400 MHz) for short range weather detection and investigation. The use of the phased array antenna technology will enable the radar to perform rapid volume scan updates that are not possible with parabolic dish antennas which are commonly used on weather radar systems.

The phased array antenna will transmit a pencil beam electronically steered in elevation. The phased array antenna will be rotated mechanically to steer the beam azimuth. The beamwidth of the antenna will be approximately 6 degrees in elevation and 3 degrees in azimuth. The radar will transmit an 80 watt peak transmit power pulsed waveform, modulated using linear FM or non-linear FM over the pulse duration. The maximum bandwidth of the modulated pulse will be 2 MHz. The maximum pulse repetition frequency will be 2500 Hz and the duty factor of the transmissions shall not exceed 10%.

b. The specific objectives sought to be accomplished.

The specific objectives of this experiment are:

1. Test the performance of the phased array weather radar antenna.
2. Test the performance of the radar's ability to detect and characterize local weather.
3. Test new algorithms and techniques for detecting precipitation and discriminating precipitation types.

c. How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along line not already investigated.

The use of phased array radar technology for weather radars is rapidly growing, however, there are no commercially available rapid-scan weather radars currently available. This research and development program will enable BCI to test technology being developed by the company to provide new products to the weather radar market. BCI is investing significant company capital into this radar development program and has a number of commercial and academic partners interesting in contributing or adopting the technology once fully tested. The basic electronic components for the radar have been developed and tested in the laboratory and now await testing in a live environment and thus the live radar testing is the final stage necessary to demonstrate the performance of the system.