The primary interation between matter and radiation after the lepton era was Compton scattering, which conserves the photon number. Energy released after the lepton era would result in the cosmic background radiation assuming a Bose-Einstein distribution, with a consequent depletion of photons at low frequency compared to high frequencies[10]. Radiative processes would be unable to produce sufficient photons to reestablish a Planckian distribution except at wavelengths longer than 15 cm. The result would be a distortion in the Rayleigh-Jeans region. After the universe had expanded for roughly one hundred years ($z = 10^4$) there were insufficient Compton scatterings to establish a Bose-Einstein spectrum[9]. As shown by Sunyaev and Zel'dovich[10], energy release at $z < 10^4$ which heats the intergalactic (or primordial) plasma would produce, by Compton scatterings, a distortion of the spectrum, depleting photons throughout the Rayleigh-Jeans region and creating an excess in the Wien region. The detection and measurement of distortions in the background radiation spectrum would provide data on important cosmological processes.

The goal of this experiment is to measure the low-frequency spectrum of the cosmic background radiation at several frequencies with small systematic errors.

The concept of the measurement is simple: compare the power received by an antenna directed upward at the sky with that received when the antenna is looking downward into an absolute reference cold load. The power received looking at the sky is the sum of power from the cosmic background radiation, galactaic emission, atmospheric emission, diffracted ground emission, and miscellaneous other sources. The difference in power received (sky minus cold load) plus the known power of the absolute reference cold load is the power from the sky. By carefully accounting for all radiation entering the antenna, one can determine the power received from the cosmic background radiation.

The experimental design reduces the extraneous sources of radiation as much as is practical and then determines the residual values. Atmospheric emission is reduced by roughly a factor of three compared to sea level by going to a high, dry site (University of California's White Mountain Research Station at 3800 meters, with only 0.3 cm of precipitable H_2O). The