The major topographic front in the northern part of Indian plate known as Himalayas is subdivided into several contrasting geological units separated by major tectonic contacts. Magnetotelluric (MT) investigations were conducted at 18 locations along a 120 km long north-south transect with a station interval of 5-8 km in Beas-Parbati valley of Himachal Pradesh in NW Himalayas to study the electrical structure of this region by using state-of-the-art wideband (0.001-1000 sec) magnetotelluric equipment. Two-dimensional MT inversion was used to find a resistivity model that fit the observed data. The 2-D resistivity section shows medium resistive formations, varying from 300 Ohm.m to more than 3000 Ohm.m, all along the profile. Within this medium resistive formation, relatively high resistive region (>3000 Ohm.m) is delineated below Rampur region, and this extend to depths of 40-50 km. The shallow section shows multiple low resistivity (<50 Ohm.m) formations at different locations which are very well resolved in the model as reflected in the sensitivity plot. The north dipping nature of resistive/conductive formations inferred from this study overlaps with the velocity structure delineated from seismic tomographic studies along the same profile. The spatial coincidence of low velocity with low resistivity layer indicates the presence of melts and/or aqueous fluids. The results are also discussed in terms of geodynamics and tectonics of this region.