Acenaphthene (Ace) is a three ring polycyclic aromatic hydrocarbon (PAH), which consists of naphthalene and a non-aromatic five member ring. Ace has been previously been studied by microwave spectroscopy where the rotational constants were reported[1]. New measurements from 2-8 GHz using chirped pulse-Fourier transform microwave spectroscopy (CP-FTMW) will be presented. The high sensitivity achieved enabled us to observe all $^{13}$C isotopologues in natural abundance and determine the Kraitchman substitution structure. The spectra of Ace complexed with water and H$_2^{18}$O were also recorded at this frequency range. From these spectra, we have been able to assign the complexes Ace-(H$_2$O)$_n$, $n$=1-3 and (Ace)$_2$-H$_2$O and experimentally derive the O-atom position of the H$_2$O. The Ace-(H$_2$O)$_3$ complex is especially interesting as the water aggregate forms a slightly distorted cyclic water trimer from that observed in the IR[2]. These complexes could give insight about the formation of ice grains in the interstellar medium.