We utilised BB recordings of the 30 temporal BB stations participated in the Desert2000 experiment (2000-2001) and permanent BB stations of the Israel seismic network to extract underlying 3D crustal P and S velocity structure. For this purpose we used the long term cross-correlation functions of the noise, and the Rayleigh wave group velocity dispersion curves analysis and followed in general the methodology of Bensen et al, 2007 including noise amplitude normalization in time and frequency domains, surface wave tomography and finally monte-carlo inversion of the tomography maps. The research resulted in the Rayleigh wave group velocity maps in the period range (5-20 sec) and P and S velocity maps at the depth range (5 – 15 km), bearing four main velocity anomalies. Two of them are outlined by the previous reflection-refraction profiles and body wave tomography studies, i.e. a low velocity anomaly corresponds to the area of the extremely deep (down to 14 km) sedimentary infill in the Southern Dead Sea Basin and a high velocity anomaly in the Southern Jordan corresponds to the area of the Precambrian crystalline rocks of the Nubian Shield on the flanks of the Red Sea. The two hypothetical anomalies - the high velocity zone close to the Beersheba city and low velocity anomaly in the region of Samaria-Carmel mountains - Southern Galilee need further investigations for approving and contouring. The highest contrast between the average Rayleigh wave group velocity (2.7 km/s) and the anomalies is 10-13%, comparable however to the level of noise in the data. The work was complemented by modelling of the revealed anomalies and checkerboard resolution test, which showed that these zones could be detected by the tomography studies but probably with somewhat distorted shapes and shifted positions.