

ABSTRACT**CHANNEL STATE INFORMATION REFERENCE SIGNALS**

In a wireless communication system, from available data resource elements (REs) in a subframe, REs are assigned to transmissions of a reference signal, thereby resulting in a plurality of remaining data REs. Furthermore, REs from the plurality of remaining data REs are assigned for data transmission to a wireless device in groups of a predetermined number of REs such that all assigned data REs within a group are within a predetermined number of symbols of each other in time domain and within a second predetermined number of subcarriers of each other in frequency domain, thereby resulting in at least one ungrouped RE.

Fig. 15