Algorithm 4 PTkISSJ_Part(A1Rtree $tree$, TimeInterval $[t_m, t_n]$, Integer k)

1: LeafEntrySet $leR \leftarrow tree.RangeQuery([t_m, t_n])$;
2: HashTable $XRegionHT2 \leftarrow \emptyset$
3: **for** each leaf entry le in leR **do**
4:     OTTTuple $rd1 \leftarrow OTT[le.Ptr_p]$, $rd2 \leftarrow OTT[le.Ptr_c]$;
5:     DeviceID $dev1 \leftarrow rd1.deviceID$, $dev2 \leftarrow rd2.deviceID$;
6:     ObjectID $o \leftarrow rd1.objectID$;
7:     CellSet $CSet \leftarrow D2C(dev1) \cap D2C(dev2)$;
8:     **for** each cell c in $CSet$ **do**
9:         **for** each X-region x in $CovC2X(c) \cup IntC2X(c)$ **do**
10:            TimeInterval $tI \leftarrow [t_m, t_n] \cap [le.t^{\vdash}, rd1.t_s]$;
11:            **if** tI is not null **then**
12:                $XRegionHT2[x] \leftarrow \{(o, tI)\} \cup XRegionHT2[x]$;
13:     **for** each X-region x in $CovD2X(dev1) \cup IntD2X(dev1)$ **do**
14:         TimeInterval $tI \leftarrow [t_m, t_n] \cap [rd1.t_s, le.t^{\dashv}]$;
15:         **if** tI is not null **then**
16:            $XRegionHT2[x] \leftarrow \{(o, tI)\} \cup XRegionHT2[x]$;