Algorithm 2 register (Range R, DeploymentGraph G)

deviceSet $D_c \leftarrow \emptyset$, $D_{uc} \leftarrow \emptyset$;
cellSet $C_c \leftarrow \emptyset$, $C_{uc} \leftarrow \emptyset$, $C_{ex} \leftarrow \emptyset$;
objectSet $R_c \leftarrow \emptyset$, $R_{uc} \leftarrow \emptyset$;
CriticalDeviceList(deviceID, CLASS) $cd \leftarrow \emptyset$;
Generate a new identifier $queryID$ for the query;
$D_c \leftarrow$ Devices that are covered by R;
$D_{uc} \leftarrow$ Devices that intersect with R;
$C_c \leftarrow$ Cells which are covered by R;
$C_{uc} \leftarrow$ Cells that intersect with R;
for each device d in D_c **do**
    if all the cells in $G.\ell_E^{-1}(d)$ are in C_c **then**
        Add (d, $CLASS1$) to cd;
    else if one of the cells in $G.\ell_E^{-1}(d)$ is in C_{uc} **then**
        Add (d, $CLASS2$) to cd;
for each device d in D_{uc} **do**
    Add (d, $CLASS3$) to cd;
for each edge e in G **do**
    if $(C_c \cup C_{uc}) \cap e \neq \emptyset$ AND $(C_c \cup C_{uc}) \cap e \neq (C_c \cup C_{uc})$ **then**
        if $G.\ell_E(e) \notin cd.deviceID$ **then**
            Add ($G.\ell_E(e)$, $CLASS4$) to cd;
        $C_{ex} \leftarrow C_{ex} \cup e \setminus (C_c \cup C_{uc})$;
for each edge e in G **do**
    if $C_{ex} \cap e \neq \emptyset$ **then**
        if $G.\ell_E(e) \notin cd.deviceID$ **then**
            Add ($G.\ell_E(e)$, $CLASS5$) to cd;