Geo-location databases (GLDB) standardization in the context of cognitive radio systems (CRSs)

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Different CRSs applications to rely on a common concept i.e. geolocation database

- Currently we can see 3 emerging "Cognitive Radio" applications driven by different market needs but that rely on geolocation database's principle

  - REM (Radio Environment Maps)
    - e.g. Intra-operator spectrum management, spectrum sharing on unlicensed bands or spectrum sharing on licensed bands
    - e.g. SON, Advanced RRM, dynamic refarming, optimized hand-over, …
  - TVWS (UHF TV band White Spaces (Unlicensed))
    - e.g. US/FCC, UK/OFCOM, …
    - e.g. RLAN / WLAN (fixed), MBB TDD (mobile), M2M, Rural Broadband, …
  - ASA/LSA (Licensed Shared Access (Licensed))
    - e.g. CEPT, China, …
    - e.g. Broadband PPDR, Mobile Broadband, …

- The geolocation database stores and processes geo-located measurements to provide radio environments that can be subsequently used by applications' users

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The database also needs open standards and Harmonized ENs

- Any new technology can be designed in many ways and different solutions to the same problem are common
- Solutions developed indepentently won‘t be compatible between each other and thereby might be of no added value for an industry
- Applications such as TVWS or ASA/LSA do require standardization
  - Standards (including harmonised ENs) to support the operation of CR Systems in compliance with the R&TTE directive
    - Including database aspects and any other needs relating to radio devices vacating under those new regimes
- We see already many regulatory and standardization organizations involved e.g. FCC, CEPT, ETSI, IETF, IEEE, 3GPP, …

Research has matured
e.g. Radio Environment Maps (REM)

- The REM can be seen as a set of network entities and associated protocols that trigger, perform, store and process geolocated radio measurements and network performance indicators

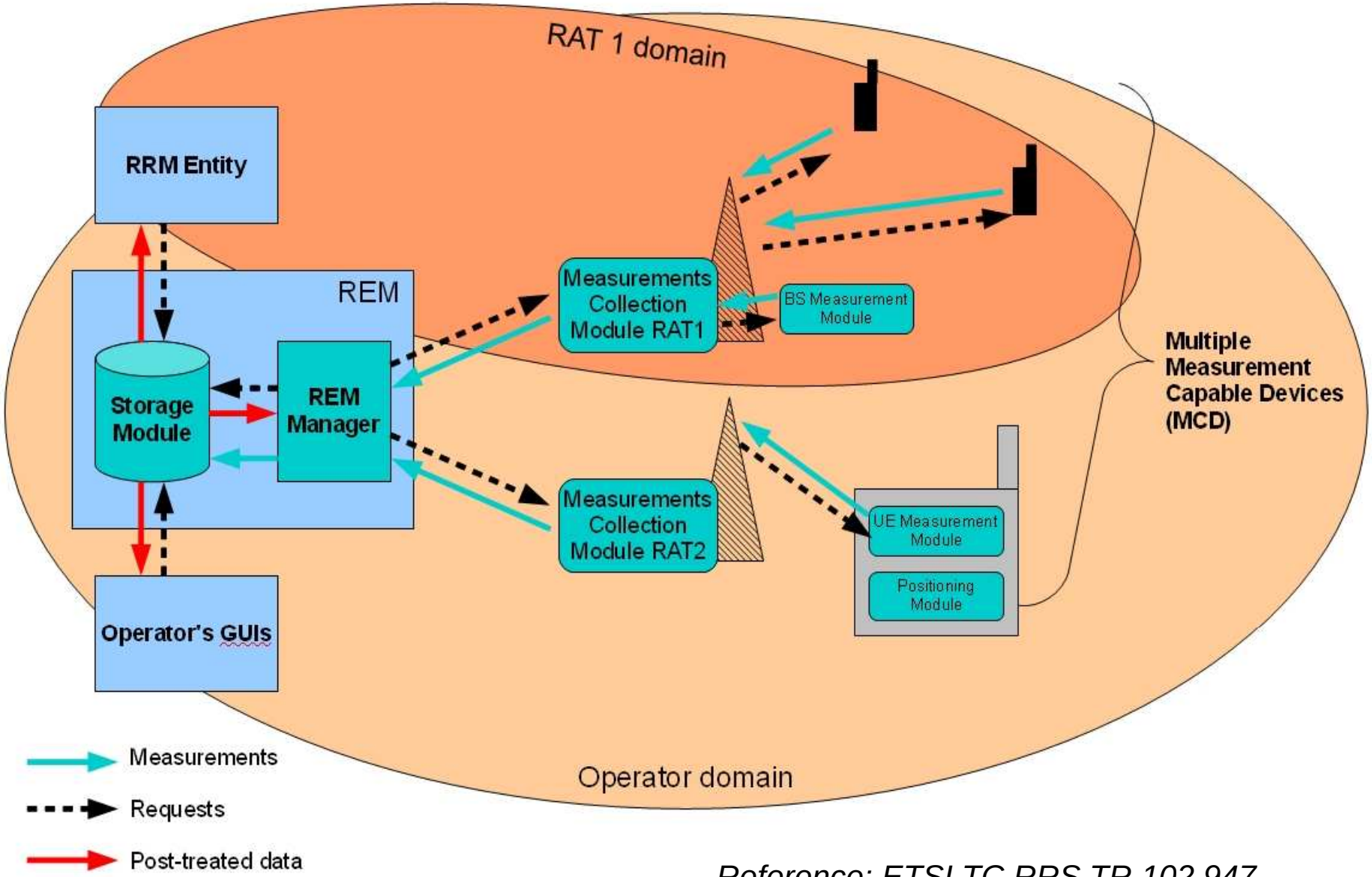
- Measurements are typically performed by user equipments, network entities or dedicated sensors

- The REM uses a dynamic database capable of tracking changes in the radio environment.

- REM is a generic concept/technology applicable to many use cases such as TVWS and ASA/LSA

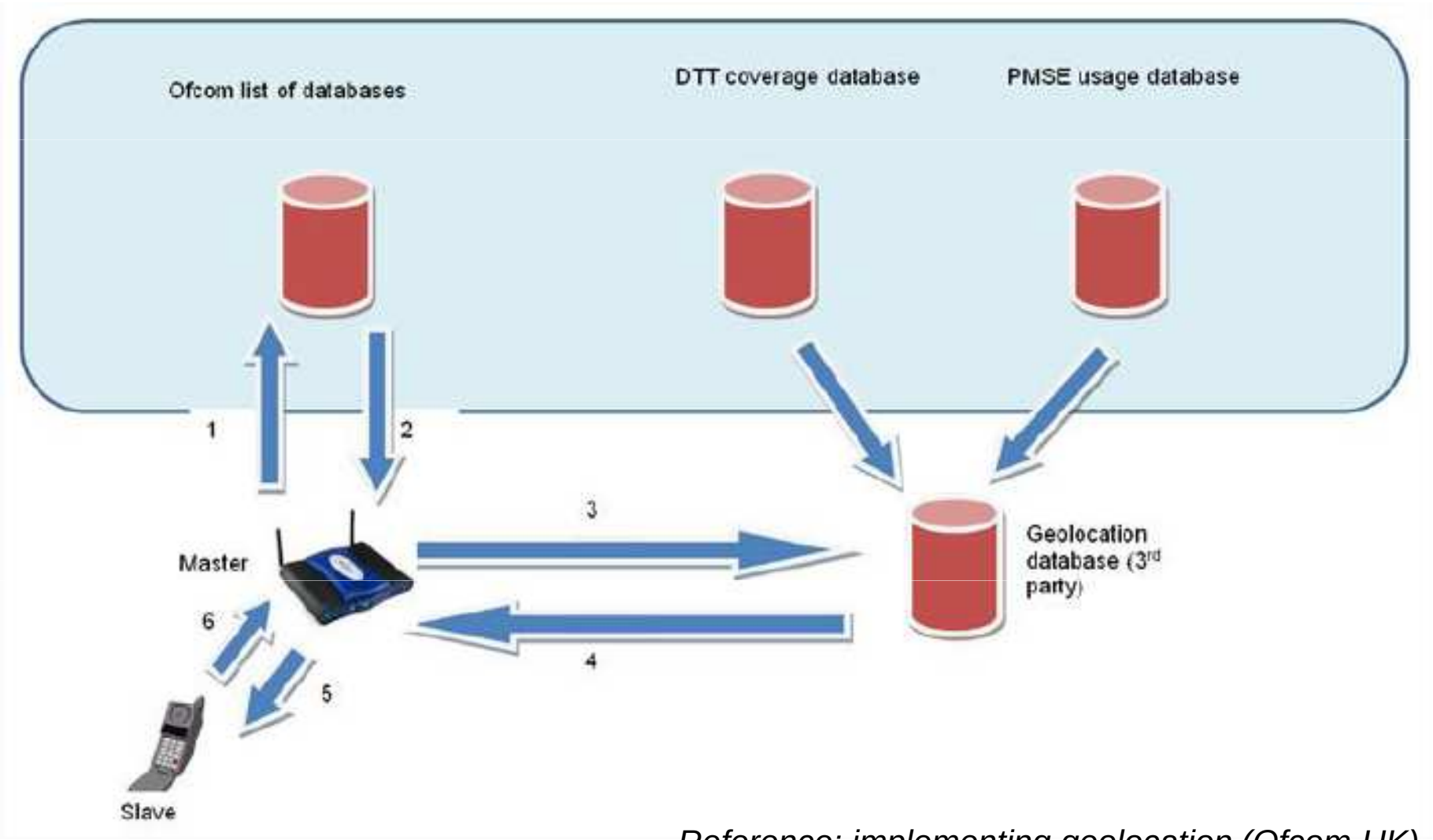
- REM has been recently further elaborated by EU FP7 FARAMIR project and is currently being standardized in ETSI TC RRS (TR 102 947)

Implementing geolocation (REM)



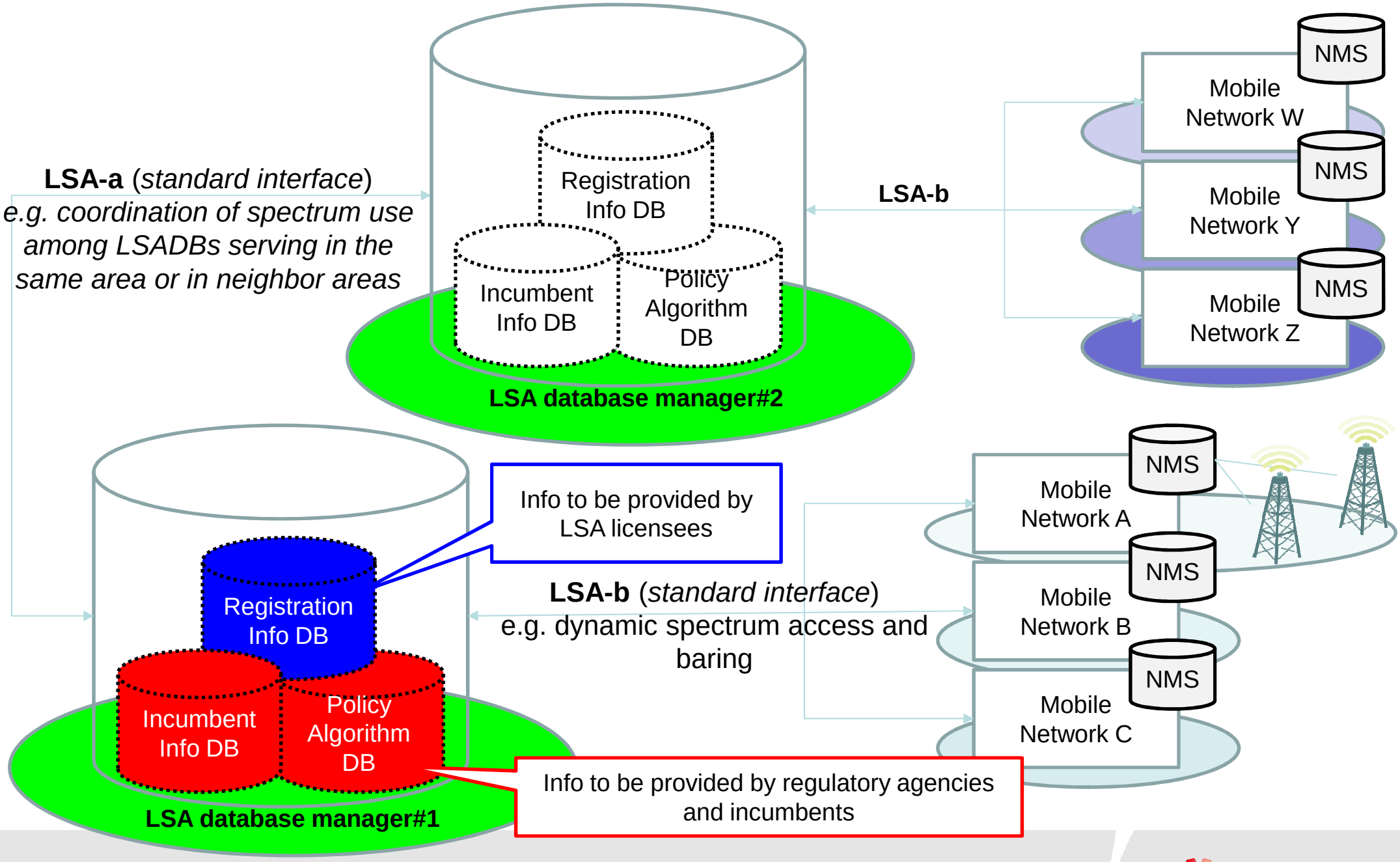
Reference: ETSI TC RRS TR 102 947

Implementing geolocation (TVWS)



Reference: implementing geolocation (Ofcom UK)

Implementing geolocation (LSA)



Reference: Huawei Technologies

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Thank You!