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BROADBAND

OPPORTUNITIES

Alameda Contra Costa Marin Monterey Napa San Benito San Francisco San Mateo Santa Clara Santa Cruz Solano Sonoma | San Jose Oakland

BayWEB: Vision

- **Subsystem of BayRICS: voice/data interoperable public safety network**
- **Two shared mutual aid assets: BayLOOP and BayWEB**
- **FCC views as “Northern California System” – sharing core and backhaul investments within CAL SIEC planning areas.**
- **Will extend footprint thru Sacramento planning area via I-80 and up I-5 into OWIN connection (coordinated thru CAL SIEC-funded IECGP and other)**

  Project Cornerstone: First US deployment of Public Safety LTE in 700MHz
- **Project Cornerstone: testing and publication of results- during Urban Shield (mid October) Test plan, exercise planning in process**
- **BTOP funding will build upon the 10 site Cornerstone project**

Standard LTE Architecture for Public Safety

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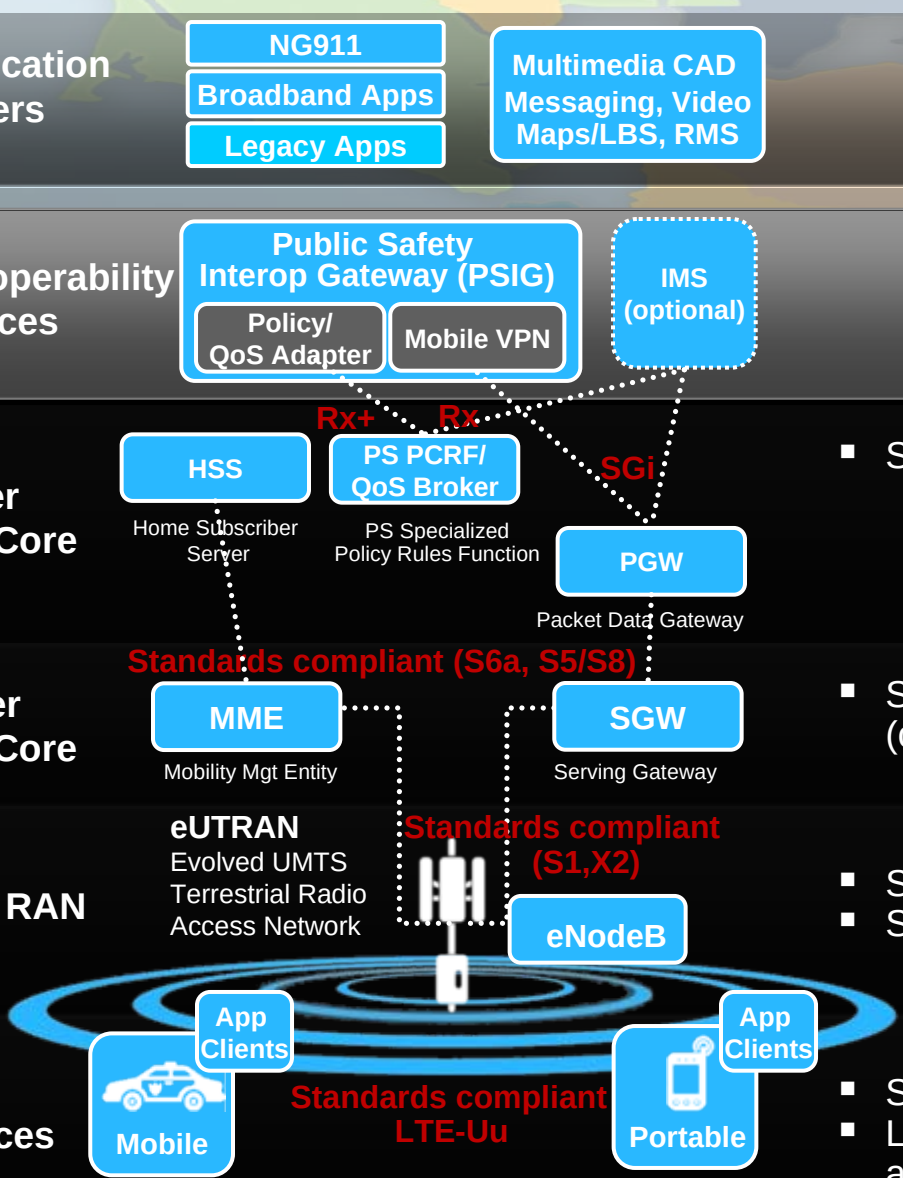
LTE STANDARDS



- Standards compliant HSS, PGW & PCRF
- Standards compliant lower core can be private (or from roaming or commercial partners)
- Standards compliant eNodeB
- Site collocation with commercial or P25
- Standard Air Interface
- LTE Smartphone Devices and downloadable application clients

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Open Standard Public Safety LTE Architecture

LMR Narrowband

ISSI

Agency 1
Agency Applications

Agency N
Agency Applications

PSIG / MVPN

Rx+/SGi

Regional IMS Applications

Regional IMS

Rx/SGi

Regional Public Safety LTE

Network Elements:
HSS, PCRF, PGW (opt)

Common Functions:
Consistent subscription, authorization, QoS and policy

Regional Applications

S6a/S5

S6a/S8

Standard LTE Roaming interfaces

S6a/S8

Standard LTE Roaming interfaces

S6a/S8

Home Regional PS LTE

Network Elements:
SGW, MME

Visited Regional PS LTE

Network Elements:
SGW, MME

Carrier 1 LTE

Network Elements:
SGW, MME

Carrier 2 LTE

Network Elements:
SGW, MME

PSST Spectrum

PSST Spectrum

Commercial Spectrum

Commercial Spectrum

PS devices

Roaming

Grant Application Summary

- **Project cost**
  - Grant amount requested from NTIA $50.6M
  - Match $21.8M
  - Competitively selected private partner, Motorola, serves as applicant:
  - Total project cost: $72.4M
  - NTIA Notification 8/18/2010

  Key components
  - Public Safety LTE network
  - Leverages, where possible, public assets (sites, towers, backhaul, space, backup power)
  - Owned, managed CORE
    - 193 sites
    - DL peak data rates of 6.5 Mbps
    - UL peak data rates of 2.5 Mbps
    - UL edge data rates of 200 Kbps

  - Public broadband access network (5.2, 5.4 GHz)
    - 193 public access points of presence (POP)
    - 160 Mbps aggregate bandwidth at each POP
    - Unlicensed spectrum for open access
    - WISP partners (7)

Design Assumptions

- **12,000 concurrent users on the LTE system based on data profile**
- **Uniform user distribution across each county**
- **Sites have antenna space for one or more PTP links**
- **LOS exists between sites**
- **Certain sites can be used as aggregation points**
  - Requires multiple PTP links at this site
- **BayLoop sites can act as aggregation point for up to 6 other sites**
- **Bay RICS Policy Group will provide licenses for:**
  - 700 MHz PSST license for LTE network
- **Bay RICS Policy Group will provide “installation ready” sites for deployment**
- **Physical space is available at each site to accommodate LTE equipment**
- **Physical space is available at the towers for all antennae**
- **Appropriate power is available for each component at the sites**
- **Public access network backhaul is completely separate from LTE network**
  - No backhaul is shared
  - No fiber or BayLoop access is required

BAY AREA UASI PROGRAM

marin sonoma napa solano contra costa alameda santa clara santa cruz san mateo san francisco | san jose oakland

Backhaul Design

- **San Francisco**
  - Total sites: 19
  - Existing fiber sites: 11 (includes BayLoop sites)
  - Unqualified sites: 8
- **San Mateo**
  - Total sites: 30
  - Existing fiber site: 1
  - Existing BayLoop sites: 3
  - Unqualified sites: 26
- **Santa Cruz**
  - Total sites: 4
  - Unqualified sites: 4
- **Santa Clara**
  - Total sites: 29
  - Existing fiber sites: 5
  - Unqualified sites: 24
- **Alameda County**
  - Total sites: 47
  - Existing fiber sites: 9
  - Existing BayLoop sites: 1
  - Unqualified sites: 37
- **Contra Costa**
  - Total sites: 18
  - Fiber sites: 10
  - Unqualified sites: 8
- **Solano**
  - Total sites: 6
  - BayLoop sites: 2
  - Unqualified sites: 4
- **Napa**
  - Total sites: 4
  - BayLoop sites: 1
  - Unqualified sites: 3
- **Sonoma**
  - Total sites: 13
  - BayLoop sites: 1
  - Unqualified sites: 12
- **Marin**
  - Total sites: 23
  - BayLoop sites: 2
  - Unqualified sites: 21

Unqualified = means that backhaul is needed and added to BTOP budget

BTOP application

- BOOM Model for performance period
- Directed by BayRICS Policy Group
- Recommended CIO Advisory Group
- Use Interoperability Working Group to develop “homework” or products to direct system management
- Assets transfer after performance period (agreement to be negotiated during performance period)

Activities

- **Developing MOU for participants in BayWEB**
- **Discussion regionally: Who should sit on Policy Group?**
- **Discussion regionally: Who should sit on CIO Advisory Group?**

Revenue

- **Any revenue generated must be reinvested into BayWEB during the Grant Performance Period.**

- **Policy decisions around that reinvestment.**
  - Revenue may be reinvested to provide additional sites for improved coverage (underground, in building)

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Cornerstone

The Pilot will purchase the Network Core, and 10 Sites to be used for demonstration and testing of 700 MHz spectrum, 4G LTE Technology with Motorola.

Alameda County-CORE and 1 Site (Oakland)

Contra Costa County- 3 Sites

San Francisco- 4 Sites

Sunnyvale- 1 Site

City of Santa Clara - 1 Site

*****we are reviewing the possibility of moving 1 SF site to Oakland.**

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Cornerstone

The System design includes 300 USB dongle modems (200 mW) for users, with an additional 30 USB dongles provisioned for spares. The System is modeled to provide in-car coverage using a USB dongle without external antenna for users with an average edge data rate up to 256 Kbps in the uplink direction and an average edge data rate of 500 Kbps in the downlink direction. This design was based on the 700 MHz PSST spectrum (5+5). These system parameters are derived using a generic traffic model from Motorola, which is considered representative of typical public safety usage with 1 Mbytes of data transferred in the uplink per user and 3 Mbytes of data transferred in the downlink per user during the busiest hour of a shift.

Questions?

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