May 2016

MOTOROLA SOLUTIONS

SSPS Smart Public Safety Solutions

WHAT IS LONG TERM EVOLUTION?

4G mobile broadband technology

Developed by mobile telephony industry (3GPP)

Enables multimedia applications (data, video and voice)

Chosen as the technology deployed in PSST (Public Safety Spectrum Trust) for private public safety use in North America

Economies of scale from commercial carrier deployments

High uplink (~25 Mbps) and downlink (~55 Mbps) throughputs per sector (10 MHz)

Coverage ranges from 2 – 80 sq. miles / 5 – 200 sq Km (dependent on throughput, antenna height and terrain)

MOTOROLA PUBLIC SAFETY

A STANDARDS-BASED APPROACH

MOTOROLA SOLUTIONS | **ERICSSON**

ERICSSON LEADERSHIP

LTE standards leading contributor

Leading provider of LTE networks

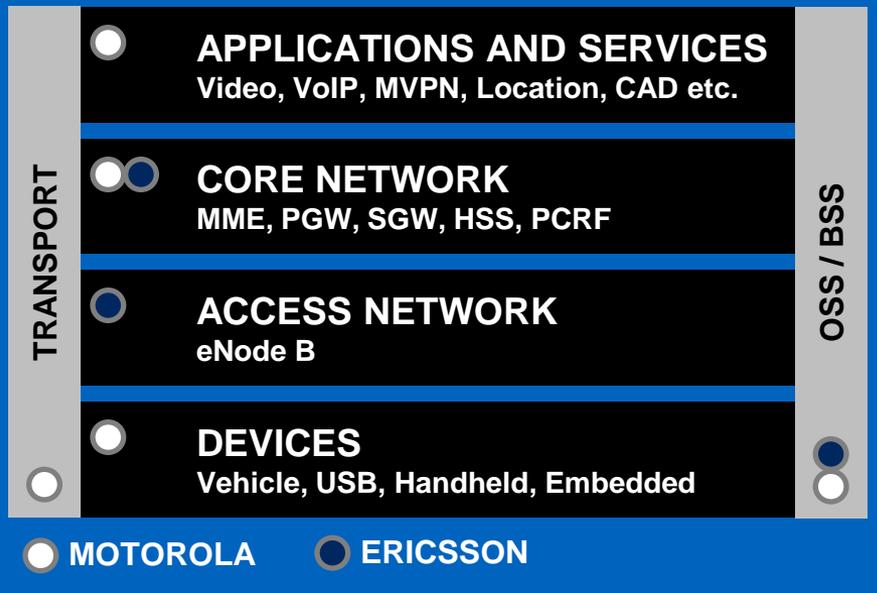**Leading LTE device certification lab**

SUPERIOR PERFORMANCE

Network reliability and stability

Uplink and downlink data rates

End to end latency

DEPLOYMENT EXPERTS

MOTOROLA LTE STANDARDS-COMPLIANT ARCHITECTURE

TRANSPORT

APPLICATIONS AND SERVICES
Video, VoIP, MVPN, Location, CAD etc.

CORE NETWORK
MME, PGW, SGW, HSS, PCRF

ACCESS NETWORK
eNode B

DEVICES
Vehicle, USB, Handheld, Embedded

OSS / BSS

○ **MOTOROLA**   ● **ERICSSON**

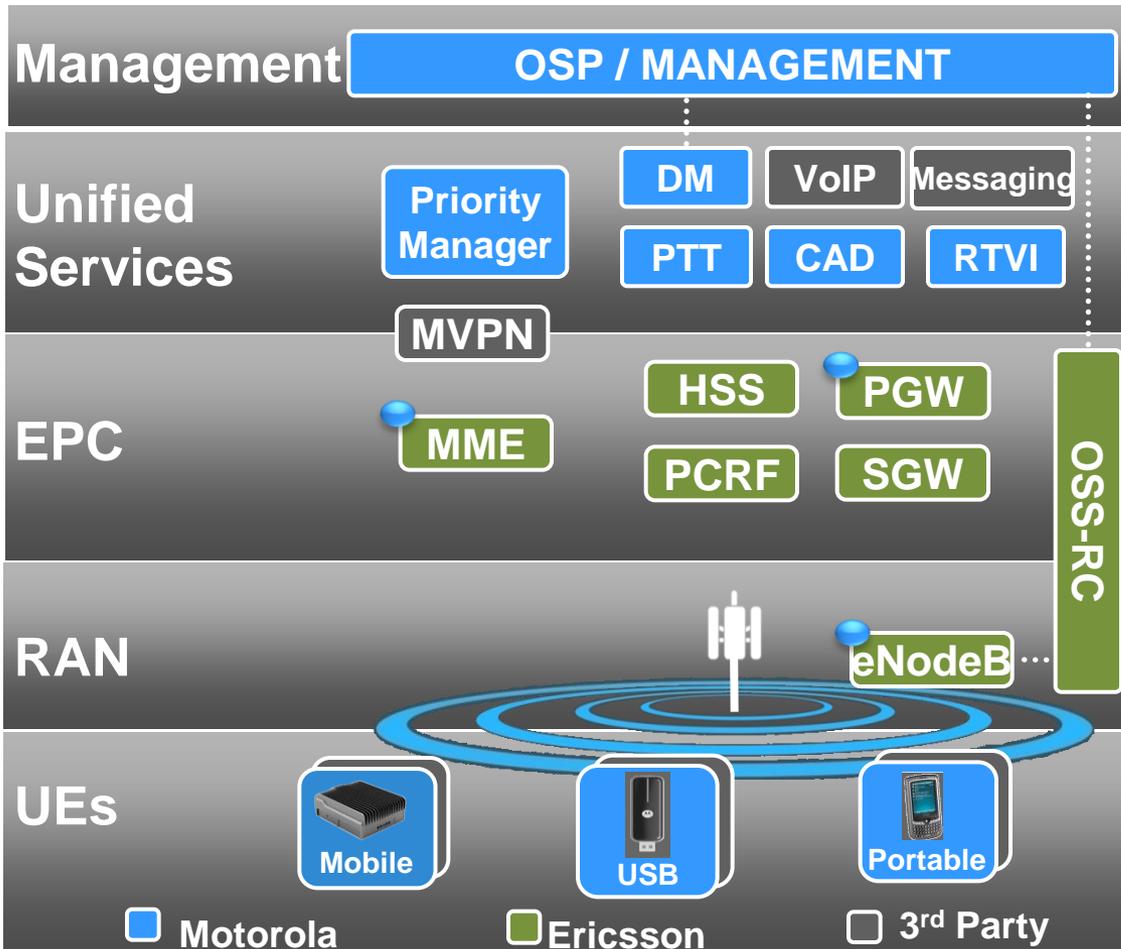| 135	1000	2B	750M
YEARS SERVING THE TELECOM MARKET	NETWORKS OPERATING IN 180 COUNTRIES	SUBSCRIBERS SUPPORTED ON ERICSSON NETWORKS	SUBSCRIBERS MANAGED BY ERICSSON NETWORKS

PS LTE ARCHITECTURE

Managment/Unified Services

- PTT- Push To Talk
- RTVI- Real Time Video
- CAD – Computer Aided Dispatch

Virtualised Evolved Packet Core (EPC) containing:

- MME Mobility Management Entity
- HSS – Home Subscriber Server
- PGW – Packet Gateway
- SGW – Serving Gateway
- Etc...

Radio Access Network - RAN

- 10MHz 3GPP Band 28
- 2x MIMO

UEs - User Device

- Portable
- Vichular
- 3° Party Device

PUBLIC SAFETY vs CARRIER NETWORK

	CARRIER MODEL	**PUBLIC SAFETY MODEL**
BUSINESS OBJECTIVE	**Revenue growth**	**Protect life and property**
CAPACITY DESIGN	**For "typical day"** (PREDICTABLE)	**For "worst day"** (UNPREDICTABLE)
COVERAGE DESIGN	**Based on population density** (PREDICTABLE)	**Based on life and property that need protection** (UNPREDICTABLE)
COMMUNICATIONS DESIGN	**One-to-one communications**	**One-to-many communications**
BROADBAND DATA NEED	**Internet access to centralized internet connections** (HEAVY DOWNLOAD)	**Traffic to agency enterprise network…not thru Internet** (HEAVY UPLOAD & DOWNLOAD APPS)
SUBSCRIBER DATA INFO	**Owned by Carrier**	**Owned by Agencies**
SERVICE PRIORITY DIFFERENTIATION	**Minimal differentiation - Subscription and application level**	**Significant differentiation - Role and incident level** (VERY DYNAMIC)

BUILT FOR PUBLIC SAFETY

PUBLIC SAFETY NEEDS MORE THAN STANDARDS

QoS & Prioritization	Prioritized services for the most critical incidents	Dynamically prioritized data flows and communications
Security	Enhanced security and data integrity	Mobile VPN security
Applications	Control room applications designed for LTE	CAD, voice and bandwidth optimized real-time video
LMR Interop	P25 and Tetra two-way radio interactions	Push-to-talk coordination across LTE, P25 and Tetra
Devices	Public safety designed user devices	Hardened and ruggedized user devices

SECURITY

LTE STANDARD COMPLIANT & ENHANCED

Over The Air LTE and LTE system encryption – using 3GPP standard defined security

Enhanced end to end application encryption whilst maintaining QoS

Firewall security and Intrusion Detection Systems (IDS) are deployed at both core and application networks
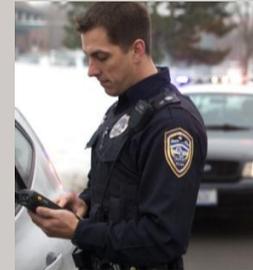
APPLICATIONS

APPLICATIONS OPTIMISED FOR LTE

RTVI: Real Time Video Intelligence

Provides the capability to transmit and receive high quality, low latency video content dynamically optimized to improve the ability to monitor, prepare, and respond to incidents

CAD (Computer Aided Dispatch), license plate search, finger print identification, report writing data applications enable integrated command & control and workforce mobility

Data Applications

Push-To-Talk & VoIP

PTT voice to supplement mission critical voice and provide interoperability to current LMR (Tetra, Astro) networks

LMR INTEROPERABILITY

UNIFIED NETWORK SERVICES

LTE to LMR (Land Mobile Radio) networks including Tetra and Astro P25, Push-To-Talk individual voice calls and group calls supported

GPS information from Tetra and LTE devices are combined enabling the locations of both types of devices to be shown on a single map client
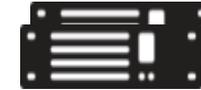
SMS messaging between LTE and LMR clients

Presence, status and alert information shared from both LMR and LTE devices
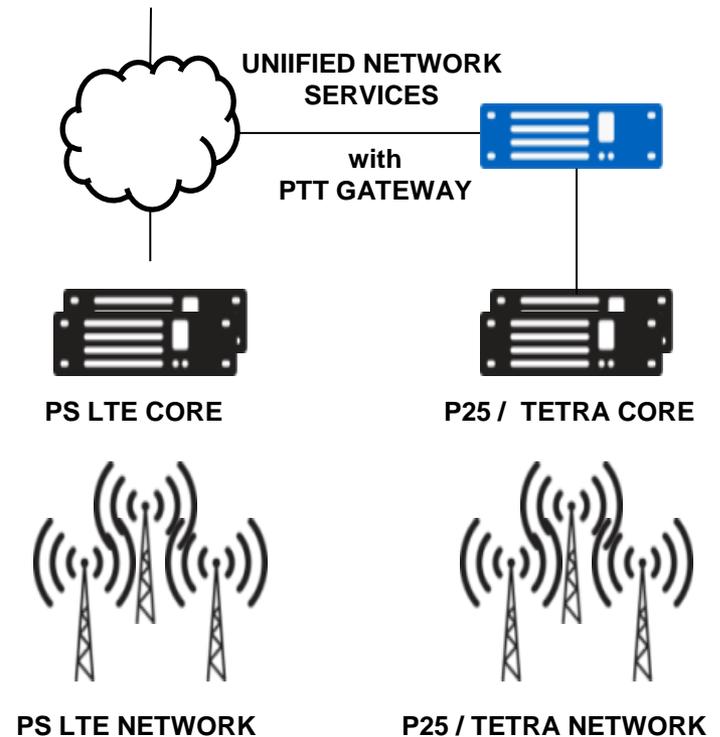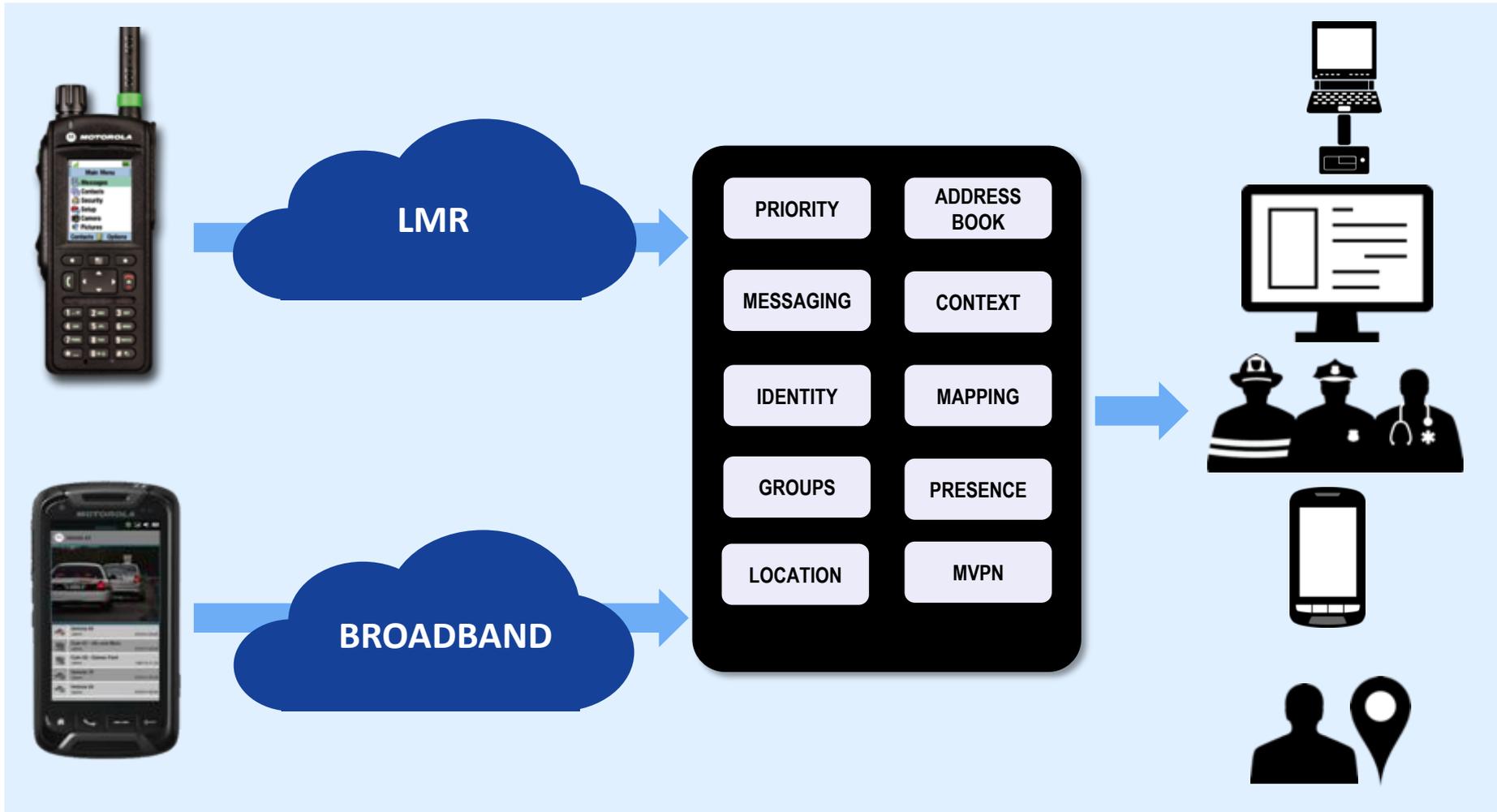
LTE APPLICATIONS & SERVICES

MVPN

APPLICATIONS

UNIIFIED NETWORK SERVICES

with PTT GATEWAY

PS LTE CORE

P25 / TETRA CORE

PS LTE NETWORK

P25 / TETRA NETWORK

MOTOROLA MIDDLEWARE

Scalable infrastructure

Ultra Portable	Deployable	"FIXED VIRTUAL CORE"	"FIXED CLASSIC CORE"
BODY WORN / MAN PACK AERIAL / DRONE / BALLOON IN-VEHICLE	Tactical Case On Wheels (COW, SOW) IN-VEHICLE		
	vEPC and Main Remote eNodeB	MME HSS PCRF EPG	MME HSS PCRF EPG
1-100	101 - 2,000	2001 – 1 M	5,000 – 1 M
	Available now	Q1 2017	Available now
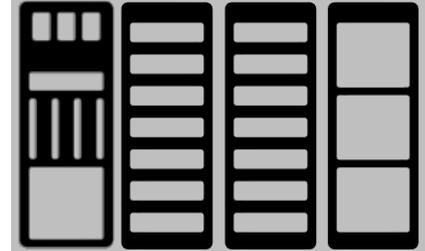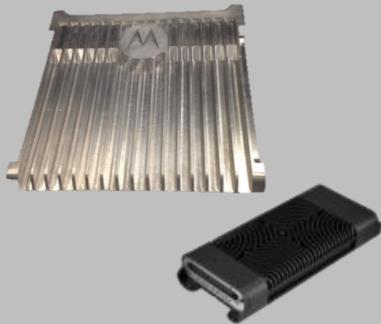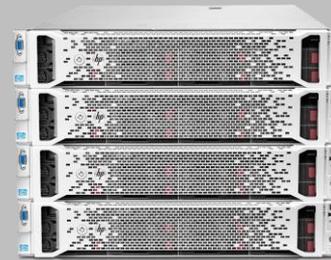
LEX L10 International

Key Features

- Motorola's leading Public Safety optimized user interface (MHx)
- Best in class audio & PTT experience
    - Dedicated large PTT button
    - Dual 1W front facing speakers
    - 3 microphone noise cancellation
- Best in class security
    - Available CRYPTR Micro, FIPS 140-2 Level 3
    - Secure boot & hardened Android
- MPP Secure pairing for collaboration features with Motorola LMR handhelds

Key Specifications

- Battery life – 10 hours (20 hrs with xcap battery)
- IP67 / MIL-810G (4' to concrete)
- Bright 4.7" HD display with glove & water touch
- Wi-Fi, BT, GPS
- Quad core 2.3GHz processor
- 8 LTE bands (3, 4, 5, 7, 20, 26, 28) 5 UMTS bands (1, 2, 4, 5, 8) and Quad band GSM

LEX L10 & TETRA PORTABLES

RADIO REMOTE CONTROL IS AN ADVANCED USER INTERFACE FOR TETRA & APX RADIOS

Radio Remote Control App

+

Bluetooth

- MTP3000 & MTP6000

- Manage radio:
  - Talk Groups
  - Volume

- Activate Emergency

- Monitor radio:
  - Signal Strength
  - Battery Life

- Ideal for
  - Covert operations
  - Surveillance

VEHICLE SUBSCRIBER MODEM VML 750

- Combined LTE, Wi-Fi & GPS antenna

RUGGEDIZED VEHICLE MODEM

- MIL-810G
- IP66
- Designed and tested for continuous vehicle use
- Vibration and mechanical shock rated
- Operating Temperature -30°C to +60°C

MULTIPLE RADIO TECHNOLOGIES

- 4G LTE Bands 3, 7, 20, 26, 28
- 3G
- Dual SIM support
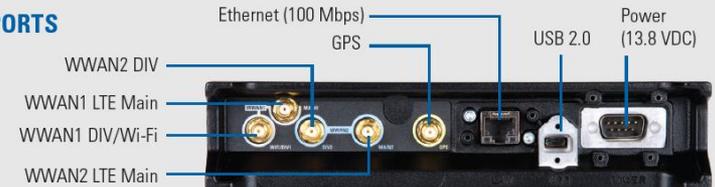- WiFi 802.11 b/g/n – up to 32 users
- Integrated GPS

OTHER

- External roof-mounted diversity antennas
- Ethernet 10/100Mbps
- USB 2.0 Interface

PORTS

- Ethernet (100 Mbps)
- GPS
- USB 2.0
- Power (13.8 VDC)
- WWAN2 DIV
- WWAN1 LTE Main
- WWAN1 DIV/Wi-Fi
- WWAN2 LTE Main

Note: Available Q4 16

Si SERIES FUNCTIONALITY

BLUETOOTH
To serve as a hub for
Personal Area Network (PAN) ecosystem

WiFi
OTA programming or uploading content

LTE (Si700)
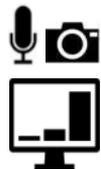For streaming hi-res video and
fast database lookups

PAN SENSORS
Connections to heart rate monitors, gas
sensors, equipment sensors, indoor
location

COMMANDCENTRAL VAULT
Digital Evidence Management System
supporting Video and Voice Recording

BUILT IN GPS (Si700)
For location, mapping and geo-tagging

VOICE COMMANDS
For easy Talkgroup change or basic
commands

APPLICATION SUPPORT
Android Operating System

VOICE RECORDING
For witness statements and note taking

BODY WORN CAMERA
Camera for recording video plus voice and
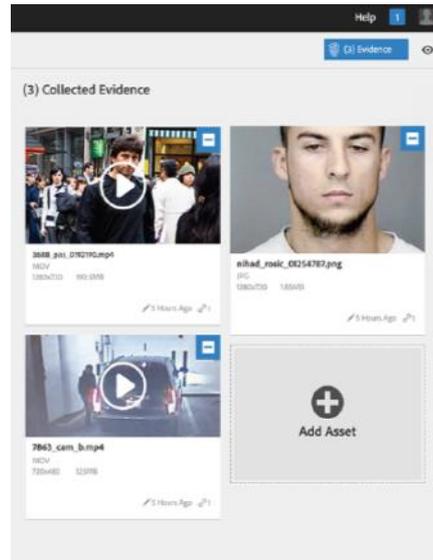taking still images

BODY-WORN VIDEO PROGRAM: KEY ELEMENTS

Camera/Capture Device

Accessories

Content Management & Workflow & Storage

Policies and Procedures

Numerous Considerations Must Be Made In Defining And Deploying An Effective System For The Long-term

REDEFINING BODY WORN VIDEO PROGRAMS

A COMPLETE, END-TO-END DIGITAL EVIDENCE MANAGEMENT SOLUTION

**Si Series
Video Speaker
Microphone**

**CommandCentral Vault
Digital Evidence Management
Software**

MOTOROLA PSLTE REFERENCES

MIDDLE EAST
CUSTOMER

PRIME CONTRACTOR

PRIVATE NETWORK
OFFERING VOICE OVER LTE

DEVICES & SECURITY

LA-RICS
CALIFORNIA

PRIME CONTRACTOR

PRIVATE LTE NETWORK &
SERVE 80+ AGENCIES

DEVICES & APPLICATIONS

MIDDLE EAST
CUSTOMER

PRIME CONTRACTOR

NATIONWIDE LTE NETWORK

DEPLOYMENT, INTEGRATION,
& END-TO-END NETWORK
MANAGEMENT

THANK YOU…