Harris LTE
Capabilities Portfolio
Customized solutions to meet mission-critical needs

Harris delivers end-to-end Long-Term Evolution (LTE) broadband solutions, providing the tools to ensure that mission-critical video, voice and data are available through secure, private and prioritized connections. Building on a base of cellular technology, Harris LTE provides enhanced data capabilities, secure wireless transmissions, and prioritized access control to manage network resources under high traffic conditions. Harris LTE provides crucial first response interoperability across broadband, cellular carrier, and Land Mobile Radio (LMR) communications.

Comprehensive System Design

For each LTE customer, Harris custom designs the mission-critical network, assuring that communication is available at the right time, in the right place, and on the right device. Harris’ designs leverage existing assets where feasible in order to reduce costs, and can incorporate a hybrid of technologies, including terrestrial LTE, mobile/deployable LTE, WiFi, along with legacy and future LMR.

Our complete designs offer:

Optimized RF footprint that addresses coverage and capacity requirements, designed using state-of-the-art commercial tools such as Mentum Planet. The result is an efficient Radio Access Network (RAN) design.

Evolved Packet Core (EPC) subsystems incorporated into a high-availability and/or geo-redundant design, as required. The Harris design ensures that the LTE regional core elements—Mobility Management Entity (MME), Serving Gateway (S-GW), and Packet Data Network Gateway (P-GW)—are sized to cost effectively support the full capacity of the cell sites served by these elements.

Optimized backhaul network which incorporate reliable fiber optic, microwave and satellite transport. We strive to ensure that cell site backhaul links do not throttle available cell capacity, particularly in cell sites that are expected to carry significant user load. Optimizing last-mile connectivity is key to achieving a balance between capacity and cost, both up-front and recurring.

A robust security architecture based on a multi-layered security approach, beginning with the LTE standardized security layers in the RAN and EPC. Technologies such as Virtual Private Networks, IPSec, and X.509 security certificates, as well as Security Gateway(s) in the core network are used to further secure the subscriber traffic.

Key Performance Indicators (KPIs) and System Acceptance Test Plan

As part of our network design activities, Harris will identify the operational parameters and thresholds necessary to support the public safety user experience. Those KPIs form the basis of the system test plan which ensures the deployed network provides the highest level of operational performance.

These KPIs are quantifiable and measurable facets of the user experience (network availability, network accessibility, delivered bandwidth, handover/roaming call continuity, etc.) which determine the user satisfaction with the network, and verify that the operator of the network is meeting service level agreements. The system acceptance test plan incorporates drive testing for KPIs, as well as network optimization based on the results of the drive testing and operational monitoring of the network.
As an implementation service, Harris provides the integration expertise and project management to ensure that the LTE network provides the level of customer relationship management necessary to ensure network acceptance by demanding public safety customers. To facilitate this, Harris can either provide OSS/BSS solutions for LTE networks, or provide the integration support necessary to ensure that Harris’ provided LTE network infrastructure integrates into existing customer-supplied back-office systems. The Harris LTE network infrastructure is commercial off-the-shelf technology which has been widely deployed in commercial cellular networks, and, as a result, supports industry-standard interfaces for the subscriber data repositories and LTE call data records to integrate with third party tools for subscriber provisioning, billing, customer care and revenue optimization.

**System Integration and Deployment**

With more than 80 years of experience, Harris has a well-practiced methodology for system integration and deployment.

**System Design and Review:** The project team will assemble information obtained from the customer, system requirement preliminary designs, and proposed equipment sites to obtain project scope agreement through a Customer Design Review.

**Site Development:** Based on site surveys of existing and proposed radio sites, the project team will develop a site plan that includes full site development (where required) for the installation of new towers, shelters, generators and fencing. Harris has a vast amount of experience building out large systems such as the State of Florida with more than 190 sites, and the Province of Alberta with more than 300 sites.

**Antenna Installation:** Experienced tower crews will install the LTE antenna system, microwave antenna system (as required), coaxial cables, and associated hardware in accordance with industry standards at the RF sites. After installation, the RF transmission lines and antennas will be swept to ensure proper performance.

**System Installation:** The Harris team will install the LTE RAN equipment at the locations identified in the system design and integrate with the proposed backhaul that may include fiber, microwave, satellite or leased MPLS links. Harris will connect the LTE RAN sites to the LTE EPC via the designed backhaul plan.

**System Optimization:** Following installation of infrastructure equipment, Harris engineers and technicians will begin system setup. The backhaul system will first be verified to be operational and meets required specifications. The LTE EPC will be verified to be operational. The LTE RAN sites will be programmed and verified as operational in preparation for acceptance testing. The Harris team will then optimize the system performance by tuning the network parameters.

**LTE User Equipment Device Integration:** The project team will coordinate the distribution of LTE handheld, vehicular, and fixed user equipment according to the installation plan. All installations will entail close coordination with the customer and users to minimize operational disruptions.

**Application Integration:** Harris will integrate IP-based applications selected by the customer and will test these applications with the deployed LTE user devices. A variety of applications can be deployed per the customer’s requirements, such as PTT over broadband, video over broadband, biometrics, location/GPS, and more.

**Acceptance Testing:** Systems acceptance testing will be performed according to the agreed upon System Acceptance Test Plan. System acceptance includes site inspections, functional test procedures and coverage test procedures.
Process-Driven Program Management

Based on standards set by the Project Management Body of Knowledge, as well as specific International Organization for Standardization 9001 processes, the key components of Harris’ reliable implementation include:

**Risk Management.** The PM will perform proactive and continuing assessments to identify, mitigate, control and manage risk throughout the project to ensure success.

**Scheduling.** Harris uses dedicated personnel and a scalable team approach to accelerate/decelerate in response to changing requirements.

**Continuity of Key Personnel.** Key personnel are assigned for the entire implementation duration, improving efficiencies and ensuring success.

**Secure, dedicated SharePoint web portal.** Team members have secure access to up-to-date Program information and technical data.

**Corporate Resources.** Harris leverages its capabilities and experience with data communications, information assurance/cybersecurity, contracts, logistics, quality and training.

Network Maintenance and Support

Harris offers a dedicated, trained staff to provide Operational Management and Physical Maintenance of the LTE network.

Proper network operational management requires a dedicated staff, correctly trained to use cutting-edge OSS/BSS tools and processes. Harris can provide constant monitoring of overall network conditions to ensure that all components are operating as expected.

Physical maintenance of the equipment includes periodic updates, tuning, and testing to maximize performance and minimize outages. Physical maintenance of the network requires highly trained technicians for both routine site maintenance, and service responses to catastrophic events. Harris can provide service and response plans for both types of service needs.
A Solution to Meet Every Need

Evolved Packet Core (EPC)

Harris has partnered with leading LTE OEM’s – in particular Nokia and Cisco Systems – to develop optimized EPCs for public safety networks. As private networks, the architecture of the EPC needs to provide nationwide roaming and communication; centralized network management, security and administration; and local control and data breakout. The embodiment of this architecture is geographically-redundant nationwide Network Operations Centers and Security Operations Centers that operate subscriber data repositories, and house the master Home Subscriber Server (HSS)/Policy and Changing Rules Function (PCRF), network management infrastructure, call data/customer billing databases, and security management components. The key differentiator between private LTE networks and commercial service providers is the regional MMEs, S-GWs and P-GWs for local breakout which enable regional public safety agencies to control the data flow within their localities.

Radio Access Network (RAN)

Harris provides a variety of configurations for LTE base stations, including traditional macro cells, small cells, or heterogeneous networks with a mix of both. Harris’ macro cell solution is Nokia’s Flexi Multiradio 10 BTS (Base Transceiver System or eNodeB), which is a high-capacity, multi-sector, LTE Advanced-capable BTS. Harris also utilizes the NEC MB4300 which is a compact single sector BTS for localized applications and mobile deployables.

The architecture supports 3GPP functions and features in 3GPP release 10 and beyond, providing a future proof platform for advanced radio systems. Flexi Multiradio 10 offers considerable savings in terms of site requirements, enabling a zero footprint installation option, reduced power consumption and battery backup. The Flexi RF Module and System Module can be mounted on a tower, pole, wall or rooftop. In addition to macro sites, Harris also provides micro-cell based coverage solutions. Small cells are particularly appropriate when trying to improve LTE coverage and capacity within a geographically constrained area, such as a government building or campus.

Deployable Systems (utilizing microwave and satellite connectivity)

Harris is developing the capability to augment fixed infrastructure with deployable solutions. Harris has leveraged our development of tactical cellular in the defense market for public safety applications. Harris can also provide traditional “Cell on Wheels” – trailer-based deployable macro sites which fully integrate with fixed RAN sites. These deployable solutions may leverage a combination of microwave or mobile satellite backhaul, which is an area where Harris is uniquely qualified. Harris CapRock, our satellite service division, is the world’s largest provider of commercial satellite services. For rapid response Harris has developed a COMS on the move which incorporates an EPC, small cell BTS, and satellite backhaul.

LMR Interoperability

Harris can provide the necessary networking infrastructure, applications and integration support to fully integrate existing LMR networks with LTE-based Push-to-Talk (PTT) solutions. Using the Harris VIDA® infrastructure, calls originating on legacy analog radio networks can be provided to users, talkgroups, and dispatchers using LTE-based PTT applications. The VIDA infrastructure, together with Harris’ broadband PTT application BeOn®, allows LTE-based users to fully participate in LMR calls, including end-to-end encrypted calls. The integration of BeOn users into LMR crypto-nets is seamless, and BeOn users can manage their encryption keys using the same Project 25 compliant OTAP rekeying procedure used to update LMR radio or dispatch console keysets.
End User Devices

**MBC-100 Mobile Broadband Client**

The MBC-100 Mobile Broadband Client provides a hardened mobile connectivity option for Mobile Data Terminal applications accessing the Public Safety Broadband Network. Using the MBC-100, first responders will be able to access streaming video feeds, online databases, and mobile productivity applications in their vehicles, with coverage and throughout maximized with use of external antennas. The MBC-100 enables users to utilize their existing mobile applications to transition from existing commercial broadband networks by adding connectivity to the LTE network.

With its industry-leading architecture, the MBC-100 supports the applicable 3GPP Release 9 requirements. The MBC-100 supports industry standard mutual LTE authentication and 128-bit AES encryption with over-the-air negotiation of traffic keys. This encryption provides robust security for public safety transmissions. The MBC-100 is built to public safety requirements with a mechanically hardened case rated for IP-65 usage, as well as conformance to MIL-STD 810G.

**MBC-200 Mobile Broadband Router**

The MBC-200 Mobile Broadband Router provides complete, in-vehicle network support for all of the connected devices in public safety vehicles. The MBC-200 has dual broadband transceivers, allowing connected devices to access on-line information through both private and commercial carrier networks. Using the three Ethernet ports, two USB ports, and a secure wireless access point, devices such as laptops, tablets, on-board digital video recorders, streaming video cameras, and license plate readers can establish and maintain connectivity across both networks simultaneously. To ensure security across both private and public broadband networks, the MBC-200 provides IPSec VPN capabilities. For AVL or other applications needing location information, the MBC-200 also includes a WAAS-enabled 50-channel GPS receiver. To survive in the public safety environment, the MBC-200 is designed to pass MIL-STD-810G requirements for vibration, shock and temperature range.
RF3590 LTE Tablet

The RF3590 LTE Tablet is a ruggedized, 7-inch Android™-based network computing device that allows first responders to access their mission-critical information under demanding conditions. Using the RF3590 LTE Tablet, first responders can access streaming video feeds, online databases, and mobile productivity applications, in the field and when traveling to the scene of an incident.

The RF3590 LTE Tablet excels in real-field conditions, including direct sunlight, rain and temperature extremes. The sealed housing of the RF3590 LTE meets the MIL-STD 810G and IP67 water and dust protection requirements, while the hardened display and housing withstand repeated 1 meter drops. The integrated wireless capabilities of the RF3590 LTE Tablet include 3GPP Release 9, Bluetooth®, and 802.11 b/g/n (Wi-Fi) capabilities. The RF3590 also includes an integrated GPS receiver with optional external antenna to provide improved location services.

Applications

BeOn®

The Harris BeOn mobile app solution bridges the communications gap that has traditionally existed between narrowband PTT radio users and broadband network users. BeOn enables narrowband services to be extended to users on broadband networks, whether on a private LTE or commercial cellular network. Specifically, PTT voice is securely delivered as Voice-over-IP data packets to smart phones, tablets, or other rugged devices using wireless broadband IP data services such as commercial 3G and 4G LTE, Wi-Fi, or public safety LTE.
About Harris Corporation

In public safety and professional communications, Harris is a leading supplier of assured communications® systems and equipment for public safety, federal, utility, commercial, and transportation markets – with products ranging from the most advanced IP voice and data networks, to next-generation, secure public safety-grade LTE (Long-Term Evolution) solutions for voice, video, and data applications, to industry leading multiband, multimode radios. Harris has more than 80 years of experience in public safety and professional communications and supports over 500 systems around the world.

© 2014, Harris Corporation
WP#1402