1.7.2 Multimode/Wireless LAN Services (MWLANS) [C.2.14.3]

A worldwide network of multimode wireless local area network services (MWLANS) will enable Agency personnel to connect to Internet protocol (IP) services remotely. Government users will benefit from secure IP access backed by AT&T customer support. Agencies' needs for wireless access to IP services will be satisfied with a MWLANS solution that is global, technologically current, highly reliable, and implements the latest security measures.

1.7.2.1 Technical Approach to Wireless Services Delivery [L.34.1.7.1]

1.7.2.1.a Approach to Service Delivery

(a) Analyze the service requirements specified in this solicitation and describe the approaches to service delivery for each service.

AT&T's Mobile Wireless LAN Service (MWLANS) satisfies Agency personnel's need for global remote wireless connectivity to IP-based services from outside Government networks by offering 802.11 wireless connections in public hot spots around the world, or with custom-designed wireless networks deployed at Agency sites. **Figure 1.7.2.1-1** and **Table 1.7.2.1-1** summarize the MWLANS offering.

Figure 1.7.2.1-1: MWLAN Network Architecture. *MWLANS provides users both local mobility and global access to their Virtual Private Network (VPN) services through both public and private wireless 802.11 networks.*

NO.	NETWORK ARCHITECTURE ELEMENT	DESCRIPTION OF FUNCTION	BENEFITS
1	AT&T Global Network Client Software	• Assists users in locating Public Hot Spots or other forms of access • Provides user with one unified login process, including status and quality of the connection (see **Figure 1.7.2.1-2**) • Provides 3DES encryption between the client and remote access server in AT&T network	• Simple to use • Provides secure connectivity • One software package for many types of remote access
2	802.11 Wireless Access Points	• Provides wireless 2.4/5 GHz connection to user • Manages radio frequency (RF) connections	• User mobility • Multiple clients • Standards-based interface that provide interoperability among equipment brands • No licensing required • No RF planning required
3	Partner IP infrastructure	• Provides IP-based tunnel between hot spot and AT&T network • Provides remote subscriber with dynamic address assignment • Provides domain name service (DNS) to direct remote subscriber to AT&T network	• Provides IP connectivity between remote subscriber and Agency VPN • Provides host network services when Agency subscriber is remote

NO.	NETWORK ARCHITECTURE ELEMENT	DESCRIPTION OF FUNCTION	BENEFITS
4	AT&T Authentication (Radius) Server	• Authenticates user and administers permissions to access IP and VPN services • Informs remote access server of authenticated subscribe	• Access, authentication and administration • Protection against unauthorized access to Agency network
5	Tunneled connection to AT&T Network	• Remote access server dynamically establishes a triple data encryption standard (DES), 128-bit encrypted tunnel to remote Agency subscriber • Secure tunnel maintained during subscriber MWLAN session • Secure tunnel removed upon completion of MWLAN session	• Secure access to AT&T global IP network and Agency VPN services • Dynamically established and terminated

Table 1.7.2.1-1: MWLAN Network Connection Steps. *MWLANS steps through these items to provide a user connection.*

AT&T's flexible and secure approach offers Agencies high-quality MWLANS to their IP-based services using globally accepted networking standards that substantially lower procurement risk. Through partnerships with WiFi providers, AT&T's MWLANS service approach provides global coverage. Client software, which is loaded on the subscribers' mobile device, simplifies the process of accessing the network by providing MWLANS access tools to assist the Agency subscriber. [redacted]

Figure 1.7.2.1-2: Software Client Identity Management. [redacted]

[redacted] **Table 1.7.2.1-2**.

SERVICE DELIVERY APPROACH	DESCRIPTION
Global coverage	Establish partnerships with multiple hotspot suppliers to create an extensive global footprint: • More than [redacted] public hotspots in [redacted] countries • Public hotspot suppliers' networks interconnect to AT&T public IP network through peering arrangements.
Ease of use	Provide easy access to MWLANS network through Global Client software loaded on subscriber's mobile device. Global Client software provides: [redacted]
Multilayer security	AT&T's MWLANS and the Global Network Client supply the following: [redacted]
Synergy with other networx services	Users can connect mobile devices to other subscribed AT&T IP services, which enable access to desktop applications away from office. These services include: • Internet • Agency VPN (premise-based or network-based)
Dedicated wireless access buildout	Installation services that provide custom designed wireless infrastructure solutions at designated Agency sites – where connectivity is required most Custom-designed, project-based installations of 802.11 networks, include the following: • Design services • Installation and implementation services • Operation and maintenance services

Table 1.7.2.1-2: MWLAN Service Delivery Approach. *With AT&T comprehensive approach, Agencies receive global MWLANS service to the Internet or VPN through an easy-to-use client that resides on the subscribers' mobile device. For Agency locations, customized private hot spots can be designed, installed, and operated by AT&T.*

AT&T's approach provides Agencies with a fully compliant MWLAN service that is scalable and flexible by leveraging the global growth of the MWLANS service. As the demand on MWLANS changes, so will AT&T's service to match the Agencies requirements.

1.7.2.1.b Benefits to Technical Approach

(b) Describe the expected benefits of the offeror's technical approach, to include how the service offered will facilitate Federal Enterprise Architecture objectives (see http://www.whitehouse.gov/omb/egov/a-1-fea.html).

AT&T's Networx services support the Government's vision of transformation through the use of the Federal Enterprise Architecture (FEA) to facilitate

technologies that contribute to mission performance. In describing services in relation to FEA, AT&T either summarizes their contribution or provides an example of how each service facilitates FEA implementation. AT&T aligns its componentized products and services so they are easily integrated, commonly manageable, and usable across Government functions, horizontally and vertically, as well as between levels of Government. Services, such as MWLANS, are within the technical reference model and support the security management component of the FEA. Regardless of whether Agencies require wireless network connectivity around the world or around the office, AT&T can supply an 802.11 network that satisfies Agencies' need to connect to IP applications (**Table 1.7.2.1-3**).

APPROACH	BENEFITS	FEA COMPLIANCE
Global coverage	[redacted] • Access to familiar applications while away from home office • Scalable network architecture that allows for the addition of public hotspot networks as required • Standards-based service offering interoperability with Government furnished 802.11 compliant network interface cards • Access points in airports, hotels, coffee shops, convention centers	• Increases geographic range in which Government Information Technology (IT) assets can be accessed and used • Increased productivity and reduced downtime of Agency personnel while traveling • Uses 802.11, the enterprise standard in wireless networking. This results in longer product lifecycles, interoperability among Agencies' networks, and network migration paths FEA Link: TRM/Service Platform and Infrastructure/Hardware & Infrastructure/Wide Area Network (WAN)
Ease of use	[redacted] • Simple login process provides fast and easy access to an Agency's VPN or the Internet • Integrate online help facilitates MWLANS access and quick problem resolution [redacted]	• Common software application facilitates access through multiple broadband service options. • Agencies are not required to develop, support or maintain customer software application for remote access services. FEA Link: TRM/Service Access and Delivery/Delivery Channels/Digital Signatures
Security	[redacted]	• Agencies' data will remain secure as it traverses both the airwaves as well as the wired network infrastructure. FEA Link: TRM/Component Framework/Security/Digital Signatures

APPROACH	BENEFITS	FEA COMPLIANCE
Synergy with other Networx services	Provides convenient and secure access to Agencies' network services: [redacted]	• Agencies are provided reliable and convenient access to core IP-based services. FEA Link: TRM/Service Access and Delivery/Delivery Channels/Digital Signatures
Dedicated wireless access buildouts	• Customized solutions constructed from Commercial-off-the-Shelf (COTS) components [redacted] • Uses standardized, inexpensive wireless equipment • Quickly and easily deployable networking in unlicensed frequencies	• Increased productivity and mobility of Agency personnel through the use of 802.11 networking, thus promoting collaboration among Agency personnel • Uses 802.11, the enterprise standard in wireless networking, resulting in longer product lifecycles and proper network migration paths FEA Link: TRM/Service Platform and Infrastructure/hardware and infrastructure/Local Area Network (LAN)

Table 1.7.2.1-3: AT&T MWLAN Approach. *Agencies can use AT&T's MWLANS to achieve important FEA objectives.*

From an FEA perspective, AT&T brings a market-based discipline to wireless services that support multiple lines of business (LoB) and subfunctions, as defined by the business reference model (BRM). AT&T regards wireless services as a horizontal and vertical capability of the service component reference model (SRM) that provides a component of security to the underlying communication infrastructure for individuals who need support or services from the Government. This component could be telephony or other voice communication infrastructure services that entail the transmission of voice, data, and messages in multiple formats and protocols.

AT&T's development of net-centric technologies supports solutions based on service-oriented architecture (SOA), which uses standardized, web-adapted components. Our approach incorporates the criteria listed below:

- Technical Reference Model capabilities are fully met and linked to the Service Component Reference Model (SRM) and Data Reference Model (DRM).

- These links are structured to support Business Reference Model (BRM) functions and provide line-of-sight linkage to mission performance and ultimate accomplishment per the Performance Reference Model (PRM)
- AT&T operates as an innovative partner through Networx to help achieve the vision of the FEA to enhance mission performance.

In addition to the benefits and FEA facilitations cited earlier, AT&T can assist specific departments and Agencies to meet mission and business objectives through a comprehensive MWLANS offering.

1.7.2.1.c Major Issues to Service Delivery

(c) Describe the problems that could be encountered in meeting individual service requirements, and propose solutions to any foreseen problems.

In transitioning into any new service delivery model, whether it be task-based or fully outsourced, unforeseen issues may arise. Therefore, it is important that GSA select a service provider that brings the depth and background to minimize an Agency's risk during transition. Our experience has enabled us to develop proven methods, processes, and procedures applicable to the simplest to the most complex projects.

Table 1.7.2.1-4 lists the top six service delivery risks for MWLANS and our mitigation strategies. As with all large, wireless LAN projects, we enter each of these risks and others (after identification and characterization) into our risk-tracking database and immediately take steps to mitigate them before they become issues. Because risk management is more effective when all stakeholders are active in the process, AT&T engages the GSA, the client Agency, and other Government solution partners for success with risk mitigation activities. Agencies will receive a MWLANS engineered to high standards that address the common pitfalls of wireless networking. Government users will receive coverage where it is needed, secure

connections that protect sensitive data, reliable networks that are available when needed and accessible through simple processes.

PROBLEMS/RISKS	DESCRIPTION	MITIGATION
Service coverage	Services not offered in locations where Agency personnel frequent (global Internet or Agency VPN) when traveling	• [redacted] (see **Figure 1.7.2.1-3**, below) and continues to expand the number of points where users can gain access. • AT&T continues to expand service coverage of public hot spots through expanded service agreements with hot spot providers • In privately designed and managed networks, AT&T provides verification of the unique wireless network design goals, including wireless coverage, in the testing and delivery phase of the project
Security	Interception of a subscriber's data and unauthorized access to Agency's network services	• AT&T implements the latest wireless security standards in our private wireless service (additional information is provided in Section 1.7.2.1.e), [redacted]
Availability	Service does not operate in accordance with 802.11 standards and does not provide Agency with desired mobility	• Agency private hot spot locations are carefully assessed by AT&T engineers during design phase to provide optimal availability • AT&T's private wireless access service is designed to meet any required Agency availability specification through [redacted] • AT&T will test and verify service availability during installation of private hot spots
Inability of subscriber to access MWLAN service	Remote Agency personnel are unable to find hot spot or access network securely	[redacted]
Schedule delays on enterprise installations	The MWLANS project suffers from delays stemming from lack of equipment inventories, or other network implementation hurdles	• AT&T assigns an experienced Project Manager to oversee the processes necessary to meet the agreed schedule • Thorough site surveys are performed that identify potential obstacles at Agency sites before they impact the implementation schedule • AT&T inventories the required wireless networking equipment needed to implement projects at our facilities
Locating hot spots	Agency personnel my have difficulty locating an AT&T hot spot while traveling	[redacted] (see **Figure 1.7.2.1-4**)

Table 1.7.2.1-4: MWLAN Network Risks. *Agencies avoid common risks associated with global WiFi service through AT&T's risk mitigation processes.*

The MWLANS service is truly a global offering, providing access to IP services in public places frequented by international travelers such as

airports, hotels, and conferencing centers. [redacted] [redacted](**Figure 1.7.2.1-3**) [redacted]

Figure 1.7.2.1-3: Geographical [redacted]

[redacted](**Figure 1.7.2.1-4**). [redacted]

AT&T has taken steps to identify risk and provide risk mitigation associated with delivering MWLANS services. AT&T is committed to service excellence and will work with the Agency to identify and resolve potential problems that might occur during service delivery.

Figure 1.7.2.1-4: Network [redacted]

1.7.2.1.d Wireless Network Architecture

(d) Describe the overall wireless network architecture and explain the benefits of the network architecture design.

AT&T's MWLANS satisfies Agency personnel's need for wireless connectivity to IP-based services. AT&T also installs custom-designed wireless networks at Agency locations that conform to IEEE 802.11 standards. **Table 1.7.2.1-5** describes AT&T's architecture for delivering these services.

SERVICE ATTRIBUTE	DESCRIPTION	BENEFITS
AT&T public hot spots	[redacted]	• Provides a global coverage area that keeps Agency personnel in touch throughout the world • AT&T aggregates service from multiple providers of 802.11 access, providing a single point of contact and one user subscription • Offers access to other AT&T IP services

SERVICE ATTRIBUTE	DESCRIPTION	BENEFITS
Dedicated wireless access buildout	Installation services that provide custom designed wireless infrastructure solutions at designated Agency sites – where connectivity is required most Custom-designed, project-based installations of 802.11 networks, including the following: • Design services • Installation and implementation services • Operation and maintenance services	Agencies may implement MWLANS at any Government site, tailored to their specific needs. AT&T–managed MWLANS frees Government employees and IT assets to focus on their core mission
Multilayer security	AT&T's MWLANS and the Global Network Client supply the following: [redacted]	Protects Agency MWLAN sessions against the following: • Unauthorized use of service • Interception of data on wireless facility • Interception of data on backbone network
Access to IP services	Users can connect mobile devices to other subscribed AT&T IP services, which enable access to desktop applications when away from office.	MWLANS can be used to wirelessly access the following: • IPS • Premises-based Internet protocol-virtual private network services (PBIP-VPNS) • Network-based Internet protocol- virtual private network services (NBIP-VPNS)

Table 1.7.2.1-5: MWLAN Technical Approach. *AT&T's MWLANS offerings are based on technical foundations that meet Agency needs.*

MWLANS is designed to deliver Government users with the coverage, security, and access they require to remain productive while traveling. A further benefit of MWLANS is its capability to untether network users at Agency locations, offering greater freedom of movement around the office.

1.7.2.1.e Security and Reliability of the Wireless Network Architecture

(e) Describe how the wireless network architecture supports and ensures wireless security and reliability, technological evolution, convergence, and interoperability with present and future commercial networks.

Strong encryption makes Agency data extremely difficult to intercept and decode, protecting sensitive Agency information [redacted] (**Table 1.7.2.1-6**).

WIRELESS ARCHITECTURE REQUIREMENT	HOW SUPPORTED
Wireless security and reliability	[redacted]
Technology evolution	[redacted]
Convergence	[redacted]
Interoperability	[redacted]

Table 1.7.2.1-6: Network Architecture Security and Reliability. *Various elements of the AT&T network support broad Agency objectives.*

By investing in wireless LAN technology, AT&T offers more advanced and feature-rich application to Agencies.

AT&T's future vision for IP convergence and the technical evolution of MWLANS closely tracks the adoption of the IEEE 802.11e standard [redacted] (**Figure 1.7.2.1-5**). As this new standard is adopted and implemented, more

Figure 1.7.2.1-5: Support for Convergence [redacted]

delay-sensitive wireless applications will be enabled, such as wireless voice and real-time video links.

Regarding continued interoperability, AT&T's MWLAN is based on the 802.11 standards. AT&T strategy is to offer MWLAN that supports the 802.11 standard to enable continued interoperability between present and future networks.

1.7.2.2 Satisfaction of Wireless Performance Requirements [L.34.1.7.2]

1.7.2.2.a Service Quality and Performance

(a) Describe the quality of the services with respect to the performance metrics specified in Section C.2 Technical Requirements for each service.

AT&T will deploy networking assets and resources, including technicians, redundant components, and spare parts, in a manner that meets the specified performance requirements for private hotspots, which are summarized in **Table 1.7.2.2-1**.

KEY PERFORMANCE INDICATOR (KPI)	SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICE QUALITY LEVEL
Time to Restore (TTR)	With Dispatch	8 hours	[redacted]
	Without Dispatch	4 hours	

Table 1.7.2.2-1: MWLANS Performance. *The AT&T MWLANS offering meets the specified Agency performance objectives and provides reliable wireless access service.*

If interrupted, AT&T's wireless networking services are restored quickly and in compliance with Agency needs.

1.7.2.2.b Approach to Monitoring and Measuring Performance

(b) Describe the approach for monitoring and measuring the Key Performance Indicators (KPIs) and Acceptable Quality Levels (AQLs) that will ensure the services delivered are meeting the performance requirements.

AT&T measures key performance indicators (KPIs) and acceptable quality levels (AQLs) for MWLANS (Time to Restore within 8 hours if requiring dispatch, 4 hours without) by [redacted] (**Table 1.7.2.2-2**).

KEY PERFORMANCE INDICATOR	APPROACH TO MONITORING AND MEASURING
Time to Restore (TTR)	[redacted]

Table 1.7.2.2-2: Monitoring and Measuring TTR. *Agencies will receive monthly reports summarizing AT&T's performance and delivery of MWLANS.*

[redacted] (see example in **Figure 1.7.2.2-1**) [redacted]

[redacted]

[redacted]

Figure 1.7.2.2-1: [redacted] **for** [redacted]

[redacted] (**Figure 1.7.2.2-2**).

Figure 1.7.2.2-2: [redacted] **Reporting.** [redacted]

Agencies are therefore assured of a quality wireless LAN service that is delivered within the requested specifications, and reported in monthly documents through a program office.

1.7.2.2.c Approach to Perform Service Delivery Verification

(c) Describe the offeror's approach to perform verification of individual services delivered under the contract, in particular the testing procedures to verify acceptable performance and Key Performance Indicator (KPI)/Acceptable Quality Level (AQL) compliance.

The first time the service is provided through the Networx contract, the service performance must be verified; KPIs will be monitored to certify that the service performance complies with the AQL. **Table 1.7.2.2-3** summarizes the verification approach for the MWLANS KPIs.

KEY PERFORMANCE INDICATOR	VERIFICATION APPROACH
Time to Restore (TTR)	[redacted]

Table 1.7.2.2-3: Service Delivery Verification. *The Key Performance Indicators are closely monitored through a comprehensive verification approach and testing procedure that certifies the service performance achieves or exceeds the Acceptable Quality Levels.*

Additionally, AT&T uses real-time monitoring and measurement tools (**Figure 1.7.2.2-3**) to deliver the MWLANS per requested Agency metrics. [redacted]

Figure 1.7.2.2-3: Real-Time Monitoring and Reporting. [redacted]

1.7.2.2.d Performance Level Improvements

(d) If the offeror proposes to exceed the Acceptable Quality Levels (AQLs) in the Key Performance Indicators (KPIs) required by the RFP, describe the performance improvements.

AT&T performance for privately managed MWLANS exceeds the AQLs requested in the RFP. Specifically, the TTR specifications will be engineered to meet the Agency's stated need.

For public access MWLANS, achieving the AQLs defined by the Government for the KPIs will result superior MWLANS service performance. [redacted]

1.7.2.2.e Approach and Benefits for Additional Performance Metrics

(e) Describe the benefits of, rationale for, and measurement approach for any additional performance metrics proposed.

For private 802.11 installations, the wireless system is constructed to meet the unique specifications required by the Agency's application, so additional metrics are not applicable.

[redacted]

1.7.2.3 Satisfaction of Wireless Specifications [L.34.1.7.3]

1.7.2.3.a Service Requirements Description

(a) Provide a technical description of how the service requirements (e.g., capabilities, features, interfaces) are satisfied.

AT&T satisfies Agencies' requirements for MWLANS through a variety of unique capabilities, advanced features, and standardized interfaces (**Table 1.7.2.3-1**).

SERVICE REQUIREMENT	DESCRIPTION	BENEFITS TO AGENCY
Public Hot Spots	[redacted]	Wide coverage and roaming for traveling Agency personnel
Private wireless installations	Upon Agency request. Design, implementation and support of private hotspots for Agencies	Supported by AT&T technical services, security, custom solution addressing Agency needs
802.11a	[redacted]	54 Mbps, 50 meter range 5Ghz frequency not subject to interference from 2.5Ghz devices
802.11b	Supported at public hot spots and privately managed wireless installations	Range up to 150 meters, 11 Mbps Common standard interfaces with Government furnished equipment
802.11g	Supported at privately managed wireless installations, as requested by Agencies	54 Mbps and range up to 150 meters Common standard interfaces with Government furnished equipment
Network Interface Cards (NICs) 802.11a;b;g; as applicable	Agency can procure compliance-tested units from AT&T or from marketplace	Compatibility from AT&T-tested units; inexpensive (market purchased network information centralizers [NICs])
802.11i	• Subset supported now: TKIP-based on predefined 128-bit key • Supported when available: AES encryption (full 802.11i compliance).	Security against interception; [redacted]
802.1x	[redacted]	[redacted]
802.11e	QoS enhancements at wireless device.	Provides improved handling of real-

SERVICE REQUIREMENT	DESCRIPTION	BENEFITS TO AGENCY
	Future support when standard matures	time services (voice, video)
Domain Name Service	Supported on both AT&T and partner networks	Provides conversion of requested URL to IP address that AT&T network can act upon
Static IP address(es)	Supported at privately managed wireless installations, as requested by Agencies	Consistent IP address for simplified data exchange/reachability

Table 1.7.2.3-1: MWLANS Capabilities. *AT&T provides a broad variety of wireless capabilities that meet all the stated Agency requirements.*

Through a comprehensive MWLANS service offering, Agencies receive a fully compliant solution for WiFi service.

1.7.2.3.b Attributes and Values of Service Enhancements

(b) If the offeror proposes to exceed the specified service requirements (e.g., capabilities, features, interfaces), describe the attributes and value of the proposed service enhancements.

In addition to the standard services, Agencies can enhance their MWLANS with additional features and capabilities for an additional fee. **Table 1.7.2.3-2** highlights additional service features and capabilities available with MWLANS. AT&T proposes the attributes in **Table 1.7.2.3-2** as a service enhancement.

SERVICE ENHANCEMENT	DESCRIPTION	BENEFITS TO AGENCY
[redacted]	[redacted]	[redacted]

Table 1.7.2.3-2: MWLANS [redacted]

1.7.2.3.c Wireless Services Experience

(c) Describe the offeror's experience with delivering the mandatory Wireless Services described in Section C.2 Technical Requirements.

[redacted] Remote access service subscribers can use wireless LANs as their preferred form of access from an 802.11b/g-enabled device.

AT&T Networx Team offers Agencies extensive experience providing managed services that create value to our customers to both in Government and commercial entities. If additional coverage is required in Government locations not currently served as part of the public MWLANS offering's standard access points, Agencies can request that new access points be installed as an option. Wireless access can be added to any Government facility where Agency personnel will require mobile connectivity to IP services. [redacted] Examples of past experience are summarized in **Table 1.7.2.3-3**.

[redacted]

Client Need	Solution	Created Value
[redacted]	[redacted]	[redacted]

[redacted]

Client Need	Solution	Created Value
[redacted]	[redacted]	[redacted]

[redacted]

Client Need	Solution	Created Value
[redacted]	[redacted]	[redacted]

Table 1.7.2.3-3: Private Hot Spot Management and Implementation. *Solutions were provided to various clients for added value and cost benefits.*

Additionally, as a member of the WiFi Alliance, AT&T has actively participated in the wireless LANs marketplace since 1996, working together with

chipmakers and hardware manufacturers and using resources from AT&T Labs for independent research, to continue wireless advances.

1.7.2.4 Robust Delivery of Wireless Services [L.34.1.7.4]

1.7.2.4.a Wireless Design Measures and Engineering Practices

(a) Describe the measures and engineering practices designed to provide robustness of the Radio Frequency (RF) access and backbone networks, ensure resiliency, and plan for growth.

For privately managed wireless access installation, AT&T takes several steps to optimize the benefits Agencies receive from MWLANS system (**Table 1.7.2.4-1**).

MEASURE/PRACTICE	DESCRIPTION	AGENCY BENEFIT
Site survey	AT&T System Design Team performs an evaluation of the proposed private hot spot location in order to optimize the network configuration and select appropriate equipment.	Challenges to delivery of a high-quality system and reliable service are identified early and accounted for within design phase.
Engineering design	AT&T Engineering Team develops detailed design document specifying system physical, functional, and operational architecture. Based on detailed design, AT&T procures equipment, integrates components, and engineers configurations.	• Agency's system design is based on detailed design plan that is foundation for creating a private hot spot that meets Agency's requirements. • Before implementation, Agency personnel can review and adjust system design plan.
Test proposed equipment	Upon completing private hot spot equipment integration and configurations, AT&T Team will test system at AT&T location.	System installation time is decreased because MWLANS system is tested, and deviations are corrected before shipping equipment to customer location for installation.
Verification and acceptance testing	Upon completion of equipment testing, AT&T Team will ship equipment and install it at Agency location. AT&T Installation Team will test and verify system is operating per detailed system design plan.	Agency receives WLANS system that matches approved system design specification approved by Agency through quantitative testing.

Table 1.7.2.4-1: Design Practices. *The steps taken by AT&T provide Agencies with a reliable and high-quality MWLANS system.*

If additional capacity is required by Agencies from an MWLANS network, more wireless access points can be added to the network, accommodating additional subscriber units as the network grows. The 802.11 specification accounts for ad hoc sharing and management of the available channels without intervention required. If Agencies should require the network coverage area to be expanded, RF repeaters can be incorporated in the network design to extend the reach of the access points.

1.7.2.4.b Radio Frequency Network Optimization

(b) Describe the methodologies employed for continuous Radio Frequency (RF) Network Optimization including drive tests and network audits to ensure cell site performance meets design criteria.

AT&T begins new installations of private wireless LANs with a site survey in order to anticipate and take into accounts service obstacles. For example, should the 2.4GHz unlicensed band utilized by 802.11b/g at an Agency site be crowded or prone to interference, this may warrant engineers to recommend 802.11a, which utilizes the 5GHz band. Upon completion of the installation, our technicians perform a test verifying that the design goals, including thorough RF coverage in the service area, are completely met.

Furthermore, wireless LANs dynamically and continually manage the RF environment. For example, when an 802.11 client moves further away from the hot spot and the access point receives less signal from the device, the client will automatically lower its data rate to maintain connectivity. In installations where there are multiple wireless access points available, the client terminals will select the strongest signal. These types of RF management instructions, part of the 802.11 standards, are transparent to the user and are an important element in the quality of the connection delivered. Therefore, AT&T tests the equipment we provide to customers in our laboratories for compliance before installation.

1.7.2.4.c Approach to Disaster Recovery

(c) Describe the approach for disaster recovery from occurrences such as commercial power grid failures and natural disasters.

Agency specifications for private MWLANS may incorporate specific failure prevention features and disaster recovery requirements similar to wired networks (**Table 1.7.2.4-2**).

APPROACH	BENEFIT
[redacted]	[redacted]
[redacted]	[redacted]

Table 1.7.2.4-2: Disaster Recovery. *Examples of measures Agencies may request AT&T undertake in order to prevent network downtime in the event of disasters.*

Agencies can specify the required service levels, and AT&T will deliver a network design that meets all critical specifications, particularly such specifications as network availability.

1.7.2.4.d Wireless Fraud Prevention

(d) Describe the mechanisms to detect and prevent wireless fraud, and protect end-user privacy for voice communication and data transfer.

AT&T takes steps to protect users' identity and data from fraudulent activity, as described in **Table 1.7.2.4-3** and **Figure 1.7.2.1-2 above**.

MECHANISM	PREVENTS
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

Table 1.7.2.4-3: Fraud Prevention. *Elements of the AT&T network deter fraud, eavesdropping, and interception.*

AT&T prevents wireless fraud in 802.11 networks both by verifying user's identities at the start of each session and implementing the latest strong encryption algorithms that prevent interception and eavesdropping.

1.7.2.4.e Approach to Multicasting Commercial Advertising (Spam)

(e) Describe the approach on multicasting of commercial advertising (i.e., spam). Discuss the policy and user options supported (e.g., opt-in, opt-out, filtering).

MWLANS is a form of access to other AT&T IP services and requires an associated IP service to deliver email service. AT&T offers Agencies protection from spam with its secure managed email service offered in the Networx proposal (for details, refer to Section 1.6.8).

1.7.2.4.f Architecture Security and Reliability Best Practices

(f) Describe how the wireless network architecture is consistent with best practices for security and reliability.

AT&T protects Agency data through strong encryption. [redacted]

1.7.2.4.g Approach to Number Portability

(g) Describe the approach for implementing number portability. Discuss the benefits and limitations of the approach.

Number portability is not applicable to MWLANS networks.

1.7.2.4.h Approach to Incorporating Security Enhancements

h) Describe the approach for incorporating into the offeror's wireless network, infrastructure security enhancements that the offeror believes are likely to become commercially available in the timeframe covered by this acquisition, including discussion of potential problems and solutions.

AT&T's approach for incorporation of infrastructure enhancements and emerging technology is covered in detail in Section 1.3.3.d Network Evolution, Convergence, and Interoperability in the Network Architecture section of the Technical Volume.

1.7.2.4.i Approach to Network Convergence

(i) Describe the approach for network convergence (i.e., IP Multimedia Subsystem (IMS)). In particular, describe how the approach ensures service quality over the converged network for data, voice, video, and multimedia.

The IEEE's 802.11e standard addresses the specific needs of converged media transmitted over wireless networks. [redacted]

[redacted]

Support of 802.11e is important for Session Initiated Protocol (SIP) services like Voice over IP and the IP Multimedia Subsystem (IMS). By extending QoS to the mobile device, MWLANS becomes another access-independent service integrated into the IMS architecture.

The 802.11e standard is not yet complete. However, AT&T is implementing components of the standard before industry adoption to address the anticipated demand for QoS. [redacted]

1.7.2.4.j Approach to 2.5G-to-3G Migration

(j) Describe the approach for 2.5G-to-3G migration.

"2.5G" and "3G" are not applicable terms to MWLANS.

1.7.2.5 Stipulated Deviations

AT&T takes neither deviation exception to the stipulated requirements.

1.7.3 <Reserved>

1.7.4 <Reserved>