ALLIANCE TECHNOLOGY GROUP

in partnership with

NOKIA


***Wireless Network Grid***

**July 29, 2022**

Presented to:
City Clerk
City of Perris City Hall
101 N D Perris 92570
Manager, Network and Server Operations
Voip-rfq@prattlibrary.org
(410)545-6340

Matt Antoine
Alliance Account Exec
(443) 498-8005
Matt.antoine@alliance-it.com

**Alliance Technology Group**
7010 Hi Tech Drive
Hanover, MD 21076

Tax ID: **52-2060067**
CAGE Code: **1YBR8**
DUNS: **969276252**

ALLIANCE
TECHNOLOGY GROUP

## Table of Contents

ALLIANCE
TECHNOLOGY GROUP

# Table of Figures

ALLIANCE
TECHNOLOGY GROUP

July 29, 2022

City Clerk
City of Perris City Hall
101 N D St.
Perris, CA 92570

Dear City Clerk,

Alliance Technology Group LLC ("Alliance"), in conjunction with Nokia, is pleased to respond to this Request for Proposal (RFP) to address the City's need for Broadband Network Grid. Alliance is a Woman-Owned Small Business with more than 25 years of experience providing outstanding expertise and sound technical solutions to our Commercial, Federal Government, and State and Local client base.

Nokia has global leadership in mobile and fixed network infrastructures with the software, services, and advanced technologies to serve our customers in 130 countries around the world with approximately 93,000 employees as of Jan 2021. Powered by Bell Labs and led by Mr. Pekka Lundmark (President and CEO), Nokia continues to invest billions of Euros in research and development efforts to invent new technologies that will increasingly transform the way people communicate.

Our team is pleased to propose an end-to-end city wide, wireless broadband network for the city of Perris to meet the infrastructure requirements of the RFP. We are offering a next-generation private LTE & microwave that will allow powerful, secure advanced communications network capable of serving the City of Perris residents & staff for decades to come. The response includes information which is proprietary and confidential to both Alliance and Nokia. Submission of this information provides no express or implied license or other rights.

With over 100 years in providing telecommunications solutions, we are confident the proposed solution will provide Perris a best-in-class wireless network that will exceed the expectations.

Thank you,

Robert T. King

Bob King
Vice President
7010 Hi Tech Drive
Hanover, MD 21076
Phone (443) 498-8005

ALLIANCE
TECHNOLOGY GROUP

# 1. Introduction

Alliance Technology Group LLC, founded in 1997, is a woman-owned Small Business (WOSB), systems integration and Information Technology (IT) provider headquartered in Hanover, Maryland with regional locations across the United States. We currently have about 125 employees and serve our more than 1,700 active government and commercial customers with implementations in every state, US Territory, and overseas.

Alliance specializes in data and mobile networking, VoIP and Unified Communications, physical security and public safety, cyber security, network security, data center computation, data storage, cloud applications mobile datacenters, and hosted solutions. Our abilities are wide, and our expertise is deep allowing us to support technology from the datacenter to edge devices including carrier and LTE services.

Our company supports more than 200 manufacturers, and we take an agnostic approach to technology designs. Our solutions are about our customers and solving their business needs. Our seasoned, well trained, and certified networking professionals propose customer solutions based on (a) current embedded base; (b) the best technological fit to meet requirements; and (c) what makes financial and operational sense. Alliance supports networking designs and implementations consisting of Nokia (Private Cellular Network and LTE networks), Cradlepoint, Extreme Networks, Cisco, HP/Aruba, and Allied Telesis.

Our government customer base exceeds 200 government agencies and departments including Department of Labor, Census Bureau, Federal Reserve, Department of Energy, National Parks Service, Bureau of Indian Affairs, DEA, Defense Health Agency, FBI, the IRS, the VA, and all branches of the Department of Defense (DoD).

For the City of Perris, Alliance has proposed a Nokia Corporation solution to fulfill the requirements of the CBRS equipment installation and support requirements of the proposal. Established in 1865, Nokia has grown to employ approximately 88,000 people globally and they offer a comprehensive portfolio of network equipment, software, services and licensing opportunities across the globe.

With telecommunications customers in more than 100 countries, Nokia combines global leadership in mobile and fixed network infrastructure through state-of-the-art software, hardware, and services for any type of network. Nokia is uniquely positioned to help communication service providers, governments, and large enterprises deliver on the promise of 5G, the Cloud and the Internet of Things (IoT). Their solutions, including Nokia's LTE infrastructure, are deployed by Verizon, AT&T, T-Mobile and Sprint and in all of the largest mobile broadband networks in the world.

Nokia currently is a supplier to the world's top 18 of 20 LTE operators, serving 73 percent of all LTE subscribers globally. Nokia today has 385 LTE customers with 322 LTE Radio and 168 LTE Evolved Packet Core (EPC) customers, supplying one-third of live LTE networks, 200 SDM customers serving more than 4 billion subscribers, and is a recognized industry leader in IP Mobile Backhaul and Transport with more than 720 customers of mobile broadband worldwide.

Nokia has 450+ enterprise customer references of P-LTE (Private Long-Term Evolution) and/or NDAC (Nokia Digital Automation Cloud) trial and live deployment globally that shall be shared upon award (subject to customer confidentiality).

Through a 60-year track record of working with enterprise and government customers Nokia designs, implements, operates, and supports advanced telecommunications solutions and

services for enterprise segment, smart city, utilities, public safety, transportation, healthcare, hospitality, education, manufacturing, and warehouse/logistics industries around the world. These projects range from access and backbone infrastructures for inter-office administrative networks to next-generation mission-critical broadband networks. With an extensive products and services portfolio, Nokia is the only vendor able to provide best-in-class end-to-end network infrastructure that is IP reliable, resilient and secure systems encompassing access, optical, IP and microwave routing, core, as well as applications. Further, their advanced features for quality of service, priority and security functions meet the needs of the enterprise industries and public safety community. With its world leading services organization whose responsibilities include network planning and optimization, network implementation, integration services to build and deploy the network, along with managed and care services to maintain and evolve that network, Nokia offers it all.

Alliance, partnered with Nokia, has become a leader in providing the world's most efficient and cutting-edge mobile network solutions and is established firmly in the market. The innovative, foresighted, and most customized approach towards our customer's problems allows us to deliver a solution that turns business challenges into opportunities. Working closely in sync with our customers, P-LTE ensures new capabilities and access as well as business advantages. Alliance is happy to provide a turnkey Private LTE (P-LTE) network that fully meets the RFP requirements and provides the City of Perris with the following unique proposition:

- Dedicated PMO team which will manage all aspects of the project streamlining deployments and enabling parallel management of activities; reducing the need of project oversight by the customer.
- Reduced TCO with best-in-class site solution, small base station footprint, low power consumption and software-based capacity evolution, scalable to meet customer requirements.
- Long-standing track record of building Mission-critical/ M2M networks for Cities, Counties, Energy, Transportation, and Public Safety operators.
- Best investment protection and evolution path with a standardized and interoperable solution.
- Most efficient and cost-effective appliance based on Nokia Evolved Packet Core solution with HPE hardware giving leading throughput, signaling capacity and session density.
- A solution from the only vendor that has a solution which can be sized and packaged according to any business needs
- Global and local services organization to provide network build, optimization, integration, support, and operational services
- Centralized management system for monitoring/configuring the network from a centralized location

Our solutions have smooth interconnectivity with other leading telecom vendor's products and comply with 3rd Generation Partnership Project (3GPP) specification allowing scalable hardware to meet the growth in traffic. It is possible to cross-use hardware and scale up as required to meet the highest capacity needs. With its many features complying with the recommendations of internationally recognized bodies such as 3GPP, the proposed solution presents a scalable and flexible multimedia provisioning platform for the rapid and easy introduction of new and profitable IP-based services.

Nokia is an industry leader in providing a robust suite of integrated network services. Their consultancy, systems integration and managed services support are superb, while their

professionals and next-generation tools ensure perfectly implemented network designs that are properly dimensioned to eliminate LTE deployment risks. Their experts are always available to help the City of Perris to understand the true capabilities of their networks and potential networks.

Nokia has a time-tested legacy in providing Radio Access Network (RAN) solutions that are highly customized in nature, designed keeping in mind the essential prerequisites of operators. Nokia's deployments have been established and measured by their success in the most advanced markets and its real-life performance in the toughest conditions enabled by unmatched products. Nokia's ingenious and most contemporary Radio Access solution will enable the operator to build a state-of-the-art network at minimal cost and provide our customers with the best-in-the arena end-user experience.

# 2. City of Perris Solution Description

## 2.1. Solution Summary

Nokia's proposed solution provides City of Perris all the components required to provide reliable WiFi internet access to citizens and employees of your park system. The solution consists of four basic network components.

1. Rugged Routers: Public WiFi access in the parks is provided via an outdoor ruggedized router in each park.
2. LTE Radios: The routers connect wirelessly to the network via a secure private Long-Term Evolution (LTE) Radio Access Network (RAN).
3. Microwave Transport: The internet traffic is consolidated and backhauled to a central location (Perris City Hall) via a series of point-to-point microwave radio links from each LTE radio site.
4. LTE Core: The network and customer traffic are centrally controlled in the city hall site by the Nokia Digital Automation Cloud (NDAC) platform.

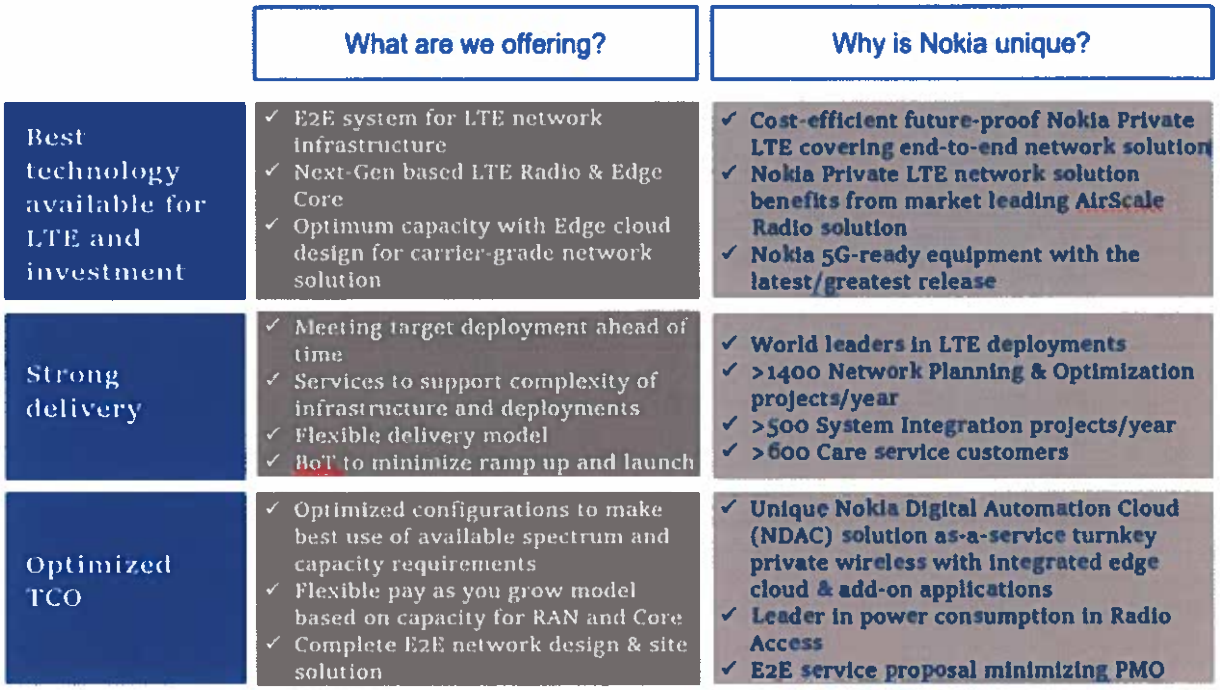


*Figure 1 Nokia's Proposal: Supporting the City of Perris to build a unique Private LTE Network*

The solution is designed to minimize network components and complexity while maximizing coverage of the city's parks. In addition, Nokia simplifies operation of the network by pre-configuring the network components before delivery and providing remote support to keep the LTE network current. Nokia proposes 11 LTE radio sites to cover the parks. The microwave transport design includes 13 microwave paths to connect the LTE sites together with network resiliency. Perris city hall will be the hub of the network where control, security and internet access are provided.

The Nokia solution approach involves design-build-integrate-maintain a Private LTE network infrastructure using CBRS spectrum for GAA deployment with assumption of 40 MHz cell bandwidth is available in the area including SAS subscription for Nokia FCC certified CBSD equipment.

The Nokia Digital Automation Cloud (NDAC) solution will create a P-LTE network infrastructure that has unmatched geographical reach providing the City of Perris the flexibility to add any end-node device anywhere in the coverage territory by simply deploying a Nokia FastMile LTE receiver/CPE or any other CBRS certified End User Device (EUD). This network will provide the platform that will help scale enterprise service line network on demand up to the envisioned hundreds of thousands of devices or more with only incremental investment on the infrastructure.

## 2.2. Services Summary

Nokia's response includes extensive remote and on-site services to survey, design, configure, install, integrate, and test the city's new network. RF design, LTE core and RAN design and configuration are part of the NDAC implementation. Engineering, path surveys, and FCC license coordination are included in the microwave services. Preliminary information indicates that 4 of the 11 sites require LTE and microwave radios to be mounted nearly 60 feet high to meet coverage and connectivity requirements. Nokia provides monopoles architectural, engineering,

and installation services in this proposal. If, upon selection, alternative mounting options become available, Nokia will work with the city to incorporate the optimal result. Project Management is included to be a single contact point for all planning, coordination, and deliverables.

Selecting the Nokia solution positions City of Perris for the future. Providing WiFi in the parks is just the beginning of the possible use cases for this network. City of Perris will have options to add smart devices, video cameras or connectivity to surrounding non-park locations, for example.

# 3. Nokia Private Wireless Solution

Our industrial-grade Private Wireless solution is based on private Long-Term Evolution (LTE) technology meeting the stringent wireless transmission requirements of today's modern enterprises. We are offering a first of its kind pre-configured, plug-and-play private wireless solution combining superior wireless coverage with easiness in deployment and operations:

- Converged wireless platform enabling a variety of business-critical voice (optional), data and video services with a scalable solution design to grow technologically along future demands
- Reliable, secure, and high-performing wireless broadband and low-latency connectivity, leveraging standardized 3GPP technology, implementing state-of-the-art digital communication and modulation techniques
- Click-and-deploy wireless systems complementing the private wireless network with applications, user equipment and network configurations
- Cloud-based management and monitoring system reducing operational complexity by automatic network monitoring, software updates and remote support with access to an online management portal for local IT providing maximum network control

## 3.1. End to End Solution Architecture

Nokia Digital Automation Cloud (NDAC), 3GPP compliant, introduces architectures for LTE wireless private E2E solution, enabling enterprises to take the next step toward digital automation with smart manufacturing and remote operations.

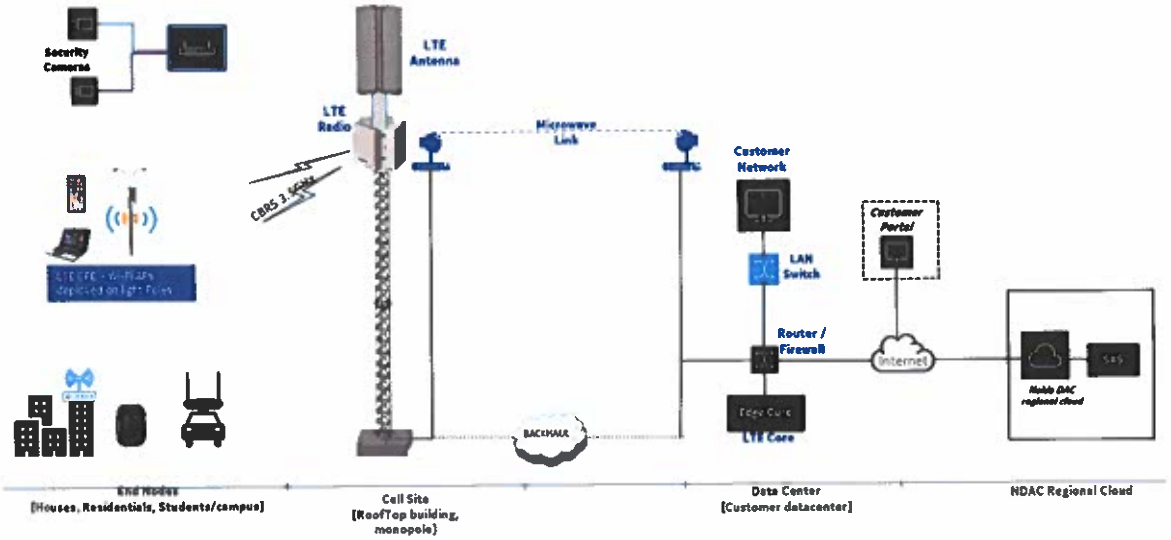


*Figure 2 E2E Solution architecture of the NDAC Private Wireless solution*

**Proposed Use Case: LTE CPE Router (ruggedized)**

Typical NDAC LTE eNB is an Omni or directional 3 sector site. The number of sectors is based on capacity and coverage needs. Each eNB requires a 1GE backhaul towards the local switch/router at each deployed location connected to the centralized EPC Core at your City Hall hub site.

Nokia's NDAC LTE eNB is typically deployed with 4 x 4 MIMO and 2 Carrier Aggregation up to 40MHz of spectrum.

Our MBO Radio can support up to 40MHz (2x20MHz) spectrum.

For Microwave backhaul, Nokia is offering two Blocks:

Ultra-Broadband Transceiver (UBT) - Generally full outdoor or standalone system with where the radio is integrated into the antenna. An AC to DC power supply will be installed for each site.

Microwave Service Switch (MSS) and UBT - Split mount configuration will be deployed at the Perris City Hall as it is the hub. The MSS-8 indoor unit will manage the traffic and the outdoor radio with integrated antenna will be installed on the outside on the roof.

Outdoor Power Units for support mounted as follows:
- 4 OAPCS mounted on poles
- 4 OAPCS mounted on monopoles
- 3 OAPCS mounted on Rooftops

## 3.2. LTE RF Coverage

Our NDAC LTE solution will provide wireless broadband services for City Parks & Buildings in designated areas.

As mentioned in the RFP site locations at Addendum '1' are selected as potential sites for preliminary design and towers up to 60 -80ft feet.

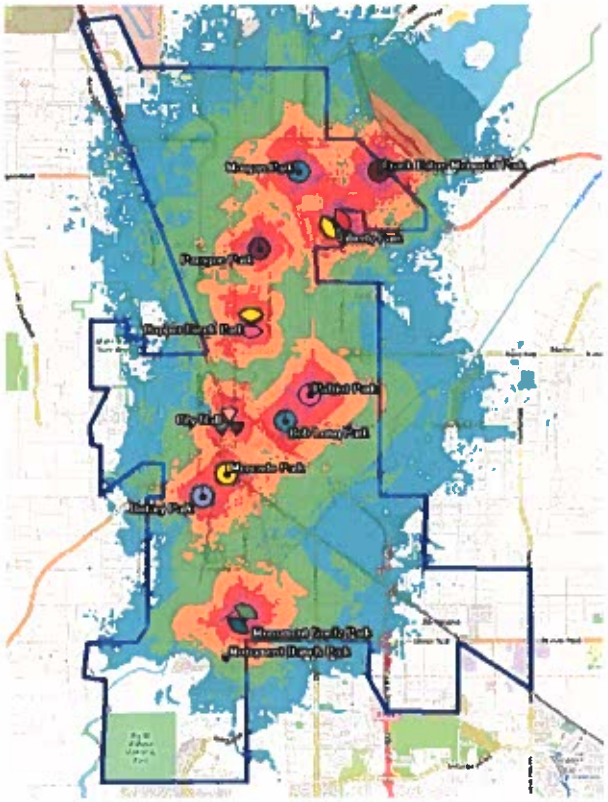

*Figure 3 User location overlay with planned coverage of 11 sites*

- In this scenario, Sites are selected from the list of parks provided by the Customer
- Propagation & coverage plots were generated based on Indoor FM Gateway with 5dBi gain.
- Min RSRP Coverage Level: -114 dBm
- 11 site locations identified as a targeting the max coverage area

## 4. Nokia Private Wireless Product Description

The following hardware, subscription and services components of Nokia DAC will comprise the private wireless network deployed for the City of Perris.:

1. Core solution consisting of industrial computing hardware and firewall router.

   a. Industrial computing hardware, the Nokia DA Edge, will be installed in the IT room of the city. It will run a complete virtualized 3GPP Evolved Packet Core (EPC) as well as Nokia DAC specific functions for system automation, network operations and management, software management and IP networking.

   b. A firewall router, the Nokia DA Firewall, will be deployed next to the DA Edge. This firewall router enables different hardware components to communicate with each other securely and connects the local private wireless network to the DAC Regional Cloud.

2. Radio solution with LTE Access Points will create the private wireless connectivity framework for all user equipment. The Access Points will be deployed in a distributed manner throughout the city park locations.

3. SIM cards in all form factors are available for user equipment. Nokia DAC SIM cards provide secure access to the private wireless network and allow SIM specific configurations (e.g., IP address, QoS, etc.) via the Nokia DAC Manager.

## 4.1. Nokia DA EDGE Core

The software required to activate an on-premises private wireless network runs in part on the DA Access points and in part on the DA Edge hardware located on the customer premises. The DA Edge runs virtualized functions including a local connectivity network in accordance with parameters, uniquely tailored to the city's use case. Customers can further leverage the wireless connectivity to boost productivity and automation goals by choosing from a variety of applications designed to run on the DA Edge. The correct configuration and type of DA Edge solution will thus depend on both the size of the enterprise network and the applications running on it.

DA Edge hardware is connected to a secure service gateway allowing the different network components to communicate with each other. The services gateway consolidates networking and security capabilities for customers. It provides cost-effective, scalable integration of routing, security, and switching in a single device. DA Edge node(s) (i.e., servers) include complete virtualized 3GPP Evolved Packet Core (EPC) functionality and management for EPC functions as well as Nokia DAC specific functions for system automation, network operations & management, software management and IP networking.

The main 3GPP virtualized core functions are:

**For 4G solutions:**

- **Mobility Management Entity (MME).**
- **Gateway functions.**
- **Home Subscriber Server (HSS).**

### 4.1.1. Nokia DA Edge Capabilities

DA Edge is the central control element in the customer premises. The DA Edge has HTTPs based control interface to Nokia DAC regional cloud. This control interface enables automatic deployment of software running on the DA Edge and DA access points as well as management of configuration parameters of DA Edge functions and DA access points. The control interface also provides fault and performance data for operations purposes. The DA Edge consists of following generic functions:

- Nokia DAC platform software running all functions as microservices
- Automation for DA Edge software management as well as for deployment and maintenance of microservices running in the DA Edge node
- Operations and management relay between DA access points and Nokia regional cloud
- Ethernet, Virtual LAN (VLAN) and IP interfaces and protocols to switches and routers, access points, DNS, NTP, and HTTP(s) proxy.
- S1 Transport on customer network: this feature allows customers to use their existing IP transport network for connection between Access Points and Edge.

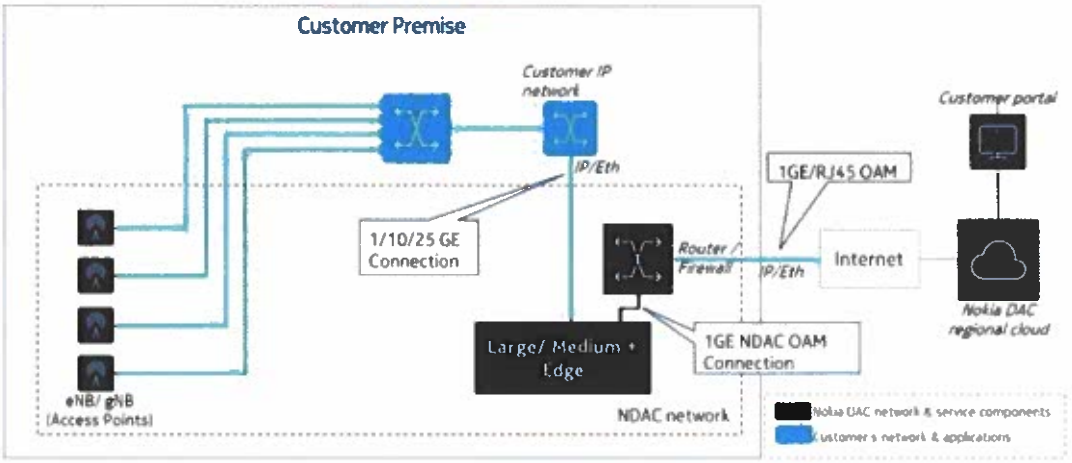


*Figure 4 Generic network architecture*

DA Edge platform enables locally optimized packet routing which, for instance, can be used to ensure that user plane traffic will not leave the customer premises, if desired. Locally optimized routing also increases customer wireless network resiliency in situations where connections to the Nokia DAC regional cloud would be disrupted (e.g., failure of the customer's internet access).

DA Edge robustness is further enhanced by the following features:

- The DA Edge continues working even in offline mode in accordance with a defined timeline. This is helpful in case of internet access break and disconnection from Nokia DAC regional cloud.
- All data in DA Edge is encrypted providing a high level of security.
- All software updates and upgrades are facilitated without manual intervention.

The Edge solution scales alongside network size and required features. The following DA Edge hardware type is offered for this response.

NDAC license capacity bundles: 4G-LTE

- Medium+ capacity bundle = NDAC for 10 Gbps/2000 users/50 radio licenses/ 10vCPUs

## 4.2. Nokia Radio Solution (Access Points)

Nokia DA radio network includes only the Nokia Radio Portfolio which consists of the following components:

- 4G Micro RRHs (AZQC)
- 4G Small Cells (MBO)

AZQC: Micro RRHs are in turn attached to the AirScale 4G Baseband units (BBUs) to complete a distributed architecture.

FW2QQF: B48+B48 Flexi Zone Multiband Outdoor Micro BTS (FW2QQF) is a dual-band Flexi Zone Multiband Outdoor (MBO) platform BTS supporting LTE TDD full band class B48.

### 4.2.1. Nokia Airscale eNodeB (Micro RRH)

Capacity, performance, low total cost of ownership, investment protection and smaller footprint are some of the special incentives of owning Nokia eNodeB (RRH and BBU). Nokia RRH

(Remote Radio Head) are available for licensed bands and un-licensed/lightly licensed CBRS LTE band 48. Nokia has multiple variants for band 48 operating under the norm of CBRS allowable EiRP for both indoor and outdoor use cases. RRH's can support 256 QAM modulation for higher data rates.

### 4.2.2. Nokia AirScale System Module

Nokia AirScale System Module consists of an AirScale Indoor Subrack (AMIA) or AirScale Outdoor Subrack (centralized indoor Subrack is considered for this offer) including backplane for high bandwidth connectivity between processing plug-in units. One or two AirScale Common (ASIB) plug-in unit(s) for transport interfacing and for centralized processing. One or up to six AirScale Capacity (ABIO) plug-in unit(s) for baseband processing and for optical interfaces to radio units. Minimum configuration is comprised by one Subrack with one Common plug-in unit and one Capacity plug-in unit. Different sub-rack configurations are defined by separate features on SW release basis.

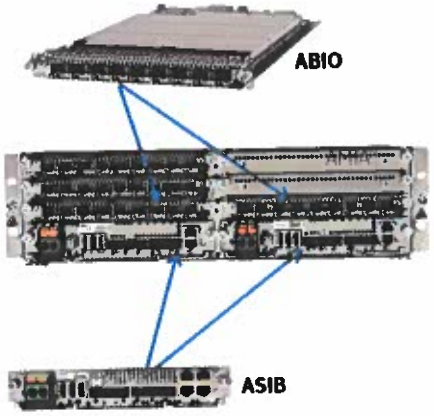


*Figure 5 AirScale System Module Slots configuration*

Indoor AirScale Subrack consists of the following items in a minimum starting indoor configuration:

- One Indoor AirScale Subrack (AMIA)
- One AirScale Common plug-in unit (ASIB)
- One AirScale Capacity Extension plug-in unit (ABIO)

The processing capacity of the AirScale System Module can be extended by adding more ABIO plug-in units. One half of the Subrack can accommodate one ASIB plug-in unit and up to three ABIO plug-in units within the left or right half of the Subrack. Further, one indoor Subrack can accommodate two of the above sub-configurations within 3U height. Maximum capacity of the AirScale System Module (AMIA) is shown in Figure below:

The Nokia AirScale System Module provides the following benefits:

- Very high capacity
- Support for GSM, WCDMA, LTE and 5G
- Highly scalable architecture, both intra-System Module and inter-SM, through extension ports
- Rich fronthaul and backhaul connectivity
- Optimized power consumption

Nokia AirScale Indoor Subrack (AMIA), depicted in Figure 4, has 3U height and can be installed in floor/stack, fit into a standard 19" rack or stacked on top of each other. AMIA Subrack

provides indoor housing, cooling and high-speed connectivity for AirScale Common and Capacity plug-in units. It includes fans and backplane for internal communication and DC-feed. Cooling air direction can be changed by rotating fans. Default direction is front-to-back.

*Figure 6 AMIA Indoor Subrack (empty)*

Nokia AirScale Subrack (AMIA) main properties are:

- It supports up to two AirScale Common plug-in units (ASIB)
- It supports up to six AirScale Capacity plug-in units (ABIO)
- IP20 ingress protected
- Indoor operating temperature range: from -5°C to +55°C
- It can be installed inside a 19-inch-wide rack or cabinet
- Common casing for 2G/3G/4G and 5G (8 slots for plug-in units)

### 4.2.3. AZQC AirScale Micro RRH 4T4R 20W

AZQC AirScale Micro RRH 4T4R 20W is introduced with LTE3628 HW feature, an optimized high-power RF for 4 path MIMO single sector deployment, radiating 4 x 5 W output power at Band 48 is shown below.

*Figure 7 AZQC AirScale Micro RRH 4T4R 20W*

Benefits

- Increases revenues by providing fixed services on mobile infrastructure.
- Error-free installation with the Nokia Wireless mobile application
- High gain antenna ideal for rural applications
- High spectral efficiency lowers RAN costs
- Subscriber self-install reduces costs and improves a fixed wireless access (FWA) business case

AZQC AirScale Micro RRH 4T4R 20W supports the following interfaces described in Table below.

| Interface | Label on the HW | Number of Interfaces | Connector type | Additional info |
|---|---|---|---|---|
| Power connector | DC IN | 1 | DC Octis Plug Kit | Hot insert not supported |
| Antenna connector | ANT | 4 | NEX 10 | - |
| External Alarm Connection/Fan | EAC/FAN | 1 | CIRC 8F IP67 Flange | Hot insert not supported |
| LED | UNIT | 1 | - | - |
| Optical Interface | OPT | 2 | OCTIS Plug Kit SFP/SFP+ | 9.8 Gbps, CPRI |
| Ethernet | RJ | 1 | RJ45 | Separate feature required to enable this interface |
| Grounding | GND | 1 | M8 or dual M5 screws | - |

*Table 1. AZQC AirScale Micro RRH 4T4R 20W Interfaces*

### 4.2.4. Multi Band Outdoor (MBO) Micro BTS

The Flexi Zone (FZ) Multiband Outdoor (MBO) Micro BTS (also referred to simply as the "MBO") is a multi-band second-generation small cell BTS optimized for an outdoor micro-cell environment. The product design utilizes a small cell-specific radio architecture based on a radio frequency integrated circuit device, and an integrated baseband processing solution that enables feature parity with Flexi macro BTS solutions

The Flexi Zone MBO Micro BTS contains multiple radio modules to support up to three band classes and optionally Wi-Fi.

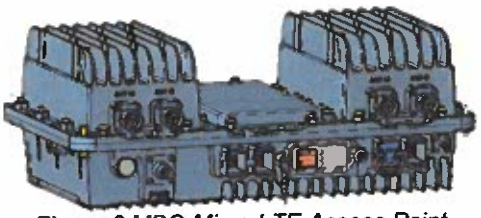

*Figure 8 MBO Micro LTE Access Point*

These LTE Access Points are categorized by the following features:

- High capacity
- Carrier-grade software quality (macro parity)
- Proven plug & play for light touch install
- Flexible backhaul, power and sync solutions

These LTE Access Points have the following specifications:

| Specification | Details |
|---|---|
| Supported frequency | 3550 - 3700 MHz (Band 48) |
| RF power | 250 mW – 2 W per Tx branch, |
| | 2 x RF units |
| Carriers | Max 2 x 20 MHz UL/DL |
| | (+ 3rd 20 MHz supplemental DL carrier) |
| Bandwidth | 10, 15, 20 MHz per carrier |
| Antenna configuration | Single sector or Omni |
| | 2 x 2 MIMO, |
| Synchronization | GPS, IEEE1588v2 |
| Backhaul | Fiber SFP (outdoors) |
| Input Power | 90 – 264 VACS |
| Weight | 11.3 kg |

*Table 2. Micro AiO LTE Access Point specifications*

The main application of this BTS is to help deliver an improved mobile broadband experience by enhancing coverage and capacity both indoors and outdoors. Thanks to its small size and fan less solution the BTS can be used in micro cell applications. It can be deployed at street level and on rooftops to cover traffic hotspots, fill network coverage holes, and improve coverage at parks, airports, railway stations, Port terminal and other Enterprise sectors.

### 4.2.5. Considerations

- Access Points typically installed on Monopoles/Rooftop or light poles while BBU installed in IT room if applicable.
- Customer operations use cases are typically UL driven, hence Small Cell (Size: Micro) is preferred as a more cost-effective AiO option
- Required quantity of Access Points to cover Enterprise sector with private wireless connectivity is driven by
    - Spectrum parameters (LTE band, Frequency in MHz, Duplex mode, Bandwidth in MHz)
    - Access Point product parameters (Type of Access Point product, count of carrier, Count of Tx, Max. output power per Tx in W, Count of Rx, Typical antenna gain in dBi)

## 4.3. Nokia Digital Automation Cloud (NDAC)

Nokia DAC provides an optimized wireless solution that matches the demanding connectivity needs of the city. It is a reliable and secure solution for challenging conditions. It is future proof as it can scale up and down according to the changing needs. The solution meets the typical requirements of Enterprise customers in terms of network coverage, capacity, reliability, quality of service, and security as well as connecting wide variety of devices.

**Standard Nokia DAC service**

Standard Nokia DAC offers an easy-to-use self-service interface for network management tasks, such as adding new networks or managing SIM cards, adding and removing devices and features, viewing real-time information on Nokia DAC Web Portal with the status and utilization of network and devices as well as radio network and edge cloud health. In a commercial deployment, the web-based self-service interface can be used by the customer personnel directly. Nokia DAC also enables access to other network management and operations solutions and integration with 3rd party applications via well-defined application program interfaces (APIs).

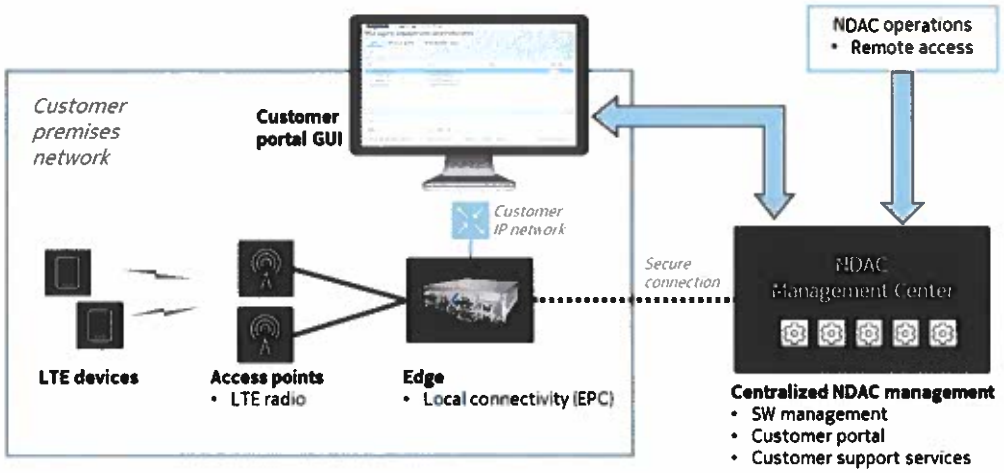


*Figure 9 Standard Nokia DAC overview*

Operating a private network requires very limited manual work as Nokia DAC service is orchestrated and maintained from Nokia DAC regional clouds, which are designed with high availability and secure architecture including multiple levels of redundancy for problem situations, and continuously increasing level of automation. Cloud based management is enabled with the connection of local edge to regional cloud through the Internet. This, in turn, enables remote changes, re-load of configurations, and application of SW changes. The local network will continue to function despite lost connection, but it's advisable not to stay disconnected for periods over one month to ensure the solution remains operational without disruption. Additionally, NDAC solution includes monthly subscription for an agreed period.

**NDAC Regional Cloud Manager benefits:**

1. Flexible solution with a Pay-As-You-Grow Models
2. Monthly/Yearly Subscription for NDAC services
3. User Data stays with Client control
4. Nokia Digital Automation can provide a pre-configured Open NMS solution
5. NDAC Self Service management portal for full NDAC service control e.g., Service provisioning, Spectrum Management

Nokia Spectrum Controller (NSC) is an integral part of the Nokia DAC solution. It provides spectrum management and channel allocation capabilities for the shared, licensed, and unlicensed spectrum. For the U.S. 3.5 GHz CBRS shared spectrum, NSC provides the Spectrum Access System (SAS). SAS will be deployed on the Nokia DAC regional cloud data center.

# 5. Nokia Microwave Solution

Nokia Wavence microwave is a full packet solution which has been continuously evolved to address increasingly stringent transport requirements. The new era of telco cloud and 5G requirements can hence be reliably addressed.

Nokia Wavence microwave provides innovative, high-capacity Ultra-Broadband transceivers (UBT) to support operators in the transition to 4.5G, 4.9G and 5G networks. 5G has introduced new requirements for transport networks in terms of capacity and latency.

Nokia Wavence is a native-packet solution with optimal TCO and high-level quality, designed to address networks where packet-based traffic is becoming (or planned to be) predominant, while ensuring full backward compatibility with existing legacy PDH and SDH technologies.

Nokia Wavence microwave solution proposed comprises of following products:

| Network Element | Product Name | Quantity |
|---|---|---|
| Indoor unit | MSS-8 | 1 |
| Outdoor unit | UBT-S | 26 |
| Outdoor Power Unit | OAPCS | 22 |

*Table 3: Microwave proposed products*

The preliminary microwave path design below, backhauls all traffic from the 11 LTE radio access sites back to the NDAC Core Edge at the City Hall site. It creates resiliency by providing transport rings which allow traffic to continue flowing even when a path is out of service.

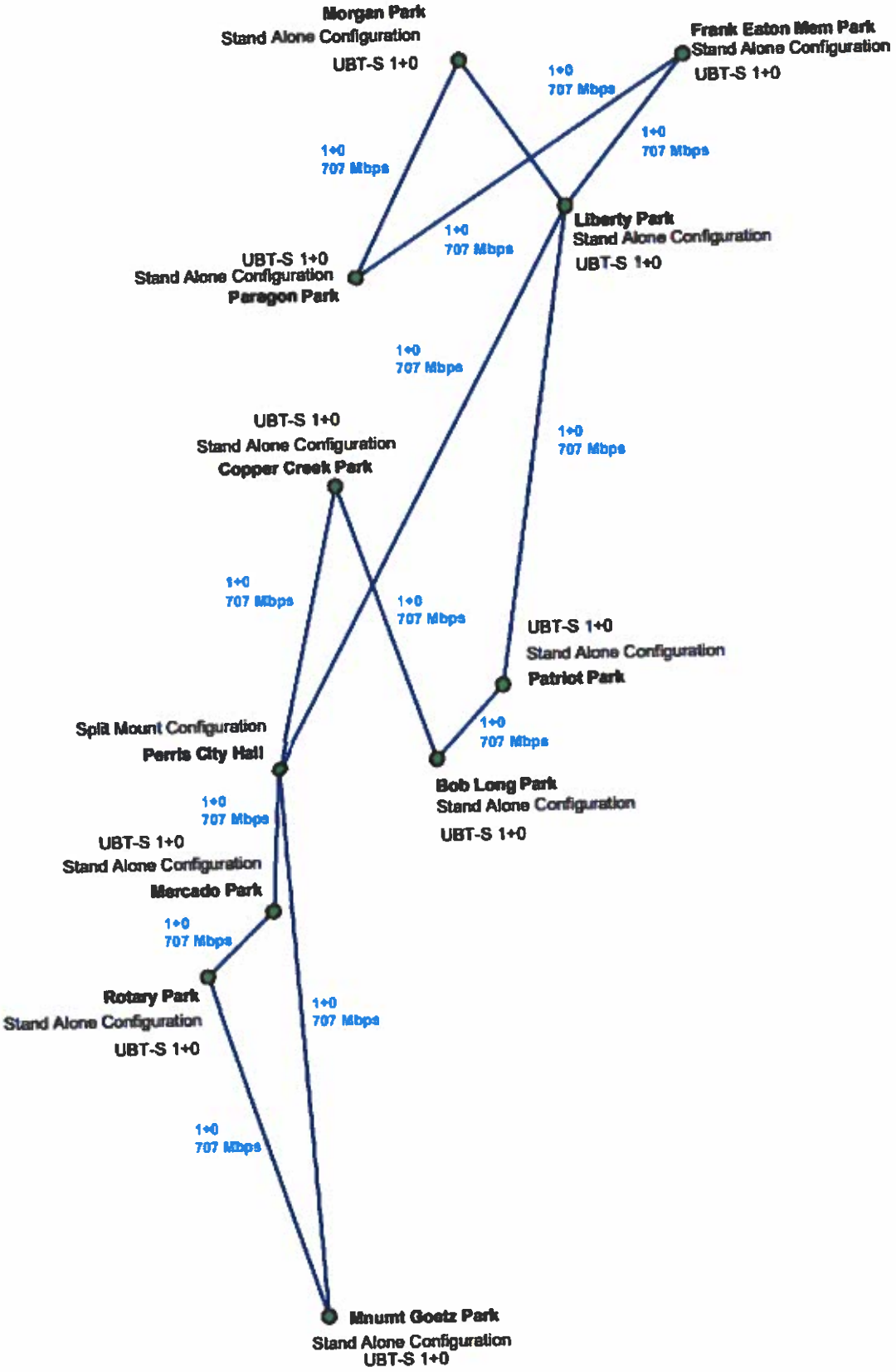


*Figure 10 Preliminary Microwave Path Design*

## 5.1. Microwave Transport Solution

Nokia Wavence microwave is a best-in-class solution to build reliable and efficient communication links while utilizing the available RF spectrum to the maximum extent.

Nokia Wavence, with its unique design, supports ultra-high capacity and impressive latency benchmarks, which makes microwave a technically competitive and yet economical solution for next generation transport.

This section describes each of the solution components in detail. Each sub-section provides details on the proposed solution and highlights the main associated benefits.

### 5.1.1. Microwave Solution Overview

Nokia Wavence microwave solution is composed mainly of two main building blocks:

- Full Outdoor: Utra-Broadband Transceivers (UBT)
- Split Mount
  - Indoor Unit: Microwave Service Switch (MSS)
  - Outdoor Unit: Utra-Broadband Transceivers (UBT)

### 5.1.2. Split Mount

A split-mount installation consists of a transceiver and an MSS unit. The installation can be all-indoor, with an indoor MSS unit and an UBT, indoor-outdoor with an indoor MSS unit and an UBT ODU.

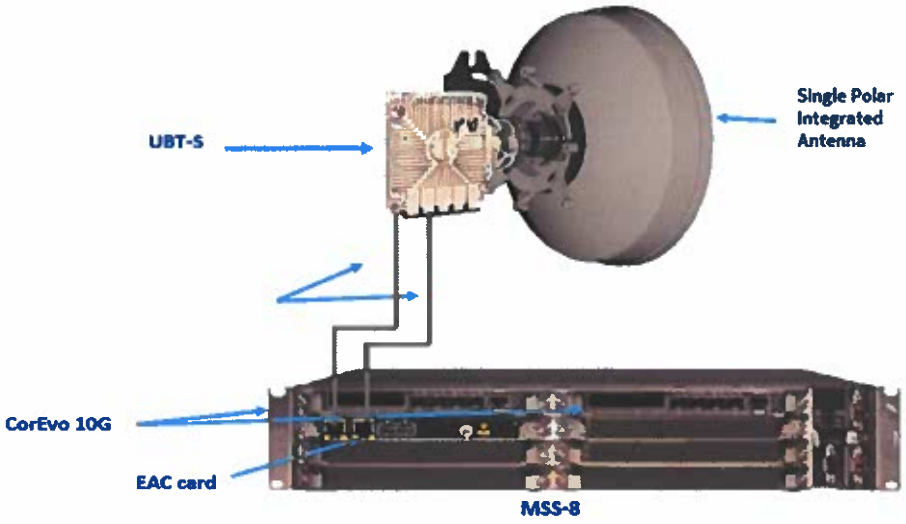


*Figure 11 Split Mount Configuration*

## 5.2. Product Overview

### 5.2.1. UBT Standalone (UBT SA)

Wavence supports the UBT in Standalone mode with same HW that is used in split mount mode. Software configuration is enough to move from one topology to the other. Standalone (SA) mode means the UBT will work as a self-supporting system managing the data and control plane without the need for another device (MSS). The following UBT variants are supported in SA mode: UBT-T UBT-S UBT-m.

*Figure 12 Stand Alone Configuration*

### 5.2.2. Ultra-Broadband Transceivers

**UBT-S (Single Carrier Transceiver)**

UBT-S implements an innovative product design offering a "single carrier in a box", equivalent to that offered in UBT-T where the hardware split between the active wideband radio part and the Antenna Interface Module (AIM), a passive component interfacing the antenna. This simplifies maintenance and spare part management.

*Figure 13 UBT-S with AIM and antenna*

UBT-S can address both full-outdoor or 'stand-alone' and Split-mount architectures using the same hardware. The features supported by UBT-S are:

- Capacity: 4xE1 to 255xE1
- High performance dual carrier radio unit in one box
- Frequencies: 6 to 42 GHz

- Modulation: QPSK to 4096 QAM
- Channel size: 7 to 112 MHz (ETSI)
- Throughput: 1.3 Gbps
- Latency: down to 50 µs
- XPIC and High PTx
- Y.1731 BNM
- Interfaces:
    - Electrical 1Gbps (PFoE)
    - Optical (SFP)1/2.5/10 Gbps
    - Optical (SFP) 1/2.5/10 Gbps/ Coupling/ Management
    - DC power (bi-filar or Coaxial)

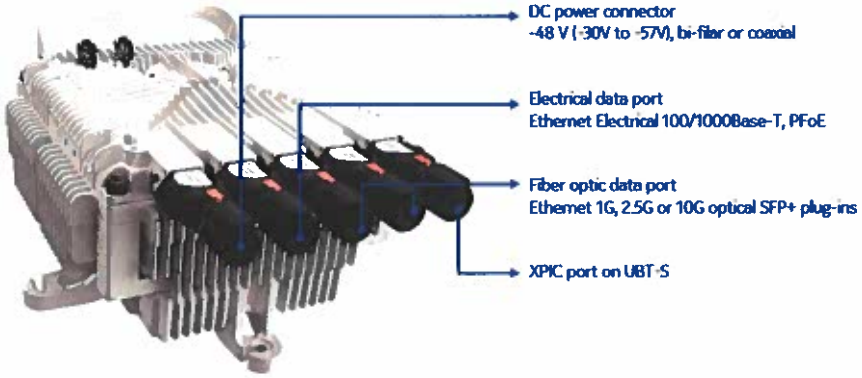


*Figure 14 UBT-S Interface Details*

Note: Configurations and features will be available as per the roadmap.

### *5.2.2.1. Microwave Service Switch (MSS)*

Microwave Service Switch (MSS) is a service switch that includes user interfaces, switching capability, multichannel functionality, and radio protection. It can also operate as a stand-alone site aggregator.

MSS-8 is a 2RU shelf supporting up to 2 CorEvo, 6 peripheral plugins and 18 radios.

MSS-8 slots:

- Slot 1 is dedicated to the CorEvo Main Board
- Slot 2 is dedicated to the CorEvo Spare Board
- Slots 3-8 are universal and can be used for transport and/or radio plug-ins
- MSS-8 supports a dual battery input.

*Figure 15 Wavence Outdoor AC Power Supply (OACPS)*

### 5.2.3. Wavence Outdoor AC Power Supply (OACPS)

Input and Output supported on OACPS:

- 100 – 240 VAC input, with hot, neutral, & ground connections using same plug as MSS-O
- -54VDC +/- 5% VCD Output on a N-Type Female Coax Connector
- Supports up to 150W on the Output

Protections provided by OACPS:

- Input: Hold Up capacitor for up to 50ms at nominal input - in case of AC power fade.
- Dual hole ground lug to ensure solid ground connection
- AC Lightning Protection: GR-1089 sect.4 Type7 / IEC 61000-6-5 (table 9, level 4)
- DC Lightning Protection: GR-1089 sect.4 Type 8.a / IEC 61000-6-5 (table 10, level 4) / ITU-T K20, K21, K45 enhanced level without external protection

Environmental conditions supported:

- GR3108 class 4: -40°C to +46°C with solar load
- EN 300 019-2-4: -33°C to +55°C
- Operating humidity: 0 to 95%
- IP65 rated
- Calculated MTBF: 57 years

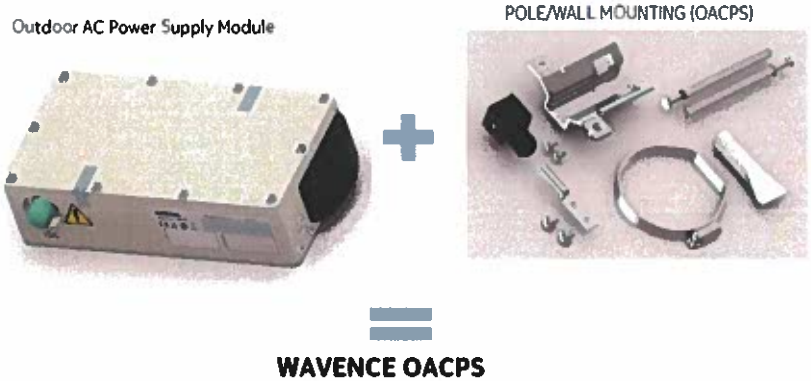


*Figure 16 OACPS Components*

## 6. Engagement and Implementation

The following services are detailed in this document.

1. RF Plan – Size Dependent
2. Site Survey
3. Network planning
4. Radio Installation, Commissioning, and Integration support
5. End-to-End System Testing Remote Support

### 6.1. NDAC Deployment Services

Scope of deployment services covers the phases from planning of the network through validation of network connectivity after installation is complete. This includes all activities to be completed before the city can use the NDAC service, i.e., hardware delivery, configurations, installations, verification and activating the service account.

Nokia DAC regional cloud runs in Nokia-controlled data centers, fulfilling Tier III data center requirements, including the same security standards applied for commercial mobile networks.

Network security in current configurations is based on SRX300 firewall, or optionally, on SRX345 with integrated mobile broadband WAN interface.

### 6.1.1. Delivery and Pre-installation

Delivery and pre-configuration service are included in the Nokia DAC monthly subscription fee.

It covers all the activities carried out before the Nokia DAC equipment arrives at customer site with plug and play readiness:

1. Order management and component purchases
2. Collecting pre-information and configuration data inputs from site survey and site design
3. SW installation
   a. SW installation to access points, routers/switches, and edge cloud
   b. SW commissioning, pre-configuration, and pre-integration
   c. SW validation and testing with customer configuration
4. HW Installation & packing
   a. Installing servers in rack (if applicable)
   b. Intra-rack cable installation (if applicable)
   c. Installation material; antennas, cables, installation kits as per bill of materials
5. Customer account creation: Customer account is created on the NDAC cloud. Service and admin credentials will be sent to customer after shipment (customer needs to activate their account to NDAC service after installation of the equipment)
6. SIM cards provisioning for the customer network
7. Equipment shipment to customer site

NDAC order forms with all required customer delivery details and product configurations need to be sent to da.orders@nokia.com to start the delivery preparations. Estimated delivery time will be provided after receiving the order (delivery time depends on the availability of the different components in the stock and the required configuration). As part of the equipment order the following information is needed to ensure smooth handling and processing of the order:

- Customer name
- Invoicing and delivery address
- Customer Network Owner details for setting up the customer account in the Customer Portal (First Name, Last Name, Organization, Location, Company Email)
- Edge and access point models and amounts
- Contract and subscription period
- Radio kits and Edge cloud will be delivered as pre-configured unless otherwise agreed.

Radio kits and Edge cloud will be delivered as pre-configured for customer environment unless otherwise agreed. For the pre-configuration of the edge and access points the following information is needed related to customer environment and planned set-up:

- Size of the ordered Edge Kit (small, medium, large)
- For each hardware component Serial Number
  - Model

  - Lat /Long
  - Location
  - Region
- Access points o number of APs (has relation to the Edge Kit)
  - radio type (indoor/outdoor)
  - desired transport layer (fiber/copper) if any
  - selection of BTS synchronization option
  - selection of BTS transmission (S1) option
  - selection of the number of BTS cells per sector (Frequency No1. and Frequency No2.)
  - selection of NDAC supported and customer requested Private LTE Band to be used
  - frequency band to used (lower and upper frequency)
  - customer requested EARFCN of cell (1st Cell)
  - customer requested EARFCN of cell (2nd Cell if requested in the selection of the Cells)
  - customer requested EARFCN Channel Bandwidth
  - selection of the antenna options
  - CBRS products specific selection, usage of external SAS and proxy (URL, DNS)
  - selection of the usage of Carrier Aggregation vs. Layering (F1-F2)
  - number of Access Points needing hand over (HO)
- Number of SIMs (depending on the Kit size / customer need)
  - need of static IPs (can be added also later)
  - mobile network (NDAC default or customer own)
  - need of multiple APNs
- Any other customer specific requirements for networking
  - Use of RSTP, OSPF etc.
  - SAS option and proxy usage in CBRS products
- Internet connectivity if installation done at customer site
- Description of the customer use case(s) to configure for right type of use and to enable testing and verification against the use case(s)

Edge Cloud core and router/switch SW is installed with the USB Installer which automates many steps of the configuration process and speeds it up. Access Points are installed with BTS Manager. In the future, this process will become fully automated enabling SW installation and configurations downloading over the air, even from the customer site.

## 6.2. Deployment Services

Nokia will conduct installation and commissioning for LTE Access Points and DA Edge components. All tasks are carried out in accordance with Nokia manuals, test procedures and according to relevant national stipulations and mutually agreed standards.

### 6.2.1. Microwave Engineering

Site Surveys will be performed to document the areas where the microwave radio equipment will be installed in the field.

Path Surveys and system design engineering services have been included. Path surveys will verify that the microwave paths do not have obstruction interference and can perform according

to specifications for bandwidth capacity and availability objectives. A detailed Path Survey report will be provided after physical survey information is compiled.

FCC License applications for each site, Frequency Selection for each path, and Prior Coordination notices will all be provided. System as-built drawings will be provided once the installation is complete.

All of the network backhaul components will be set up and interconnected at the Nokia staging facility where configurations can be loaded and tested before shipping to the city sites, thereby minimizing installation time and configuration issues in the field. Once installed in the field, verification tests will be performed to validate all configurations.

### 6.2.2. Installation

Nokia will support the installation of solution components at the city. A supervisor will be assigned by Nokia to guide the technicians of the city in physically installing all Nokia and 3rd party components delivered by Nokia.

Installation takes place when the results of planning are available and pre-required construction works are completed. The Nokia supervisor verifies via a handover meeting that the site is ready for installation. The installation supervision includes:

- Inventory of the delivery and discrepancy reporting
- Setting up the components
- Installation of the plug-in units and cabling as well as interface and external cabling
- Labelling of all the interfaces
- Final checking of the installation
- Preparation of documentation for the work performed

The Nokia supervisor ensures the site quality and verifies that the implementation activities at the site are in line with Nokia standards, specific requirements of the customer and local implementation processes. The supervisor also reports site-specific implementation progress to the project manager and updates project tools.

### 6.2.3. Integration

This service takes care of end-to-end integration of solution components into the existing ICT infrastructure of the city as well as system verification prior to acceptance.

Integration will be performed by the technicians with a Nokia supervisor on site. During the integration, it will be ensured that the site is fully operational and ready for use by the customer. Interconnections between LTE Access Points and DA Edge will be configured. DA Edge will be integrated into the existing ICT infrastructure of the city and network element parameters will be customized according to project-specific documents and Nokia integration manuals.

Integration includes a final validation of the Nokia DAC installation before go-live. This comprises testing the connections between network elements, network synchronization and inspection of network data in the network management system. Interworking of solution components as well as the functionality of alarms and recovery systems on a network level is overseen and tested. Nokia prepares an integration test report that includes all the test results for each test executed.

### 6.2.4. Commissioning

To enable an easy plug and play experience, DA Edge and DA Firewall hardware are pre-configured by Nokia before delivery. The commissioning will be performed by the technicians with a Nokia supervisor on site. Technicians ensure that network connections / cables are properly connected to the required ports of the DA Edge, DA Firewall with switch / router as per Nokia instruction and Internet connection is established with DA Edge and DA Firewall at site.

For commissioning, the customer must provide Nokia with a network plan including any relevant information that is needed to enable the connections between delivered components and other elements in the network.

The commissioning results and test logs are included in the site folder. These logs also serve for handing over the solution component for integration and acceptance by the customer. Nokia conducts an inventory of the hardware at the end of commissioning. The site-based packing list is verified and recorded in the logistics tools.

The purpose of this service is to ensure the following:

- Necessary power and networking connections are made
- Components are powered up
- Basic commissioning tasks are performed preparing the components for remote access from Global Services Delivery (GSD) enabling remote software installation, commissioning, and integration

Pre-requisites and assumptions include:

- All required hardware has been ordered
- All required hardware is delivered on site and close vicinity of the designated rack where the component will be installed
- Site is prepared with required space, power supply and LAN connectivity requirements to support the system installation
- Remote access to all involved server nodes is available

Nokia supplies the tools, test equipment and documents required to perform installation and commissioning. Nokia also supplies the installation materials needed for the implementation.

## 6.3. RF Planning & Testing services

### 6.3.1. NDAC

The following chapters describe our services for the planning and deployment phase of the proposed private wireless solution.

**Project management**

Nokia provides project management support to the customer with all the resources required to deliver the project economically and according to agreed business priorities and time schedule.

**Engineering & design**

Nokia provides engineering and design services. This service is constructed in several steps:

- Nominal design / High Level Design (HLD)
- Detailed design / Low Level Design (LLD)
- Acceptance test planning (ATP)

Before completing the design phase, the HLD/LLD/ATP are reviewed and signed off by the city before moving to implementation phase of the project.

**Nominal design**

During the nominal design, a high-level design is created covering preliminary coverage, capacity, and topology design of our Private Wireless solution, which is then verified through a prediction tool simulating the performance of the design. The nominal design defines the configuration of solution components and the sites for hardware deployment. Deliverables of the nominal design are design plots and design documents.

**Detailed design**

After a site survey, a network planning team will finalize the solution design based on the feedback and observations made during the survey. The detailed design will cover detailed planning including capacity, configuration and parameter planning for all components of the proposed solution. A data build creation will take place to generate configuration parameters for the LTE Access Points.

**Acceptance testing and sign-off**

Nokia will perform, execute, and forward the final test report to the customer after completion of the acceptance testing in all respect. Such report will include completed data sheets containing the results of each test performed. The customer will sign off the Final Acceptance Certificate (FAC) after the submission.

**Bring into operations**

This service includes local services to be performed on the premise of the customer: starting from site readiness checks, a survey of the Enterprise sector, until the acceptance testing execution and final hand-over of the deployed solution to the customer and DAC Operations Center.

**Site readiness checks and survey**

Nokia will perform a physical site survey to validate the nominal design. The main objective is to collect further insights on deployment sites for LTE Access Points and DA Edges, antenna placements, and other hardware. For installation planning ensuring there is space, connectivity, power, sufficient air conditioning etc and that any gaps are identified which need to be addressed by the customer before implementation can begin.

**Post installation checks**

After the site installation, Nokia team will verify and validate the detailed design and configuration in elements and that the equipment is appropriately implemented.

**Handover to DAC Operations Center**

The objective of this service is to ensure smooth transition from deployment phase to operations of our Private Wireless solution without jeopardizing service levels and customer satisfaction.

### 6.3.2. Microwave Planning

Site Surveys will be performed to document the areas where the microwave radio equipment will be installed in the field.

Path Surveys and system design engineering services have been included. Path surveys will verify that the microwave paths do not have obstruction interference and can perform according

to specifications for bandwidth capacity and availability objectives. A detailed Path Survey report will be provided after physical survey information is compiled.

FCC License applications for each site, Frequency Selection for each path, and Prior Coordination notices will all be provided. System as-built drawings will be provided once the installation is complete.

All of the network backhaul components will be set up and interconnected at the Nokia staging facility where configurations can be loaded and tested before shipping to the county's end sites, thereby minimizing installation time and configuration issues in the field. An onsite customer witness test (CWT) is also included in this proposal as an option. Once installed in the field, verification tests will be performed to validate all configurations.

## 6.4. Network Operation Services

Nokia DAC Operations team maintains the data centers, to ensure un-interrupted availability of services to the customers. Nokia DAC Services team offers services to customers throughout the lifecycle of the private network:

- Network planning
- Delivery of Hardware & Software
- Cabling and Installation
- Configuration, Integration and Verification
- Operations, Health check, Anomaly detection, Enhanced security, end to end performance optimization
- Online Support

The Nokia DAC Services team provides flexible support for customers of all sizes. We ensure the best available expertise helping you to get the most out of your cloud service. Having access to the right support is an investment that can save you money and make you more productive going forward.

With the NDAC subscription customer receives

- Access to NDAC Private LTE network cloud service
- Access to NDAC Customer Portal for network administration
- Maintenance and SW updates from NDAC Cloud Service
- Account and billing support

Customers can get support by contacting Nokia DAC Operations & Services team via email da.operations@nokia.com. Initial response time and target resolution times differs between Nokia DAC Support options / Service Level Agreements.

Further support is based on a tiered model where:

- Tier 3 is provided by DAC Operations Center

Nokia DAC Tier 3 software support – service level options

| Service level | Service availability | Initial response time | Target resolution time | Target for permanent fix | Support channels | Price/month/ end customer |
|---|---|---|---|---|---|---|
| **Basic** | 8-16<br>local business hours | P1: 24 h<br>P2: 24 h<br>P3: 24 h<br>P4: Service request: 48 h | Best effort | Best effort | DAC info center<br>DAC manager<br>DAC helpdesk<br>Chatbot | Included in monthly subscription fee |
| **Professional (optional)** | 24/7 | P1: 4 h<br>P2: 8 h<br>P3: 24 h<br>P4: Service request: 48 h | Best effort | Best effort | DAC info center<br>DAC manager<br>DAC helpdesk<br>Chatbot & live chat<br>Contact e-mail | Fixed fee or<br>10% of monthly total subscription list prices ***) |

*Table 4. NDAC Support Tiers*

The DAC Operations Center monitors the performance and operational status of the private wireless network 8 hours (local business hours) 5 days per week throughout the year via the DAC Regional Cloud. This includes health checks as well as anomaly detection and respective notifications.

A remote support is provided by the DAC Operations Center to respond to support requests of the customer. This includes a self-service via the DAC Manager and the Nokia DAC Info Center, which provides the following self-help services:

- Network and user administration
- Health dashboards for operational status of LTE Access Points and DA Edge
- Online access to documentation
- Online training materials

### 6.4.1. Network Severity levels

The case severity levels for remote network operations support of DAC Operations Center are classified as shown in the table below.

| Severity level | | Description |
|---|---|---|
| P1 | **Critical impact**<br>Nokia DAC service unavailable in production | ◆ Private wireless network infrastructure is unavailable in production (e.g., DA Edge is down, no radio coverage, no connection to network, etc.)<br>◆ Applications having a significant amount of end user-facing errors due to private wireless network connectivity problems<br>◆ Business impact is critical (e.g., revenue loss, potential data integrity issue, etc.)<br>◆ No workaround available that is easy to implement (less than 30 mins)<br>◆ Affected Nokia DAC component or feature is marked as General Availability<br>◆ Immediate attention from Nokia DAC is required to solve the problem |

| | | |
|---|---|---|
| P2 | **High impact**<br>Nokia DAC service use severely impaired | ◆ Private wireless network infrastructure is degraded in production (e.g., severe connectivity problems in the network, no DAC Manager connectivity, part of radios down, major data throughput issues, etc.)<br>◆ Applications having noticeable rate of user-facing errors or difficulties to get connected to the network<br>◆ Business impact is moderate (e.g., danger of revenue loss, productivity decrease, etc.)<br>◆ A workaround to mitigate critical business impact is available and easy to implement (less than 30 mins)<br>◆ Affected Nokia DAC component or feature is marked as General Availability or Beta<br>◆ Affected Nokia DAC component or feature is marked as General Availability or Beta<br>◆ Fast response from Nokia DAC is required |
| P3 | **Medium impact**<br>Nokia DAC use partially impaired | ◆ Private wireless network connectivity issue is limited in scope and/or severity<br>◆ The issue has moderate end user visible impact, some users face errors in connecting to network<br>◆ Business impact is low (e.g., inconvenience, minor business process effects, etc.)<br>◆ Business impact is low (e.g., inconvenience, minor business process effects, etc.)<br>◆ Case requires more in-depth investigation and troubleshooting and less frequent interactions |

*Table 5. Case severity levels of Tier 3 network operations support*

## 6.5. NDAC Support services (Optional)

Support services include hardware care, software care and training.

### 6.5.1. Hardware care

Hardware warranty period for Nokia supplied equipment is 12 months from the date of shipment or 16 months from the date of manufacturer indicated on the hardware part in question, whichever is shorter.

Nokia will repair or replace a defective hardware unit during the warranty period if it is shipped to a Nokia designated facility along with a detailed description of the issue and the necessary documentation required for return shipment back to the customer.

Repaired or replaced units and subassemblies will have a new warranty period of 3 months from shipment date or until the end of the original warranty period, whichever is longer.

### 6.5.2. NDAC Training (Optional)

The customer will be granted access to online training curriculums for Nokia DAC.

**NDAC Aware Training:**

- Overview of NDAC and Applications
- Building blocks of NDAC Solution

- Benefits of NDAC to various Enterprise verticals

**NDAC Installer Training:**

- Indoor/Outdoor mounting
- Tilt & Octis mounting
- Antenna mounting

**NDAC Operator Training:**

- NDAC NMS Tools
- NDAC Manager
- NDAC Admin
- REST APIs

# 7. Approach and Management Plan

## 7.1. Management Plan

Alliance has well established Management procedures, developed over our 30 years of experience with network installations and formulated based on ISO certified processes. Our Alliance and Nokia team of Project Managers, Engineers, and implementation professionals will work together to implement the City of Perris' Private Wireless Network and Microwave Backhaul.

The workflow for the Private Wireless Delivery will commence with Contract execution and follow the process diagrammed in Figure 17 and the Microwave Backhaul Delivery is diagrammed in Figure 18.

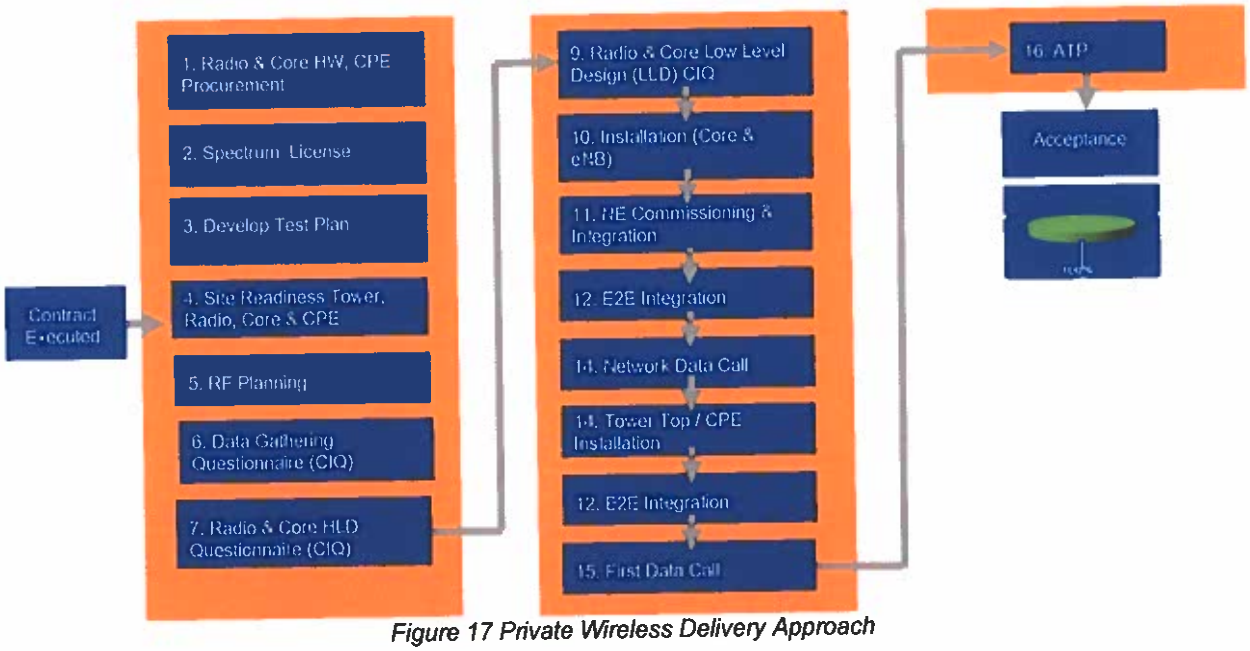


*Figure 17 Private Wireless Delivery Approach*

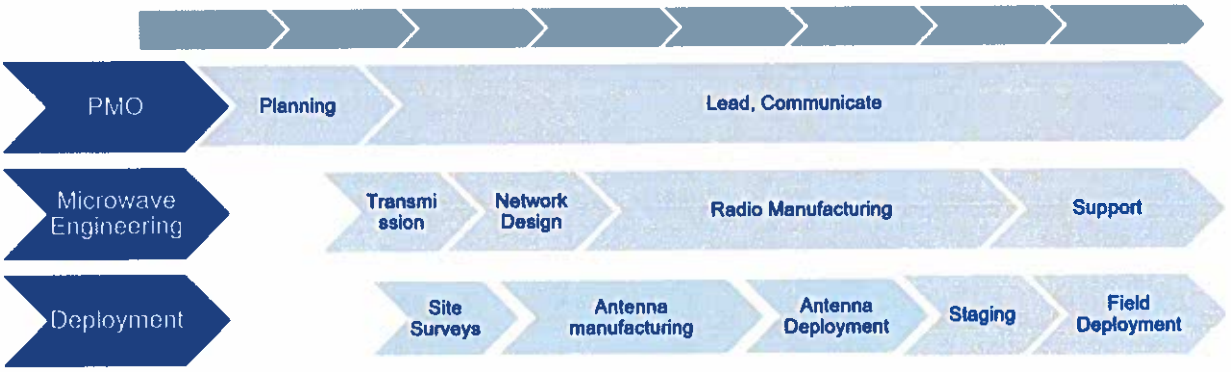


*Figure 18 Microwave Delivery Approach*

## 7.2. Organizational Chart

Account Executives - Zach Schiefelbein/Matt Antoine, zach.schiefelbein@alliance-it.com/matt.antoine@alliance-it.com

Project Manager – Greg Wilson, greg.wilson@alliance-it.com

Account Manager – Mayank Bhatia, mayank.1.bhatia@nokia.com

Bid Manager – Scott Brewer, scott.brewer@nokia.com

Partner Sales Manager – Chad Bittinger, chad.bittinger@nokia.com

Customer Solution Architecture – Ravi Pandilla, ravi.pandilla@nokia.com

Pre-Sales Solutions Consultant – Arvind Kumar/En Hsin, arvind.12.kumar@nokia.com

NDAC Solutions Specialist – Fred Marquez, fred.marquez@nokia.com

MW Solution Specialist – Pablo Campos, pablo.campos@nokia.com

# 8. Qualifications and Experience

Between Alliance and Nokia, our team has decades of experience working on projects of similar size and scope for customers of all sizes in government and private sectors.

The following references have deployed similar solutions and architecture for private wireless networks.

## 8.1. Chattanooga

### The Gigabit Smart City
Chattanooga – EPB (USA)

"Chattanooga is the perfect place for companies to enhance productivity today and test the applications everyone in the country will want tomorrow."

Harold DePriest, former CEO of EPB

GIG CITY
CHATTANOOGA TN

Watch the video
Read the case study

#### Challenges/context

- Chattanooga was known as dirtiest city in the U.S. (you had to drive with your lights on during the day).
- In the early 2000's job opportunities were drying up in towns without broadband, and people were fleeing towns.
- To turn around its fortunes city decided to build the fastest internet in the United States.

#### Solution

- Chattanooga was the 1st to build a 1Gb network in 2010, and 1st to build 10 Gb network in 2015 (TWDM -PON).
- Nokia provided the Fiber access solution for both deployments
- The city built it through power supplier EPB.
- NG connect, works with EPB and the city to test new smart city concept.

#### Benefits

- It has attracted big international companies : Volkswagen, Amazon,...
- Creation of 2800 new jobs and a whole start-up community.
- Smart metering program allowed to reduce power outage by 60% and make estimated 312 M$ savings
- Independent study published in january 2021, estimated the city recorded a $2.7bn community benefit from 10 years of its smart city network

## 8.2. Brush County

### Nokia Digital Automation platform to overcome digital divide
Case: Brush County – County wide fixed wireless access (FWA) for education

#### Background, challenges and drivers

- Due to COVID-19 students are forced to learn online, which requires reliable connectivity with sufficient capacity.
- In June 2021 BroadbandNow estimates 674,433 people in Colorado lack access to an internet service that can provide 25 Mbps (million bits per second) download speeds and 3 Mbps upload speeds.
- In September 2021, Brush County approved NDAC pLTE project to develop a private wireless network in support of rural and underserved students.

#### Solution

- A private LTE network will provide students and administrators much more than connectivity alone
- Nokia Digital Automation Cloud platform provides reliable, secure, high-performance private wireless connectivity and the ability to efficiently process data on site.
- Private networks on the CBRS band allow for deployment at a fraction of the cost and support multiple features such as bandwidth control, content filtering, and safety issues like gun shot detection and video monitoring on and off campus.

## 8.3. Fresno

### Nokia Digital Automation Cloud for home connectivity

Case: Eliminating the Digital Divide for Students in Fresno, California

**Background, challenges and drivers**

- COVID revealed the digital divide within Fresno USD, showing gaps in access to quality, affordable internet. Hotspots did not work well in poorer areas of due to fewer cell towers, and long term, the data plans for commercial cellular hotspots are financially unsustainable.
- Fresno USD is the third-largest district in California, with 94 schools and 70,000 students, has a high degree of poverty.

**Solution**

- Provided a Private LTE solution that was effective and more important future-proof for every student to have access to broadband connectivity supporting their education at home and throughout the community; covers a geographic region with over 25 schools and can support around ten thousand students
- Nokia Digital Automation Cloud for private LTE network allows only students to connect to the network with district-issued CBRS spectrum SAS control SJC-411A hotspots
- Bandwidth goes up to 100Mbps, depending upon the topography and the number of concurrent users
- Fresno USD developed an app to track students' Internet access when students are using their district-issued laptops

35 to 60 ft towers "Schools as Towers" supporting up to ten thousand students

Case Study: Eliminating the digital divide for students in Fresno, California

## 8.4. Project Manager

The Alliance Technical Project Manager, Mr. Greg Wilson, is an accomplished and professional PM who has extensive project experience managing projects of this same scope and magnitude. He is an employee of Alliance Technology Group. He will manage the installation and the day-to-day supervisory tasks of the implementation. He is also the liaison between the City of Perris personnel, and the OEM, Nokia.

Mr. Wilson will employ generally accepted project management tools and practices in his day-to-day operations of the project from beginning to end. He is an expert in managing the POAM. He will manage the project using all required deliverables. Mr. Wilson's Resume is attached in the Appendix.

## 8.5. Party Chief

The Customer Program Manager (CPM) will be assigned to this project to serve as the single point of contact, or Party Chief, for all on-site and off-site project activities. The CPM is the primary point of contact for handling issues that arise related to the Nokia solutions and offerings. The CPM is responsible to ensure the project meets all contracted technical and quality specifications and ensures that commitments made to the City of Perris for network and installation engineering, equipment delivery and installation, test, and product acceptance are met and exceed requirements and expectations. The major activities include aligning expectations between the City of Perris and the specific delivery teams, oversees service and product delivery, prioritizes efforts, track schedules, manage risks throughout the project, provide early warnings if required and closely monitor satisfaction metrics. The CPM resume is in the Appendix.

Our CPMs have multi-year experience as a Project Manager in the telecommunications industry, serving as the lead for end-to-end project planning. They have extensive experience working with customers to understand the project scope and requirements, communicating these requirements within Nokia and its contractors, ensuring appropriate plans are in place for delivery, and communicating results.

# 9. Staffing Plan

## 9.1. Staffing Plan

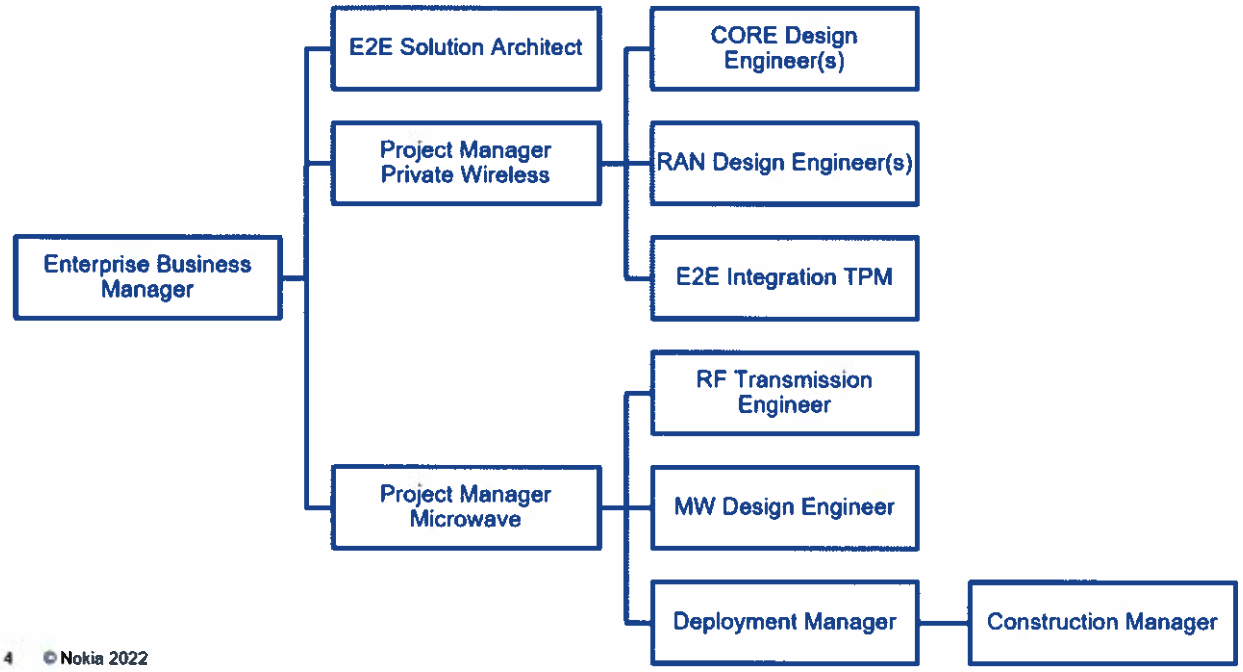


*Figure 19 Proposed Project Team*

## 9.2. Workload

Mr. Wilson, the proposed Project Manager for the City of Perris, has a fluid schedule and is fully expected to be available to take the lead in ensuring the team meets and exceeds all expectations the City of Perris has for this project.

Alliance and Nokia both draw from a deep pool of qualified Project Managers, Engineers and other networking professionals. The individuals proposed are indicative of the qualifications of the type of professionals our team can call on to complete this project. Any proposed changes to the key personnel contained herein will be presented at the time of award.

## 9.3. Budget and Schedule

On projects large and small our team has a track record of delivering on budget and on schedule. Alliance managed a project for a Department of Defense agency that included network upgrades at 77 locations both inside and outside of the continental United States. The project was anticipated to take 12 months with 4 teams of engineers. The project was

completed months ahead of schedule. Alliance proposes firm fixed price solutions in order to ensure that budgets are met and there are no surprises.

# 10. Work Plan and Schedule

## 10.1. Proposed Project Plan

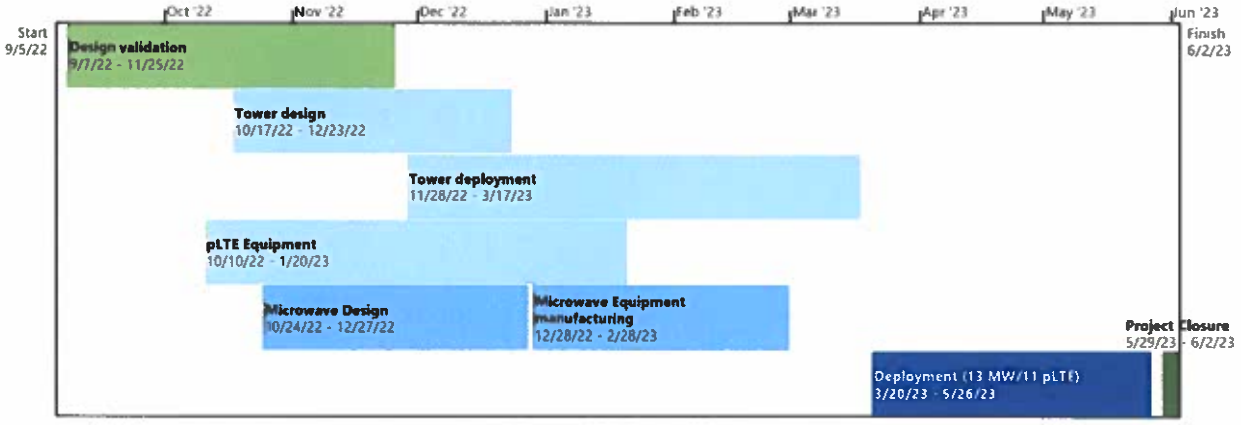


*Figure 20 Project Plan*

## 10.2. Implementation Schedule

| Task Name | Duration | Start | Finish |
|---|---|---|---|
| **City of Perris** | **195 days** | **Mon 9/5/22** | **Fri 6/2/23** |
| Kick off meeting | 2 days | Mon 9/5/22 | Tue 9/6/22 |
| **Design validation** | **58 days** | **Wed 9/7/22** | **Fri 11/25/22** |
| SAS validation | 20 days | Wed 9/7/22 | Tue 10/4/22 |
| Zoning approvals | 50 days | Mon 9/19/22 | Fri 11/25/22 |
| **Tower design** | **50 days** | **Mon 10/17/22** | **Fri 12/23/22** |
| Geotechnical | 20 days | Mon 10/17/22 | Fri 11/11/22 |
| Preliminary CDs | 20 days | Mon 10/31/22 | Fri 11/25/22 |
| Foundation design | 15 days | Mon 11/14/22 | Fri 12/2/22 |
| Final CDs | 15 days | Mon 12/5/22 | Fri 12/23/22 |
| **Microwave Design** | **47 days** | **Mon 10/24/22** | **Tue 12/27/22** |
| Path surveys coordination | 2 days | Mon 10/24/22 | Tue 10/25/22 |
| Path surveys | 21 days | Wed 11/9/22 | Wed 12/7/22 |
| Frequency coord and PCN | 5 days | Thu 12/8/22 | Wed 12/14/22 |
| Design freeze | 1 day | Thu 12/15/22 | Thu 12/15/22 |
| Site surveys | 20 days | Wed 11/30/22 | Tue 12/27/22 |
| **pLTE Equipment** | **75 days** | **Mon 10/10/22** | **Fri 1/20/23** |
| Site surveys | 10 days | Mon 10/10/22 | Fri 10/21/22 |
| Equipment order | 50 days | Mon 11/14/22 | Fri 1/20/23 |
| **Microwave manufacturing** | **45 days** | **Wed 12/28/22** | **Tue 2/28/23** |
| Radio manufacturing | 40 days | Wed 12/28/22 | Tue 2/21/23 |
| Hardware shipment | 5 days | Wed 2/22/23 | Tue 2/28/23 |
| **Tower deployment** | **80 days** | **Mon 11/28/22** | **Fri 3/17/23** |
| Tower foundation (4 monopoles) | 10 days | Mon 12/26/22 | Fri 1/6/23 |
| Tower shipment | 60 days | Mon 11/28/22 | Fri 2/17/23 |
| Tower installation | 20 days | Mon 2/20/23 | Fri 3/17/23 |
| **Deployment (13 MW/11 pLTE)** | **50 days** | **Mon 3/20/23** | **Fri 5/26/23** |
| Equipment installation | 50 days | Mon 3/20/23 | Fri 5/26/23 |
| Project Closure | 5 days | Mon 5/29/23 | Fri 6/2/23 |

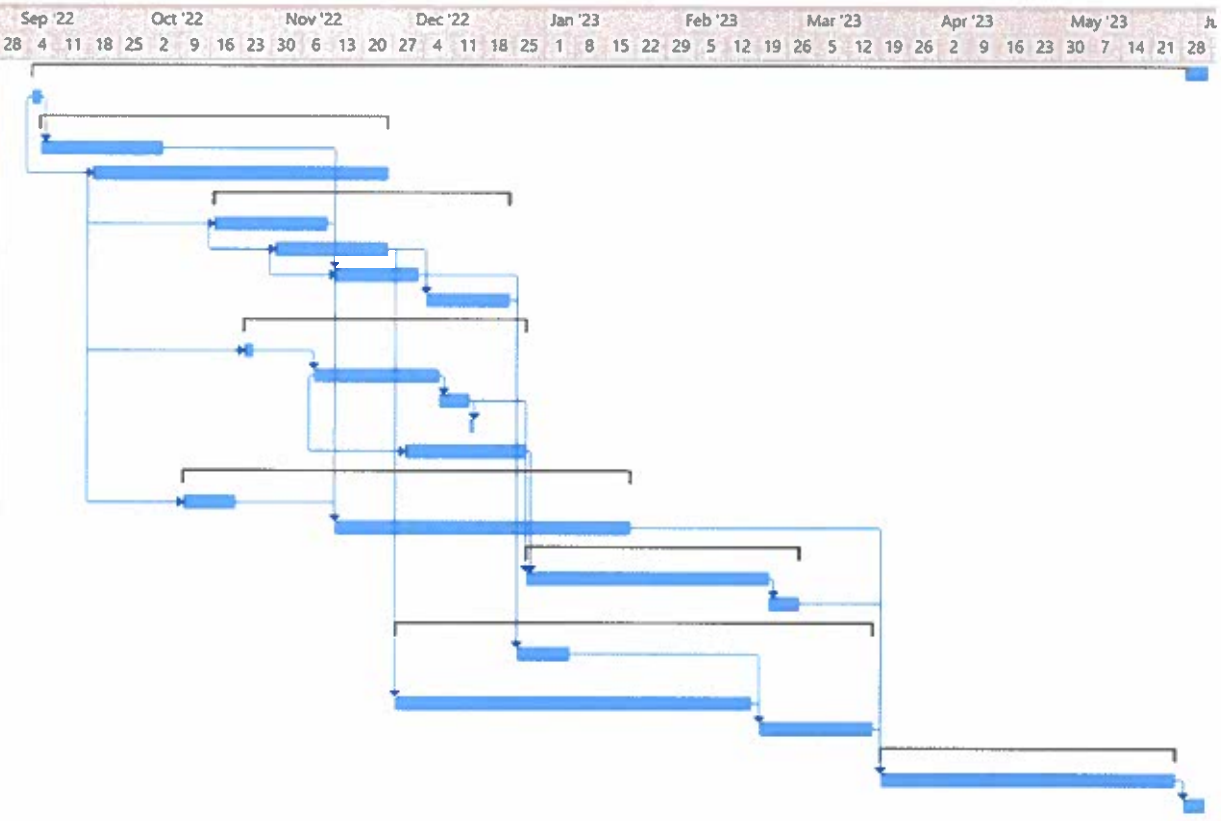


*Figure 21 Implementation Schedule Gantt Chart*

# 11. Quality Control and Assurance

In Alliance's partnership with Nokia, we are fully committed to delivering high-quality, reliable, and mission critical functions for the consumer. Nokia is fully ISO 9001 and TL 9000 compliant quality management system, implemented across the business globally. They have global multi-site certificates held for ISO 9001 and TL 9000 issued by an Accredited Certification Body (Bureau Veritas). Alliance maintains ISO 9001:2015 and 20243:2018 certifications on individual business units and which influence quality control and supply chain processes across the company.

We are customer centric and it shapes how we conceptualize and practice quality. We are committed to creating value for our customers today and into the future. Together we deliver differentiated products, services, and solutions reliably and securely – first time, every time, on time, as promised. We pursue continuous improvement of business processes and quality management to enable superior performance. We constantly renew our knowledge, skills and techniques to innovate new ways to serve customers and enable the human possibilities of technology. We value each other, our customers, and stakeholders while honoring ethical, legal and statutory obligations.

We have an elaborate seven step process to delivering high quality solutions together. We first set the direction and objectives for the company and manage business capabilities and company performance. We set up and manage all customer projects end-to-end. We are always finding new creative ways develop solutions to customer problems. We understand the market and engage our customers to define and solve their challenges and then we deliver that plan and deploy networks as well as maintenances and operation of customer networks.

All of our staff members adhere to key methodologies. We assure that we eliminate waste, improve productivity, and achieve sustained continual improvement in targeted activities and processes of an organization. We optimize our resources, effort, and energy of our organization toward creating value for our end users. We increase performance and decrease process variation and that results in defect reduction and improvement in the quality of products.

Nokia embraces the Seven ISO Quality management principles. This ensures that they are customer focused, have exemplary leadership, engage their customers and their employees, have a defined process based approach to each solution, continuously seek improvement in their processes and products, rely on evidence based decision making, and continuous relationship management with their end-users and partners. Statements and Information

## 11.1.

The City of Perris' Request for Proposal shall be incorporated in its entirety as a part of Alliance's Proposal.

## 11.2.

The City's Request for Proposal and Alliance's Proposal will jointly become part of the Agreement for Professional Consultant Services for this project when said Agreement is fully executed by the Consultant and City project manager.

**11.3.**

Alliance's Services to be provided, and fees therefor, will be in accordance with this Request for Proposal except as otherwise specified in Section 10 of Alliance's Proposal under the heading "ADDITIONS OR EXCEPTIONS TO THE CITY'S REQUEST FOR PROPOSAL."

**11.4.**

A statement of qualifications applicable to this project including the names, qualifications and proposed duties of the Consultant's Staff to be assigned to this project; a listing of recent similar projects completed (within the past 36 months) including the names, titles, addresses and telephone numbers of the appropriate persons whom the City could contact. If one or more of the Consultant's staff should become unavailable, the Consultant may substitute other staff of at least equal competence only after prior written approval by the City.

**11.5.**

A statement of Consultant's area of expertise and a description of how those strengths will benefit the City. Resumes of the lead person that will act as the primary liaison with the City and additional key individuals who will be performing the services will be included.

**11.6.**

Alliance, its supplier and subcontractors, are not aware of any possible conflicts of interest with any current clients or staff members and the City.

**11.7.**

A copy of the Consultant's hourly rate schedule and a statement that said hourly rate schedule is part of the Consultant's Proposal for use in invoicing for progress payments and for extra work incurred that is not part of this RFP. All extra work will require prior approval from the City.

**11.8.**

A statement that all charges for Consultant services is a "Not-to-Exceed Fee" which must include conservatively estimated reimbursable expenses, as submitted with and made a part of said Consultant's Proposal.

**11.9.**

Alliance will document and provide the results of the work to the satisfaction of the City. This may include preparation of field and final reports, or similar evidence of attainment of the Agreement objectives.

### 11.10.

Alliance will not discriminate against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sex, age, sexual orientation, ethnicity, status as a disabled veteran or veteran of the Vietnam era.

### 11.11.

All federal laws and regulations shall be adhered to notwithstanding any state or local laws and regulations by Alliance and any suppliers or subcontractors. In a case of conflict between federal, state, or local laws or regulations the strictest shall be adhered to.

### 11.12.

Proposal submittals shall include a detailed Milestone or Proposed Timeline Report, clearly identifying the project milestones and expected dates to complete. A recovery action plan should also be included to indicate steps that will be taken if milestones or timelines are not met as anticipated.

### 11.13.

The Cost Proposal shall be an itemized breakdown of expenses by proposed task. The Cost Proposal shall include all items that will be charged to the City, including travel, administrative and other direct charges that will be involved in the project. Costs shall be segregated to show staff where funds are being allocated.

## 12. Additions or Exceptions to the City's Request for Proposal

Alliance makes no requested additions, and takes no exceptions, to the City's Request for Proposal.

ALLIANCE TECHNOLOGY GROUP

# 13. Financial Proposal

Quote Date: 7/26/2022
Customer Name: The City Clerk of the City of Perris
Company Name: City of Perris
Address: 101 N D Street
Address: Perris, CA 92570
Quote Number: 425-CityofPerris-01-07262022
Quote Expiration: 9/18/2022

**SALES QUOTATION**

ALLIANCE TECHNOLOGY GROUP

WBE and WOSB Certified

Please send purchase order to Matt Antoine,matt.antoine@alliance-it.com, ph. 443-498-8005.
Reference quote number 425-CityofPerris-01-07262022 on your PO.

**Solution Description: Year 1 Pricing with Year 2 and 3 options. Prepaid Annually.**

## City of Perris - Year 1

| Product Code | Item Description | Qty | Price Per | Unit Price | Extended Price |
|---|---|---|---|---|---|
| | **Hardware** | | | | |
| SKNDEDGN1057 | MXIE DL110 Edge + Switch Kit | 1 | | $24,772.37 | $24,772.37 |
| SKNDALLN1033 | NDAC Sim Card Kit (100pcs) | 2 | | $541.52 | $1,083.04 |
| SKNDACPN1151 | NDAC Site Power Solution - Radio | 1 | | $3,469.42 | $3,469.42 |
| SKNDALLN1020 | NDAC Micro 4G AP Kit US B48 | 10 | | $7,792.42 | $77,924.20 |
| HWNDANTN1023 | AW3089 3300-3800 11.0dbi T4 Omni Ant) | 7 | | $1,092.22 | $7,645.54 |
| HWNDANTN1020 | AW3232 3300-3800 120deg 15.5dbi Dir Ant | 3 | | $908.66 | $2,725.98 |
| SKNDACPN1186 | NDAC Airscale Micro RRH Kit B48 | 3 | | $5,497.83 | $16,493.49 |
| SKNDBBUN1006 | Multi RAT Indoor BBU Kit | 1 | | $13,758.35 | $13,758.35 |
| | | | | **Hardware Subtotal:** | **$147,872.39** |
| | **Software Subscription** | | | | |
| SSNDBACN1088 | Medium Cap. bundle pW Core 4G | 1 | | $6,211.60 | $6,211.60 |
| SSNDBACN1085 | MXIE subscription per vCPU | 10 | | $310.64 | $3,106.40 |
| SSNDBACN1020 | Micro 4G Connectivity | 13 | | $6,211.89 | $80,754.57 |
| | | | | **Subscription Subtotal:** | **$90,072.57** |
| | **CPE Devices** | | | | |
| HWNDUSES1009 | Nokia Industrial 4G router 410R-a | 14 | | $1,373.14 | $19,223.96 |
| HWNDANTN1055 | 5-in-1 Multi Port Ant (Nokia Industrial) | 14 | | $329.10 | $4,607.40 |
| | | | | **CPE Devices Subtotal:** | **$23,831.36** |
| | **NDAC Services** | | | | |
| PSNDINSN1017 | Project Management Service (Remote) | 5 | | $2,244.71 | $11,223.55 |
| PSNDINSN1002 | Consultation Service (Remote) | 3 | | $2,244.71 | $6,734.13 |
| PSNDINSN1001 | Installation Services | 2 | | $1,808.24 | $3,616.48 |
| PSNDINSN1016 | Installation support (Remote) | 2 | | $1,808.24 | $3,616.48 |
| PSNDINSN1004 | Network Planning Service (Remote) | 5 | | $1,808.24 | $9,041.20 |
| | | | | **NDAC Subtotal:** | **$34,231.84** |
| | **EBC Deployment Services** | | | | |
| P585836 | E2E Project Management (Remote) | 1 | | $28,807.06 | $28,807.06 |
| P585845 | Deploy Site Survey (Site Engineering) (On-Site) | 1 | | $42,296.49 | $42,296.49 |
| P585850 | Deploy NDAC Edge Core (On-Site) | 1 | | $4,988.24 | $4,988.24 |
| P585850 | Deploy Radio (On-Site)RRH/Antennas Installation, Commissioning and Integration considering 4 monopole installation, 3 Rooftop installation and 4 light poles | 1 | | $332,533.22 | $332,533.22 |

| | | | | | |
|---|---|---|---|---|---|
| P585835 | EZE Acceptance and Testing (On-Site) | 1 | | $14,975.93 | $14,975.93 |
| | | | | Radio Services Subtotal: | $423,600.84 |
| | **Monopole Materials & Services** | | | | |
| xxxxxxx | Tower Materials and Services for 60ft. Monopole (Tower Materials and Freight, Foundation Installation, Tower Erect Services, A&E Services and Construction Manager) | 4 | | $250,445.58 | $1,001,782.32 |
| | | | | Monopole & Services Subtotal: | $1,001,782.32 |
| | **Microwave Backhaul** | | | | |
| SVC-QHIE-INST | Installation Network Management System - TSM-8000 | 1 | | $336,784.19 | $336,784.19 |
| 301090767 | Warranty/Maintenance Service -Year 1 | 1 | | $23,263.88 | $23,263.88 |
| 3DB29118AB | 9500MPR Radio - Microwave Packet Radio | 11 | | $25,595.27 | $281,547.97 |
| SVC-KWIE-ENG-TSEx | Technical & RF Services - Path Surveys & Design, Freq Coordination, Licensing, Enginnering & Factory Integration | 1 | | $118,682.59 | $118,682.59 |
| 300702487 | Application & Configuration Release - "PM, Application & Configuration Release,<br>Freight & Logistics (Antennas Only)" | 1 | | $43,450.02 | $43,450.02 |
| | | | | Microwave Subtotal: | $803,728.65 |
| | | | | Grand Total Year 1: | $2,525,120.07 |
| | **Optional Items** | | | | |
| | **Microwave Backhaul** | | | | |
| 301090767 | Warranty/Maintenance Service -Year 2 | 1 | | $23,263.88 | $23,263.88 |
| 301090767 | Warranty/Maintenance Service -Year 3 | 1 | | $23,263.88 | $23,263.88 |
| 3CK08004AAAA | MW Training - Wavence Trainings (8 students, 2 classes) | 1 | | $3,193.77 | $3,193.77 |
| 3EM16790BV | Microwave Network Management System - TSM-8000 | 1 | | $24,120.03 | $24,120.03 |
| SVC-QHIE-INST | Installation Network Management System - TSM-8000 | 1 | | $9,530.46 | $9,530.46 |
| | | | | Microwave Backhaul Subtotal: | $83,372.02 |
| | **SW Subscription (Years 2 & 3)** | | | | |
| SSNDBACN1088 | Medium Cap. bundle pW Core 4G | 1 | | $11,181.13 | $11,181.13 |
| SSNDBACN1085 | MXIE subscription per vCPU | 10 | | $559.06 | $5,590.60 |
| SSNDBACN1020 | Micro 4G Connectivity | 13 | | $11,181.42 | $145,358.46 |
| | | | | SW Maintenance Years 2-3 Subtotal: | $162,130.19 |
| | **Extended Warranty & Operational Support** | | | | |
| SSNDIWAN1010 | Warranty for 2nd and 3rd year (1st year included with HW) | 2 | | $7,393.62 | $14,787.24 |
| SSNDSLAN1003 | Professional Support | 1 | | $53,872.94 | $53,872.94 |
| | | | | SW License Years 2-3 Subtotal: | $68,660.18 |
| | **Optional NDAC Training** | | | | |
| PSNDINSN1011 | Nokia DAC Assure | 2 | | $311.76 | $623.52 |
| PSNDINSN1012 | Nokia DAC Installer | 2 | | $498.82 | $997.64 |
| PSNDINSN1013 | Nokia DAC Operator | 2 | | $498.82 | $997.64 |
| | | | | NDAC Training Total | $2,618.80 |
| | | | | Base Year 1 Total: | $2,525,120.07 |
| | | | | Option Year 2 Total (Includes Radio Subcription / HW Warranty) : | $88,458.72 |
| | | | | Option Year 3 Total (Includes Radio Subcription / HW Warranty) : | $88,458.72 |
| | | | | Grand Total for 3 Years: | $2,702,037.51 |

ALLIANCE
TECHNOLOGY GROUP

******* IMPORTANT NOTES *******

Alliance's Services to be provided, and fees, therefore, will be in accordance with this Request for Proposal except as otherwise specified in the Consultant's Proposal under the heading "ADDITIONS OR EXCEPTIONS TO THE CITY'S REQUEST FOR PROPOSAL."

A copy of Alliance's hourly rate schedule and said hourly rate schedule is part of Alliance's Proposal for use in invoicing for progress payments and for extra work incurred that is not part of this RFP. All extra work will require prior approval from the City.

All charges for Alliance services is a "Not-to-Exceed Fee" which must include conservatively estimated reimbursable expenses, as submitted with and made a part of said Consultant's Proposal.

The budgetary planning pricing included above provided by Nokia of America Corporation is indicative only, solely to inform Synnex of Nokia of America Corporation's current estimate of prices for the relevant item(s) to enable Synnex to evaluate its potential interest.,

The terms and conditions, including planning pricing, of the items provided under this Proposal or subsequent agreements are subject to future negotiations and future agreement on the terms and conditions which would any sale. There are no penalties, liquidated damages or other remedies associated with changes to the pricing.,

Prices are valid for 60 days.,

This pricing is valid only for the equipment, equipment features, and services explicitly described within this proposal. Any equipment item, equipment feature, installation item, or service not explicitly described in this bid is not included in this pricing, and any addition of such will require a revised proposal with modified pricing. Additional information obtained by, but not limited to, Path and Site Surveys could require changes to the scope and content of this proposal. Please review all sections of this bid carefully for details as to what this proposal includes, and what assumptions have been made. ,

Pricing is based on attached Scope Of Work, Assumptions, Detailed Equipment List and/or Design Configurations. ,

Taxes, transportation, ancillary material, travel and living expenses are excluded.,

Typical equipment lead time is approximately 8 weeks or sooner After Receipt of Purchase Order with valid frequencies based on equipment availability. Lead time can be confirmed After Receipt of Purchase Order and order scheduling.,

Category A microwave antennas are quoted for 4 monopole sites. Alternate mounting solutions may impact antenna type, performance and price.,
A copy of Alliance's hourly rate schedule and said hourly rate schedule is part of Alliance's Proposal for use in invoicing for progress payments and for extra work incurred that is not part of this RFP. All extra work will require prior approval from the City.

ALLIANCE
TECHNOLOGY GROUP

# Appendix

## Resumes

Greg Wilson

Project Manager

*SUMMARY*

**Project Manager** with extensive experience in business communications systems implementation and customer relationship management for government and Fortune 100 companies. Proven abilities in technology transfer, support and systems engineering and overseeing user training resulting in productivity improvement. Adept at leading a team, mentoring, coaching and cross functional team building. Excellent leadership, problem resolution and telephony skills.

- Customer Service
- Compliance
- Workflow Optimization
- Risk Management
- Process Improvement
- Cost Controls

**EXPERIENCE**

Alliance Technology Group LLC

**Project Manager** 2010- Present

Successfully and profitably managing projects, coordinating installation of Avaya communication system products, for a wide-range of Government customers (TransUnion, Financial Management Service, Bureau of Public Debt, U.S. Navy, Financial Crimes Enforcement).

AVAYA, Basking Ridge, NJ (Virtual office) 2000 - 2010

**Government Solutions Services Project Manager with DoD Secret Clearance** (2007-2010)

Successfully and profitably managed numerous *(80+)* projects, coordinating installation of Avaya communication system products, for a wide-range of Government customers (Aerospace Corp, Air & Army National Guard, Army Personnel Command, Dept of Treasury, Environmental Protection Agency, Government Accountability Office, Lockheed Martin etc.)

- Effectively managed multiple strategic multi-million dollar accounts simultaneously, including companies nationwide role outs involving coordination over different cites and states.
- Orchestrated and coordinated highly technical and complex projects within time frame and budget.
- Facilitated and managed change order process with key business stake holders to ensure that scope creep and deliverables were met within milestones.
- Provided the flexibility and conduit for negotiations during project obstacles between vendors and customers.
- Negotiated with key procurement individuals to ensure the SOW was in line with cost and deliverables.
- Developed project plans specifying goals, strategy, staffing, scheduling, identification of risks, contingency plans, and allocation of available resources. Identified and scheduled project task, milestones, and deliverables.
- Conducted project meetings to communicate individual roles, project expectations, and ensure that all project team members have the tools and training required to perform effectively. Monitor projects on an ongoing basis to evaluate progress, quality, and issue resolution to resolve any issues that are project impacting related to completing priorities and constraints.

**Implementation Services Manager/Services Project Manager I, Site Project Manager** with **DoD Secret Clearance** - Peterson AFB Colorado Springs, CO and Barksdale AFB Shreveport, LA. (2004-2007)

- Onsite Manager for CITS (Combat Information Transport System) for US Air Force.
- Manage, coordinate and facilitate implementation of the bases data network. Integrating outside / inside plant contractors, Technicians, Engineers and the Government Program office.
- Accountable for Initiating, Planning, Executing, Controlling and Closing of two **$9M** infrastructure and network upgrade government projects. Successfully managed multi-year, multi-vendor, multi-million dollar fiber infrastructure and network upgrade/installation under budget and ahead of schedule.

**Senior Field Service Manager / Services General Manager** (2002-2004)

Supported $12 million commercial customer base utilizing Avaya's diverse range of telephony equipment.

- Scheduled and oversaw up to 18 field technicians covering a large geographically diverse area of Maryland. Successfully met or exceeded customer requirements of lead time for repairs and placed the highest emphasis on out of service customers.
- Proactively participated in monthly onsite meetings with several key customers to track progress on open issues and discuss upcoming maintenance or projects
- Regularly traveled to remote offices for technician and customer visits in order to increase both employee and customer satisfaction

ADDITIONAL RELEVANT EXPERIENCE

**Project Manager** Lucent Technologies / (October 1, 2000 spin off to Avaya Inc) 1997–2002

**Dedicated Switch Installation Crew Supervisor** AT&T / (Sept 30, 1996 spin off to Lucent Technologies) 1994–1997

**Dispatch/Load Supervisor** AT&T 1991–1994

**Field Service Manager** AT&T 1987–1991

**Large Business Voice Technician** C&P Telephone of Maryland / (1984 spin off to AT&T) 1972-1987

***EDUCATION***

- 2009 Completed Project Management Certificate Penn State University
- 2007 Worked towards Avaya Project Manager Associate (APMA) Certificate Program
- 2004 Completed numerous Avaya University telephony equipment related courses
- 2001 Worked towards Avaya Project Management Professional certification
- 2001 Completed Avaya Project Management Certificate
- 1998 - 2001 Microsoft Word, Excel and Power Point Alliance certification
- 1998 Lucent Technology Project Implementation course
- 1991 Essex Community College, Maryland, worked towards AA in Business Management
- 1970-71 Catonsville Community College, Maryland, worked towards AA in Business Management
- 1970 Graduated Overlea Sr. High School, Maryland

## Customer Program Manager

### Summary

CPMs have strong leadership skills. They have managed large complex projects/programs having multiple stakeholders, high volume and long time-spans as guided by the principles of PM established by the Project Management Institute (PMI®), working independently toward predetermined long-range targets and pursuing courses of action essential in obtaining desired outcomes.

As the lead Project Manager they have been responsible for the overall success of planning and implementing projects. Responsibilities included: initiating a project/program design, planning various aspects of the project's execution, and organizing necessary resources. accountable to the Customer and Nokia for delivering all projects in accordance with the contract.

**Key Responsibilities as Lead Project Manager:**

- Developing a complete understanding of the customer's business needs.
- Functioning as a single point of contact (SPOC) and coordinating project activities through final delivery of all contracted-for elements, coordinating all in-scope tasks until project closeout.
- Perform role as guided by the principles of PM established by the Project Management Institute (PMI®).
- Collaborate to develop a baseline Project Management Plan & Schedule Management Plan (Project Timeline) with baseline schedule that includes critical paths & key milestones.
- Gain consensus/approval on a Communication Management Plan which includes status meeting location/duration/frequency, and reporting content & format with distribution list & media type. The plan will also include exception reporting and escalations.
- Establishing and managing a Change Management Plan.
- Managing Resources – allocating staff and other resources (e.g., equipment, laboratories, etc.), and gaining commitment to project schedule.
- Developing action plans to improve performance throughout the duration of the project/program.
- Applying advanced principles, theories and concepts to achieve objectives in creative and effective ways.
- Analyzing & tracking project risks to verify that risks are identified, status is reported, and appropriate risk response plans are executed. Escalating as necessary.
- Managing close-out activities and verifying that all activities within scope have been completed..

Qualifications:

- Bachelor's degree or equivalent.
- PMP certification or equivalent.
- Multi-year PM experience in Telecommunications.
- Proven success in managing complex network deployment projects.
- Strong computer skills including MS Word/Excel/MS Project.
- Excellent planning and critical thinking skills.
- Excellent negotiation, communication, and leadership skills.
- Strong business acumen in planning and organizing, information integration, and decision-making.