JOHNSON COUNTY, TEXAS JANUARY 9, 2015

POINT-TO-POINT MICROWAVE UPGRADE

Approved

Commissioners Court

JUL 27 2015

MOTOROLA

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SECTION 1

INTRODUCTION

Since 1928, Motorola Solutions, Inc. (formerly Motorola, Inc.) has been committed to innovation in communications and electronics. Our company has achieved many milestones in its 84-year history. We pioneered mobile communications in the 1930s with car radios and public safety networks, made the equipment that carried the first words from the moon in 1969, and commercialized the first-handheld portable scanner in 1980. Today we are a leading provider of mission-critical communication infrastructure, devices, software, and services. Our customer-focused products and services help both government and enterprise markets improve operations through the increased effectiveness and efficiency of their mobile workforces. Our customers benefit from our global footprint and thought leadership, including sales in more than 100 countries, an industry leadership position, unmatched products and services, and a strong patent portfolio.

Our Government customer segment includes sales of public safety mission-critical communications systems, commercial two-way radio systems and devices, software, and services. Our extensive portfolio is based on Association of Public Safety Communications Officials Project 25 (APCO 25), Terrestrial Trunked Radio (TETRA), and Digital Mobile Radio (DMR) standards, as well as broadband technologies such as Long Term Evolution (LTE) and Wi-Fi. Our products and services are sold stand-alone, as well as part of an integrated system. In addition, we offer critical applications in the public safety command center, including voice, Computer Aided Dispatch, and multimedia/video. Our comprehensive service offering includes mobility consulting, system design and installation, network and device management, and product support.

We offer a unique combination of innovative technology, extensive market experience, and the ability to design, integrate, and seamlessly implement the various technologies and services Johnson County needs, both today and well into the future. As a two-time recipient of the Malcolm Baldrige National Quality Award for performance excellence and quality achievement (1988 and 2002), as well as of the National Medal of Technology for technological innovation (1999 and 2004), Motorola has the resources and unfailing commitment to quality to create a turnkey solution for Johnson County that fully addresses your specific needs.

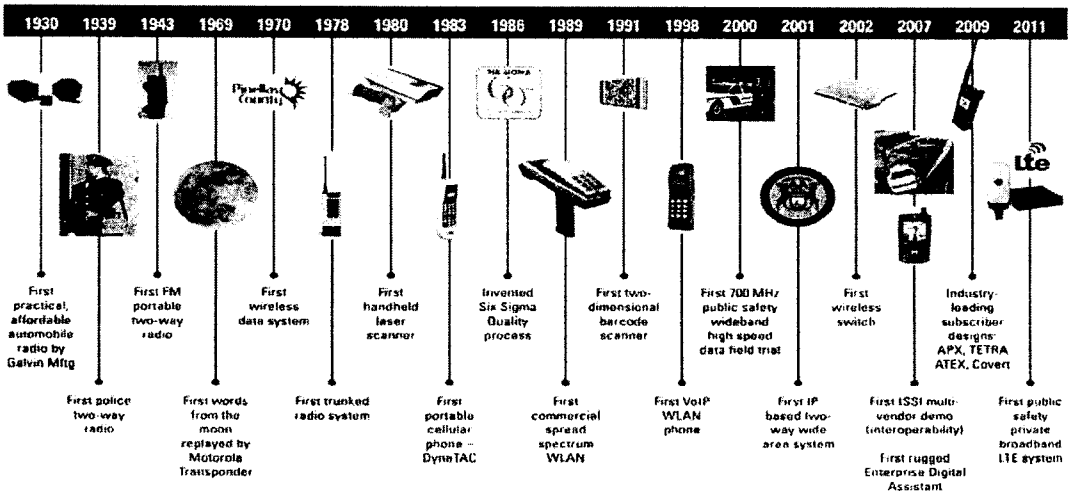

Figure 1-1: From the first portable radio for public safety to the first Project 25 trunked system, Motorola has led the industry in innovation.

This budgetary proposal, presented for your consideration, is intended to assist Johnson County with defining your project funding requirements, as well as your solutions requirements for equipment and services. Upon request, your Motorola account executive will provide a detailed proposal with firm pricing that is tailored to your specific needs, which will include verification of all assumptions relative to unknowns that are contained within this proposal.

SECTION 2

SYSTEM DESCRIPTION

2.1 PROJECT OVERVIEW

Johnson County is currently operating on a three site simulcast system with the Cleburne location being the prime site with Precinct 2 and Alvarado as remote site location. These sites are currently connected using a leased T1 link, but the reliability of these leased T1 lines have come under scrutiny as several network outages have been reported leaving users cut off from dispatch personnel. Johnson County is also in the process of constructing a standalone ASTRO ASR site at the Diamond Retreat location that will also be in need of a network connection.

Motorola is proposing a budgetary microwave point-to-point (PTP) system to be used as the primary network connection links for Johnson County's ASTRO 25 Simulcast system as well as the new Diamond Retreat ASTRO ASR stand alone site location. The microwave system will be designed to maintain the current single T1 link configuration that is currently in use by Johnson County's simulcast system using the proposed microwave system as the primary communication link, while keeping the current leased T1 links as a backup option.

Figure 2-1 shows a block diagram of the proposed system.

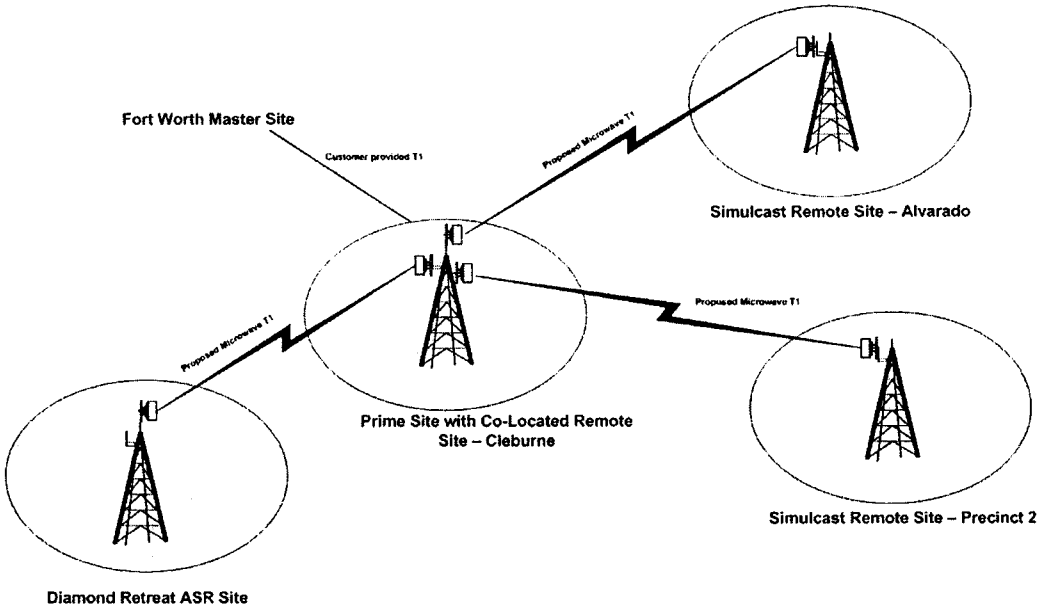

Figure 2-1: Logical system block diagram

The system contains three PTP Licensed single T1 Microwave links for Johnson County to provide backhaul for their public safety communication system. Each link is designed to provide 19Mbps aggregate throughput operating in the 11GHz licensed band with a predicated reliability of 99.999% and is a 1+0 non-redundant configuration which does not have microwave hot-standby operation. The PTP will connect the four sites listed above in a spur configuration with each link emanating out from the Cleburne prime site to the two simulcast remote sites (Precinct2 and Alvarado) and Diamond Retreat ASTRO ASR site. The Johnson county simulcast system will continue to connect to the Fort Worth Master site at the Eagle Mountain location by way of a single leased T1 line from the Cleburne location. At this time it is assumed that a second T1 line from the Cleburne location to the master site will be set up to connect the Diamond Retreat location to the master site which explains why the Diamond Retreat link will also terminate at the Cleburne location.

Included in the proposed PTP system will be a networking switch that will allow Johnson County to maintain their current leased T1 lines to be used as a backup connection incase the PTP connection goes down. One pair of networking switches will be installed for each site link. Both the PTP and leased line T1's will be connected at each end to one of the switches. The switch will constantly monitor the PTP link and if at any time the PTP is deemed unreliable the switch will automatically switch to the leased T1 line and will switch back to the PTP when the link is deemed reliable again.

2.2 SITE INFORMATION

Cleburne Site

- Location: 32° 19'44.2"N, 97°21'54.0"W
- Tower Height: 485ft.

Precinct 2 Site

- Location: 32° 32'41.0"N, 97°25'25.6"W
- Tower Height: 400ft.

Alvarado Site

- Location: 32° 24' 41.9"N, 97° 10' 17.2"W
- Tower Height: 300ft.

Diamond Retreat Site

- Location: 32° 11' 34.3"N , 97° 28'49.2"W
- Tower Height: 120 ft.

Table 2-1: Site Connectivity

Point A	Point B	Connectivity Type
Cleburne Tower	Precinct 2 Tower	11GHz Proteus MX PTP link
Cleburne Tower	Alvarado Tower	11GHz Proteus MX PTP link
Cleburne Tower	Diamond Retreat Tower	11GHz Proteus MX PTP link

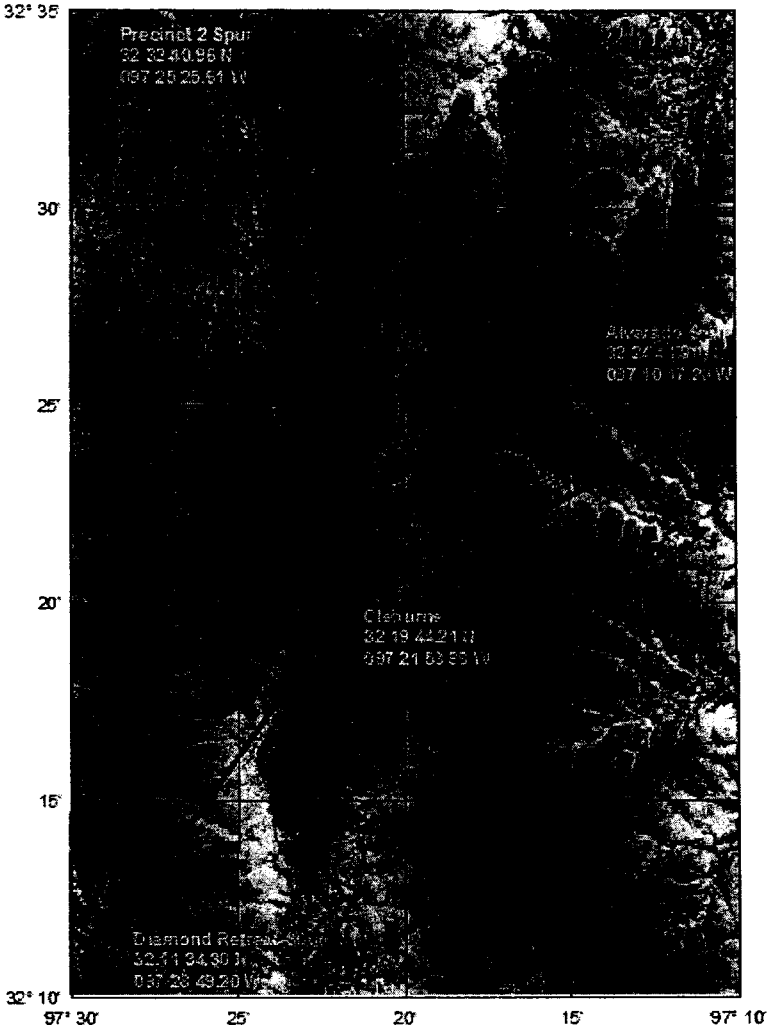

Figure 2-2: System Map

2.3 PTP PRODUCT DESCRIPTION

Motorola PTP Licensed Microwave systems are the ideal solution for service providers and network operators who need to deploy high-performance connectivity solutions to support bandwidth-intensive multimedia applications on their networks. The PTP solution is an IP-optimized, high-capacity wireless broadband radio designed to efficiently and affordably transport the voice data.

The Proteus MX is an Ethernet/TDM Hybrid backhaul radio platform, it offers carrier-class Ethernet along with native TDM in a single and extremely flexible platform. The Proteus MX is designed specifically for mission critical application. It features 100% redundancy capability of all traffic and overhead channels with automatic switchover. These features make it ideal for Public Safety and Utility networks where critical traffic must be maintained and safeguarded.

2.4 PTP COMPONENTS

The Proteus Microwave PTP (Figure 2-3) is designed with a split-mount architecture, which includes an Antenna, Radio Frequency Unit (RFU), Signal Processing Unit (SPU), and associated IF cable and connectors. The SPU requires a 120V/15A outlet or -48 VDC for power at each location.

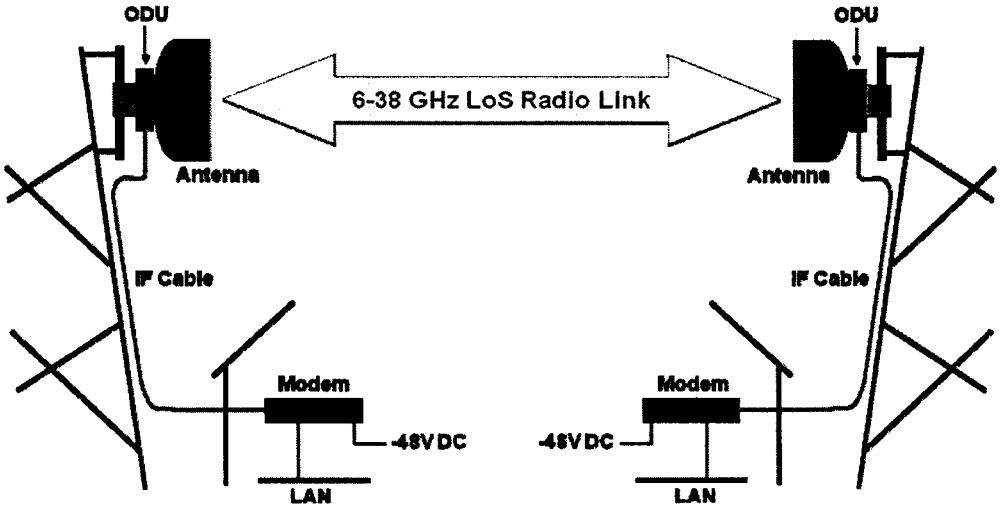

Figure 2-3: PTP System Overview

Signal Processing Unit (SPU)

The Signal Processing Unit is composed of three parts: a 19-inch wide by 3.5-inch tall rack mountable chassis, one (for non-protected) or two (for protected) front pluggable Channel Units, and an optional TDM/SDH Traffic Line Interface (TLI) card, a printed wiring assembly installed in the Channel Units to provides support for various TDM traffic types. Signals from the customer equipment connect to the SPU.

The Proteus MX is a software defined radio. Software in the SPU (Figure 2-4) determines the operating parameters of the radio terminal, including the multiplexer configuration, data rate, modulation, and channel bandwidth. The radio is licensed for a particular set of operational characteristics defined by a Configuration License Key.

Built-in features on the SPU include two 10/100/1000BaseT Ethernet ports, two 100BaseT Ethernet network management ports, an audio Engineering Orderwire connection, and two RS-232 digital service channels. Traffic Line Interface (TLI) cards to provide TDM capability in channels.

Johnson County is responsible for supplying a 120V/15A outlet for power and necessary rack space to mount the SPU at all site locations.

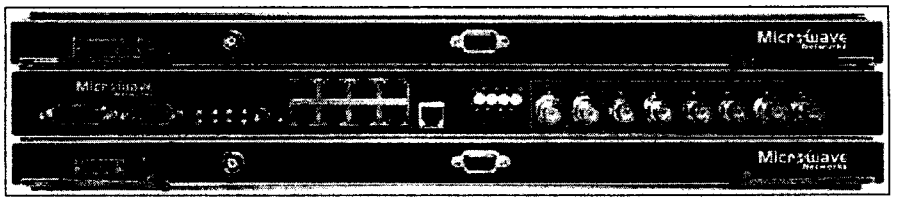

Figure 2-4: Proteus MX SPU

Outdoor (Split Mount) Radio Frequency Units

The RM1 Standard Power Outdoor Unit/Radio Frequency Unit mounts outdoors, directly to its associated antennas. The mounting hardware uses four spring loaded latches, so no tools are required to mount the ODU. In non-protected installations the ODU attaches directly to the antenna.

Intermediate Frequency (IF) signals from the SPU are carried to the ODU through up to 850 feet of standard RG8 type 50-ohm coaxial cable.

RM1 ODUs are available for 7, 8, 11, 13, 15, 18, 23, 26, 32, and 38 GHz bands for channel bandwidths from 2.5MHz to 30MHz.

RM4 Outdoor Unit

RM4 High Gain Outdoor Units (Figure 2-5) are similar in all respects to the RM1 Outdoor Units, however they provide typically 1 to 3 dB higher transmitter power and improved threshold compared to the equivalent RM1 ODUs and are for use in channel bandwidths of 7 MHz to 56MHz.

RM4 ODUs are available for Low band and High band 6 GHz and 7, 8, 11, 13, 15, 18, 23, 26, 32, and 38 GHz bands.

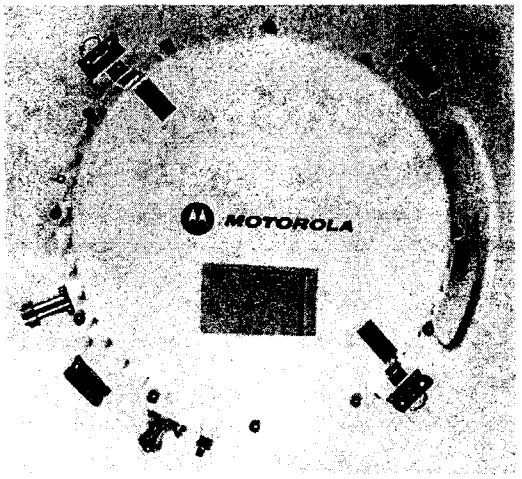

Figure 2-5: PTP Outdoor unit

Antennas

The Proteus MX uses parabolic reflector antennas (Figure 2-6). The RM1/RM4 antenna mount ODU's use antennas specifically designed to mount those ODUs. Those antennas provided are 2.5 or 4-foot diameters antennas. They are low profile, performance Class A antennas.

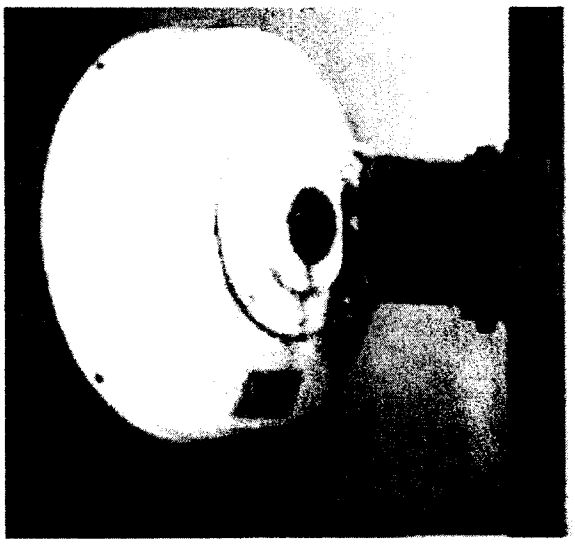

Figure 2-6: Typical RM1/RM4 Low Profile Antenna

2.5 LINK FROM CLEBURNE TO PRECINCT 2

This link length is 12.67 miles and Motorola has designed the link in the 11GHz band. The interference level and/or link path profile may affect the design and equipment use in order to meet the system requirements. The minimum level of Receive Signal Strength (RSS) is -80.5dBm. Any interference that causes the RSS to fall below this threshold may cause the link to fall below the 99.999% link reliability. The link is designed for a minimum aggregate throughput of 19Mbps to reliably carry the T1 data. The antennas will be installed on existing towers at the Cleburne and Alavardo site locations.

The equipment for this link is described as follows:

Cleburne Site PTP Equipment

- Proteus Microwave Radio Terminal
- One 4' Antenna for Microwave Radio Terminal mounted at 190'
- One Signal Processing Unit (SPU)
- One Coaxial Cable Installation Kit
- Lighting Suppression Kit

Precinct 2 Site PTP Equipment

- Proteus Microwave Radio Terminal
- One 4' Antenna for Microwave Radio Terminal mounted at 250'
- One Signal Processing Unit (SPU)
- One Coaxial Cable Installation Kit
- Lighting Suppression Kit

2.6 LINK FROM CLEBURNE TO ALVARADO

This link length is 15.26 miles and Motorola has designed the link in the 11GHz band. The interference level and/or link path profile may affect the design and equipment use in order to meet the system requirements. The minimum level of Receive Signal Strength (RSS) is -80.5dBm. Any interference that causes the RSS to fall below this threshold may cause the link to fall below the 99.999% link reliability. The link is designed for a minimum aggregate throughput of 19Mbps to reliably carry the T1 data. The antennas will be installed on existing towers at the Cleburne and Alvarado site locations.

The equipment for this link is described as follows:

Cleburne Site PTP Equipment

- Proteus Microwave Radio Terminal
- One 2.5' Antenna for Microwave Radio Terminal mounted at 173'
- One Signal Processing Unit (SPU)
- One Coaxial Cable Installation Kit
- Lighting Suppression Kit

Alvarado Site PTP Equipment

- Proteus Microwave Radio Terminal
- One 2.5' Antenna for Microwave Radio Terminal mounted at 173'
- One Signal Processing Unit (SPU)
- One Coaxial Cable Installation Kit
- Lighting Suppression Kit

2.7 LINK FROM CLEBURNE TO DIAMOND RETREAT

This link length is 15.26 miles and Motorola has designed the link in the 11GHz band. The interference level and/or link path profile may affect the design and equipment use in order to meet the system requirements. The minimum level of Receive Signal Strength (RSS) is -80.5dBm. Any interference that causes the RSS to fall below this threshold may cause the link to fall below the 99.999% link reliability. The link is designed for a minimum aggregate throughput of 19Mbps to reliably carry the T1 data. The antennas will be installed on existing towers at the Cleburne and Diamond Retreat site locations.

The equipment for this link is described as follows:

Cleburne Site PTP Equipment

- Proteus Microwave Radio Terminal
- One 2.5' Antenna for Microwave Radio Terminal mounted at 475'
- One Signal Processing Unit (SPU)
- One Coaxial Cable Installation Kit
- Lighting Suppression Kit

Diamond Retreat Site PTP Equipment

- Proteus Microwave Radio Terminal
- One 2.5' Antenna for Microwave Radio Terminal mounted at 120'
- One Signal Processing Unit (SPU)
- One Coaxial Cable Installation Kit
- Lighting Suppression Kit

2.8 SITE LINKS

The T1 circuits provided by the proposed microwave PTP system is designed to meet the T1 specifications listed in Table 2-2.

Table 2-2: T1 specifications

Parameter	Measurement Value
Bit Error Rate—BER	1×10^{-6}
Stratum Level	2 or Better
Max. Delay	5 milliseconds (ms)
Availability	99.999 %
Line Coding	B8ZS (bit 8 zero substitution)
Signaling	Clear Channel
Compression	None
Framing	ESF (extended super frame)
Pulse Amplitude	0 dBdsx (3.0V +/- 0.3V or 6V P-P)
Dry or Wet	Dry, No voltage (-48 VDC or other) Present

2.9 BACKHAUL DESIGN ASSUMPTIONS

Motorola has based the system design on information gathered from meetings with the Johnson County and an analysis of their existing system and requirements. All assumptions have been listed below for the County's review. Should Motorola's assumptions be deemed incorrect or not agreeable to Johnson County, a revised proposal with the necessary changes and adjusted costs will be required. Changes to the equipment or scope of the project after contract will require a change order; as outlined in the Statement of Work (SOW). The assumptions are:

- Motorola has performed a paper path study for each proposed microwave link. A physical path survey and study is required to verify Line-of-Sight, clearance of the Fresnel Zone, tree heights, obstructions, and interference. Actual link performance cannot be confirmed until the physical path survey and study have been completed.
- The Point-to-Point (PTP) solution is based on licensed 11 GHz frequency. Johnson County is responsible for licensing and procuring the frequency pairs for the PTP links. Motorola Solutions will assist with the licensing and frequency coordination and preparing license applications.
- Johnson County is responsible for providing rack space for mounting the SPU at all of the proposed site locations.
- Johnson County is responsible for providing a single 120V/15A outlet for power at all the proposed site locations. The outlet must originate from a UPS and backup generator subpanel.

- The existing locations will have sufficient space available for the system and equipment described.
- The equipment locations will have adequate electrical power and site grounding to support the requirements of the system described and meet R56 standards.
- The towers will have adequate space and size to support the antennas proposed for this system.
- At the Cleburne tower location Johnson County will provide tower space at 190, 173, and 450 feet for the proposed microwave dishes. Johnson County is responsible for any tower modifications required to support the proposed microwave dish.
- At the Precinct 2 tower location Johnson County will provide tower space at 250 feet for the proposed microwave dish. Johnson County is responsible for any tower modifications required to support the proposed microwave dish.
- At the Alvarado tower location Johnson County will provide tower space at 173 feet for the proposed microwave dish. Johnson County is responsible for any tower modifications required to support the proposed microwave dish.
- At the Diamond Retreat tower location Johnson County will provide tower space at 120 feet for the proposed microwave dish. Johnson County is responsible for any tower modifications required to support the proposed microwave dish.
- Any tower stress analysis or tower upgrade requirements are the responsibility of the Johnson County.
- The Johnson County is responsible for any remediation or tower repairs per the tower analysis reports. No remediation efforts are included in this proposal.
- Johnson County is responsible for providing all the UPS and backup generators at all sites.
- Any electrical upgrades necessary for the proposed equipment is the responsibility of Johnson County.
- Where necessary, Johnson County will provide a dedicated delivery point, such as a warehouse, for receipt, inventory, and storage of equipment prior to delivery to the sites.

2.10 CUTOVER PLAN

A high level cut-over plan is presented below for switching from the existing system to the new Microwave system. A detailed cutover plan will be discussed with the County during the customer design review and finalized during the project prior to cutover. Given the fact that we are adding a parallel T1 circuit to each of the sites without having to disconnect the current leased T1 circuit, the implementation of the proposed microwave system should cause only minimum downtime of the system.

- Conduct the field path and site survey to verify Line-of-Sight requirements.
- Conduct a tower analysis to verify that each of the towers can support the proposed equipment.
- Cold install all of the hardware components at each of the sites in the rack space provided by Johnson County.
- Mount the antennas and Outdoor Unit on the towers at the heights described in this document.
- Connect the equipment to the Johnson County provided electrical circuits.
- Align the antenna dishes and test the connections.

- Monitor the connection for a test period of time.
- Connect the PTP output into the automatic switching device.
- Connect the Switching device into the site gateway
- Connect the leased T1 into the switching device (this will cause a brief site link outage at the site).
- Verify site network link connectivity.
- Test the automatic switching capability by failing the PTP link.

2.11 SUMMARY

Motorola is pleased to offer Johnson County with this microwave Point-to-Point system design. Motorola has designed this system to enhance voice and data communications for Johnson County, providing users with effective and reliable communication.

SECTION 3

SERVICES

3.1 PROFESSIONAL INTEGRATION SERVICES

To ensure a smooth installation and deployment, our proposed solution for Johnson County includes estimates for the following services:

- Includes Project Management for system installation and optimization.
- Includes Field Engineering support for system installation and optimization.
- Includes system installation and optimization.

This solution will be installed, optimized, tested, and cutover by our dedicated Project Implementation Team.

3.2 MOTOROLA SYSTEM SUPPORT

Motorola's standard commercial warranty provides for the repair or replacement of defective hardware components by the original equipment manufacturer (OEM).

In addition to the standard commercial warranty, specially selected support services will be delivered in conjunction with the one year warranty period. After the warranty period expires, these customized support services may be purchased under a separate agreement. The customized warranty support services to be provided include the following additional services:

- Dispatch Service and Call Management
- On-Site Infrastructure Response (24x7)

3.2.1 Post-Warranty Services (Motorola Maintained)

Motorola has also included in this budgetary proposal two (2) additional years of supplemental support to assist you in maintaining your communications network. This full suite of services is designed to maintain and manage your system in order to provide optimal uptime and availability to all system users. These services are:

- Infrastructure Repair by OEM
- Dispatch Service and Call Management
- Technical Support by OEM
- On-Site Infrastructure Response (24x7)

3.2.2 Optional Services

3.2.2.1 Site Acquisition and Development

- **Site Construction Services:** Civil installations; electrical and grounding installations; mechanical installations; existing site renovations; tower Services; testing, inspections, and red-lines.

Your partner for successful site development

- 80+ years experience designing, implementing and supporting radio communications solutions.
- Nationwide team of experienced professionals.
- Proven processes, repeatable methodologies, focused project management.
- Comprehensive Managed Services portfolio that provide a wide range of service solutions and the ability to manage the entire process or augment customer staff as needed.

This budgetary quotation is being provided with the assumption that all sites necessary for equipment installation related to this quotation are ready for installation. This includes:

- All architectural and engineering services needed for the sites.
- Site acquisition where necessary sites having been identified and permitted, that all approvals have been obtained from all regulatory and zoning agencies.
- Site development and construction including obtaining all required building permits.

SECTION 4

ASSUMPTIONS

Motorola has made several assumptions in preparing this budgetary proposal. In order to provide a firm quote, Motorola will need to verify all assumptions or seek alternate solutions in the case of invalid assumptions.

- All existing sites or equipment locations will have sufficient space available for the system described.
- All existing sites or equipment locations will have adequate electrical power and site grounding suitable to support the requirements of the system described.
- All existing towers will have adequate space and size to support the antenna network requirements of the system described.
- Any site/location upgrades or modifications are the responsibility of the Customer.
- Any tower stress analysis or tower upgrade requirements are the responsibility of the Customer.
- Approved FCC licensing will be provided by the Customer.
- Approved local, State, or Federal permits as may be required for the installation and operation of the proposed equipment, are the responsibility of the Customer.

Any required system interconnections not specifically outlined here will be provided by the Customer, Where necessary, the Customer will provide a dedicated delivery point, such as a warehouse, for receipt, inventory, and storage of equipment prior to delivery to the sites.

SECTION 5

ADDITIONAL EQUIPMENT AND SERVICES AVAILABLE UPON REQUEST

The following is a summary of equipment and services that Motorola will quote separately, upon request:

- Site connectivity
- Site acquisition or preparation costs, such as buildings, towers, grounding, or licenses/permits or costs to upgrade sites to comply with Motorola's "Standards and Guidelines for Communications Sites" (R56)
- Site power generation or utility costs such as electrical power terminations, generators, battery chargers and backup battery banks
- Console furniture
- Application software such as Computer-Aided Dispatch (CAD) and Records Management System (RMS)
- Coverage prediction and testing
- Subscriber programming and installation
- Long Term Evolution (LTE)
- Video surveillance
- In-car video
- Automatic License Plate Recognition (ALPR)
- Integrated Command and Control (ICC)
- Next Generation 911
- Wi-Fi
- Customer training (http://www.motorola-wls.com)
- Customized service package based upon customer-specific requirements
- Microwave maintenance
- Asset management
- Life cycle system management services

SECTION 6

SYSTEM ESTIMATE

Motorola estimates the system solution and services will be within the following price ranges:

Description	Estimated Price		
Single Hop Option – Cleburne to Alvarado Site	$168,000.00	to	$185,000.00
Single Hop Option – Cleburne to Precinct 2 Site	$173,000.00	to	$191,000.00
Single Hop Option – Cleburne to Retreat Site	$178,000.00	to	$197,000.00
Two Hop Option – Cleburne to Alvarado and Cleburne to Precinct 2	$301,000.00	to	$339,000.00
Three Hop Option – Cleburne to Alvarado, Cleburne to Precinct 2 and Cleburne to Retreat	$417,000.00	to	$473,000.00
Post-Warranty Years 1 – 3	Included	to	Included

Pricing shown is for budgetary purposes only. Please contact your Motorola account manager for a firm pricing quotation.

Trevlyn Pitner, Sr. Account Manager

Motorola Government & Public Safety – North Texas Region

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Email: Trevlyn.Pitner@motorolasolutions.com

SECTION 7

OUR PURPOSE—HELPING PEOPLE BE THEIR BEST IN THE MOMENTS THAT MATTER

Motorola's products continue to grow and improve, and our drive for excellence is stronger than ever. From the five-pound Handie-Talkie™ radio to the lightweight models of today, we have been the leading provider of two-way radio services for government markets.

[ENTERPRISE] More recently, in 2010 we introduced the ES400 Enterprise Digital Assistant (EDA) and announced our 802.11n WiNG 5 WLAN wireless network architecture.

[GOVERNMENT] More recently, in 2011 we implemented the country's first statewide broadband LTE public safety network. Additionally, Motorola maintains Project 25 system leadership by continuing to develop and maintain best-in-class solutions to achieve our customers' vision.

Throughout our history, Motorola has transformed innovative ideas into products that connect people to each other and the world around them. Moving forward, we strive to fulfill our commitment to improve products and services, and to make sound recommendations to guide Johnson County as you link current and future communication objectives with technology's ever-evolving promise. By partnering with our customers and observing how our products can help in their specific industries, we are able to enhance their experience every day.

Upon request, your Motorola account executive can provide a firm proposal tailored to address your unique solution requirements.