

# PRICING SUMMARY

## 8.1 PRICING SUMMARY

### City of Maricopa City of Maricopa Site Addition

Simulcast Subsystem			
Equipment		\$	594,009.58
Outsourced Services		\$	36,870.78
Microwave Subsystem			
Equipment		\$	79,775.05
Outsourced Services		\$	81,801.43
DC Power SubSystem			
Equipment		\$	57,091.10
Outsourced Services		\$	33,312.21
Site Development			
Equipment (Shelter, tower & generator)		\$	155,565.20
Construction Services		\$	144,676.85
VHF System			
Equipment		\$	22,182.18
Services (Antenna install and DC power add-on)		\$	29,932.00
Motorola Services			
	<u>Days</u>	<u>Rate</u>	<u>Extended</u>
Construction Management	32.00	\$ 1,670.00	\$ 53,440.00
Project Management	88.00	\$ 1,670.00	\$ 146,960.00
Engineering	49.00	\$ 1,670.00	\$ 81,830.00
System Technologist	69.00	\$ 1,670.00	\$ 115,230.00
Documentation	10.50	\$ 1,408.00	\$ 14,784.00
Misc Expenses			\$ 2,100.00
Freight / Shipping			\$ 10,264.52
Misc. Materials			\$ 7,405.41
CCSi Staging			\$ 21,693.12
Upgrade Operations			\$ 3,963.96
Coverage Testing			\$ 19,189.19
12 Month Enhanced Warranty Service			\$ 10,645.16
<b>System Total</b>			<b>\$ 1,722,721.74</b>
System Discount (for order of all items as proposed by 10/31/14 with shipment by 12/31/14)			\$ (95,994.38)
<b>System Total After Discount</b>			<b>\$ 1,626,727.36</b>
Estimated Taxes (Based on 65% of Project Value @ 8.7%)			\$ 91,991.43
<b>System Total including Taxes</b>			<b>\$ 1,718,718.79</b>

Integration with the Regional Wireless Cooperative, (RWC) may require additional work by the RWC including potential changes to fees, and operations and maintenance costs. These costs are not reflected in this proposal and should be discussed with the RWC Executive Director.

OAM&P Equipment is not included.

Motorola Solutions, Inc.  
7237 Church Ranch Blvd Suite 406  
Westminster, CO 80021

September 12, 2014

Commander James Hughes  
45147 W. Madison Ave  
Maricopa, AZ 85139

Re: City of Maricopa Site Addition

Dear Cmdr. Hughes,

Motorola Solutions, Inc. is honored to have the opportunity to provide the City of Maricopa with quality communications equipment and services. The Motorola Solutions project team has worked closely with you and your staff to develop a plan that will improve coverage for the City of Maricopa with the addition of a communications site in Maricopa.


Motorola's solution includes a combination of hardware, software, and services which includes:

- 180 ft. Tower with Equipment Shelter
- 16 Channel Simulcast C Sub-Site (16 GTR 8000's)
- Single Microwave Link Between FS 575 (Maricopa) and South Mountain
- DC Power System and Battery Backup

The proposal includes this cover letter, the System Description, Statement of Work and various Exhibits as shown in the Table of Contents and is subject to the terms and conditions of the Master Communications System Agreement between the City of Phoenix and Motorola, agreement #124391. The proposal shall remain valid until November 21, 2014.

Motorola Solutions would be pleased to address any questions, or concerns, the City of Maricopa may have regarding this proposal. Any questions should be directed to Carrie Hemmen of Motorola Solutions, Inc. at 602-319-2355.

Sincerely,  
MOTOROLA SOLUTIONS, INC.



Larry Mabry  
MSSSI Vice President & Director Sales

# CITY OF MARICOPA SITE ADDITION



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# SYSTEM DESCRIPTION

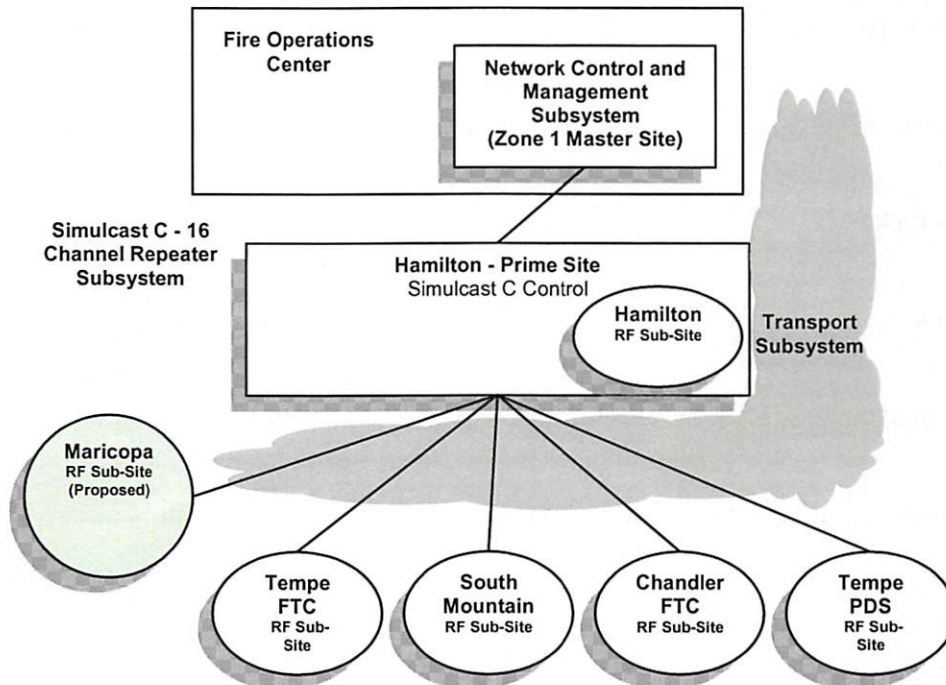
## 1.1 SIMULCAST C SITE ADDITION

Motorola is pleased to provide the City of Maricopa a proposal to add a 16-Channel Simulcast sub-site to expand Radio Frequency (RF) Coverage in Maricopa. This sub-site will be located near FS 575 in Maricopa.. The 16 channel sub-site will be part of Simulcast C subsystem in Zone 1 of the Regional Wireless Cooperative (RWC) multi-zone radio network.

The Simulcast C Maricopa sub-site will connect via two paths to the Simulcast C Prime Site located at 911 S Hamilton in Chandler AZ. The first path will be a Motorola provided microwave hop to the South Mountain microwave site, and the second path will be via a City provided leased T1 line. The Maricopa site will be a newly developed RF site and will be composed of sixteen (16) 700Mhz Channels, Antenna Subsystem, Battery & Generator Backup and Microwave Equipment.

## 1.2 SIMULCAST C SYSTEM OVERVIEW

The system deployed today consists of a single Simulcast Cell with five sub-sites. The following diagram shows the current configuration with the proposed Maricopa sub-site:



The addition of the Maricopa sub-site will increase the number of total sub-sites to six. The Maricopa sub-site with help from the other Simulcast C sites will provide Inbound and Outbound Portable Coverage within a Medium Density Building with 12dB of losses at 95% Coverage. Coverage Maps are attached with this proposal for further review.

## 1.2.1 Simulcast C Subsystem

The Maricopa sub-site will be added to the current radio subsystem that consists of one ASTRO 25 Simulcast cell that includes five remote transmitter sub-sites with sixteen base repeaters per site.

Current Simulcast C Sites are located at:

- 911 S Hamilton
- Tempe Fire Training Center
- South Mountain
- Tempe PD Site
- Chandler Fire Training Center

The equipment for the proposed Maricopa RF sub-site mirrors that provided at the other Simulcast C sub-sites and includes:

- Three (3) GTR 8000 Expandable Site sub-system chassis'
- Sixteen (16) GTR 8000 simulcast repeaters
- Two (2) Site Routers
- Antenna Systems consisting of two transmit antenna subsystems, two receive subsystems and a spare antenna / transmission line for both transmit and receive
- GPS Timing Antenna/Receiver
- One (1) Site Manager Advanced

In addition the following third party equipment is also quoted in this proposal:

- Aviat Microwave Equipment for one (1) microwave hop between Maricopa sub-site and South Mountain microwave site
- GNB Absolyte Battery Plant for battery backup
- Emerson DC Power System
- 180' Self Supporting Tower from Valmont Structures and supporting equipment
- 100 KW Kohler Generator and supporting equipment

The equipment included for the Master Site includes:

- One (1) ASTRO Repeater Site License

The new Maricopa sub-site along with the other five sub-sites that constitute Simulcast C will provide users with portable coverage within buildings of 12 dB losses or less, as indicated by the painted area of the coverage maps. Tower top amplifiers (TTA) have been utilized on all current sites to extend the inbound coverage for portable subscriber equipment and provide additional system balance as described above. A TTA will also be utilized at the Maricopa sub-site.





## 1.2.2 Proposed Maricopa sub-site RF Design

Site 6 (Future): Maricopa Site (33-3-55.06 N / 112-3-39.21 W)

Parameter	Transmit	Receive
Antenna Height	160 ft	180 ft
Antenna Type	CC807-06	CC807-11
Antenna Gain	6dbd Omni-directional	11dbd Omni-directional
Effective Radiated Power (ERP)	47.7 dBm	N/A
Tower Top Amplifier	N/A	Yes

## 1.2.3 Site Alarm Monitoring Subsystem

Each of the Simulcast C sub-sites is equipped with Site Alarm Monitoring. The Maricopa sub-site will also include Site Alarm Monitoring. The RF sites have monitoring points for all transmitters and site control equipment. In addition, discrete contract closures monitor environmental and site points, including microwave, backup power and other selected points.

Equipment at these sites monitor the microwave radios, battery and backup power generators and other environmental points.

## 1.2.4 Site Connectivity

The Microwave Transport Subsystem is included as part of this proposal. Two redundant T1 links are required to connect the Maricopa sub-site to the Simulcast C sub-system. These T1 circuits will form the primary and alternate paths. This proposal includes a quote for a one microwave hop between the Maricopa sub-site and the RWC South Mountain microwave site. The City of Maricopa is responsible for providing one (1) leased T1 as an alternate path to connect the Maricopa site to the Hamilton prime site.

## 1.2.5 DC Power System and Battery Backup

The proposal includes quotes for a DC Power System and Battery Backup for the Maricopa sub-site. The Emerson DC Power Solution is capable of providing up to 600A, and has efficiency levels of 96.5%. The 23" shelf system is designed to cover the sub-site's 13kw requirements plus provide redundancy @ 120VAC (14 2000W rectifiers). The DC Power Plant will be used to power all the DC components at the Maricopa sub-site.

Battery backup will be provided by the GNB Absolyte Battery Plant which is rated for 800Ah for 8hrs of backup. The quote also includes at spill containment kit and a battery monitoring unit.

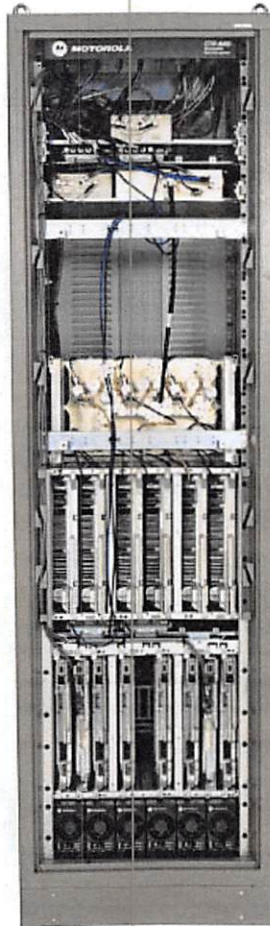
## 1.2.6 Tower and Civil Work

The proposal also includes a 180' Self Supporting Tower for the Maricopa sub-site. The tower has been sized for antenna and microwave dish loads needed for the Maricopa sub-site and for future expansion to the sub-site. A 12'x 24' pre fabricated shelter is also included for the sub-site.

## 1.3 MARICOPA RADIO EQUIPMENT DESCRIPTION

### 1.3.1 GTR 8000 Expandable Site Subsystem

The GTR 8000 Radio in the Expandable Site Subsystem (ESS) configuration is used at ASTRO 25 Simulcast Remote Sites and operates in the 800 MHz or 700 MHz frequency bands. It forwards digital voice and data from the comparator to the transmitter and forwards digital voice and data from the receiver to the comparator. Each ESS at the remote site includes up to six transceivers, six 48V DC power supplies and six RF power amplifiers. The ESS provides a modular, flexible design for today's communication systems and those of the future. The innovative design allows for upgrades within systems via hardware and/or software to avoid total infrastructure replacement. The software based design and the use of the Software Download Manager eases the ability for future upgrades.



GTR Expandable Site Subsystem (ESS 6-pack)

### 1.3.2 NFM Equipment Description

RWC's existing Alarm and Control Subsystem is Motorola's Network Fault Monitoring. NFM provides real time monitoring and remote control of the subsystems at all Simulcast C RF Sites.

MOSCAD monitors equipment faults and diagnostic error messages generated by the following:

- Up to 96 Discrete (dry-contact) alarms at each remote RF site (including TTA)
- TRAK GPS alarming
- Microwave Radio alarming

Equipment faults are graphically displayed by the Unified Event Monitoring application available at the Network Management terminals. All remote RF sites monitored by NFM connect back to the Master site. Upon detection of a fault, the UEM application will change the alarmed device icon from green to red and critical alarms will generate an audible alert tone. Acknowledgment by the operator of the critical alarm will silence the audible alert tone. The audible alert tone will sound, even if a user is not logged in to the server.

In addition to the audible alert tone, an alphanumeric alarm page can be configured and generated via a dial-up service or a dedicated paging system. Maricopa is responsible for providing the paging service and pagers. The alert tones will not reset if the alarm condition goes away on its own accord.

### 1.3.2.1 Site Alarms and Controls

All discrete alarm point reporting and control functions are accomplished through SDM3000 Site Device Manager.

Each of the existing remote RF sites is equipped with a MOSCAD Site Device Manager Remote Terminal Unit (SDM RTU) to monitor and report faults and to provide control at the site.



**SDM 3000 MOSCAD RTU Front View**

The MOSCAD SDM-3000 RTU is a universal microprocessor controlled device that serves as the site alarm collection manager. The RTU delivers site alarm data via IP interface to the ASTRO 25 LAN. The RTUs serve as the actual equipment interface at the sites. RTUs at each of the remote sites will accommodate the following inputs and outputs:

#### **Ninety-six (96) Digital Inputs (DI)**

These will be used for fault reporting purposes, such as low generator fuel level, building intrusion, building smoke or tower lights out, etc. Punch blocks will be a point of demarcation between the actual site alarm wiring and the DI.

#### **CPU Serial Alarm Diagnostic Interface**

SDM3000 CPUs are part of the Network Fault Management (NFM) RTUs at the remote sites. The CPUs provide RS-232 serial and IP alarm diagnostic interfaces to various processor-based RF communication devices for the purpose of receiving and reporting faults from these devices. The serial interface can allow remote troubleshooting and remote software updates to processor-based equipment.

## 1.4 VHF EQUIPMENT

Motorola has provided DC distribution and antenna equipment as specified by Customer to support the relocation of VHF radio equipment from an existing site to the new shelter and tower.

- OAM&P equipment has not been included in Motorola's proposal.

SECTION 2

# COVERAGE MAPS

Coverage Maps are included on the pages that follow.



## SECTION 3

# EQUIPMENT LIST

## 3.1 SIMULCAST C

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
NETWORK	1	147	2	SQM01SUM0205	GGM 8000 GATEWAY	\$ 4,200.00	10%	\$3,780.00	\$ 7,560.00	\$ 8,400.00
NETWORK	1a	147	2	CA01619AA	ADD: DC POWER	\$ -	10%	\$ -	\$ -	\$ -
ESS 1	2	112	1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM	\$ 6,000.00	15%	\$ 5,100.00	\$ 5,100.00	\$ 6,000.00
ESS 1	2a	112	1	CA00855AA	ADD: 700/800 MHZ	\$ 6,300.00	15%	\$ 5,355.00	\$ 5,355.00	\$ 6,300.00
ESS 1	2b	112	1	X306AC	ADD: QTY (6) GTR 8000 BASE RADIOS	\$ 71,400.00	15%	\$ 60,690.00	\$ 60,690.00	\$ 71,400.00
ESS 1	2c	112	6	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE	\$ 16,700.00	15%	\$ 14,195.00	\$ 85,170.00	\$ 100,200.00
ESS 1	2d	112	1	CA00862AA	ADD: SITE & CABINET RMC W/CAPABILITY OF 7-24 BRS	\$ 2,100.00	15%	\$ 1,785.00	\$ 1,785.00	\$ 2,100.00
ESS 1	2e	112	1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER	\$ 8,400.00	15%	\$ 7,140.00	\$ 7,140.00	\$ 8,400.00
ESS 1	2f	112	1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU	\$ 1,000.00	15%	\$ 850.00	\$ 850.00	\$ 1,000.00
ESS 1	2g	112	2	CA01536AA	GPB 8000 REFERENCE DISTRIBUTION MODULE	\$ 5,000.00	15%	\$ 4,250.00	\$ 8,500.00	\$ 10,000.00
ESS 1	2h	112	2	CA01537AA	ADD: REFERENCE DISTRIBUTION SOFTWARE	\$ 6,500.00	15%	\$ 5,525.00	\$ 11,050.00	\$ 13,000.00
ESS 1	2i	112	1	X882AH	ADD: 7.5 FT OPEN RACK, 48RU	\$ 495.00	15%	\$ 420.75	\$ 420.75	\$ 495.00
GPS	3	906	2	DS0900382702	GPS TIMING ANTENNA/RECEIVER W/ ADDTL FILTERING	\$ 1,190.00	5%	\$ 1,130.50	\$ 2,261.00	\$ 2,380.00
GPS	4	906	2	DS58534AAUB	MOUNTING KIT FOR 090-03827-02 , GPS TIMING ANTENNA	\$ 90.00	5%	\$ 85.50	\$ 171.00	\$ 180.00
GPS	5	207	2	DSIX2L1M1DC48IG	SPD, HPD GPS DATA LINE, 48VDC, HARD WIRE WITH ISOLATED GROUNDING	\$ 233.00	15%	\$ 198.05	\$ 396.10	\$ 466.00
GPS	6	351	2	DS30C87465CO1	125FT OUTDOOR UV PROTECTED CABLE 6 PR, 22AWG DB15	\$ 634.00	10%	\$ 570.60	\$ 1,141.20	\$ 1,268.00
ESS 2	7	112	1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM	\$ 6,000.00	15%	\$ 5,100.00	\$ 5,100.00	\$ 6,000.00
ESS 2	7a	112	1	CA00855AA	ADD: 700/800 MHZ	\$ 6,300.00	15%	\$ 5,355.00	\$ 5,355.00	\$ 6,300.00
ESS 2	7b	112	1	X304AE	ADD: QTY (4) GTR 8000 BASE RADIOS	\$ 47,600.00	15%	\$ 40,460.00	\$ 40,460.00	\$ 47,600.00

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
ESS 2	7c	112	4	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE	\$ 16,700.00	15%	\$ 14,195.00	\$ 56,780.00	\$ 66,800.00
ESS 2	7d	112	1	CA00877AA	ADD: CABINET RMC FOR EXPANSION RACK	\$ 600.00	15%	\$ 510.00	\$ 510.00	\$ 600.00
ESS 2	7e	112	1	CA00880AA	ADD: EXPANSION 6 PORT CAVITY COMBINER	\$ 8,400.00	15%	\$ 7,140.00	\$ 7,140.00	\$ 8,400.00
ESS 2	7f	112	1	CA01058AA	ADD: 700/800 PHASING HARNESS	\$ 1,000.00	15%	\$ 850.00	\$ 850.00	\$ 1,000.00
ESS 2	7g	112	2	CA00885AA	ADD: HIGH AVAILABILITY XHUB	\$ 3,500.00	15%	\$ 2,975.00	\$ 5,950.00	\$ 7,000.00
ESS 2	7h	112	1	X882AH	ADD: 7.5 FT OPEN RACK, 48RU	\$ 495.00	15%	\$ 420.75	\$ 420.75	\$ 495.00
ESS 3	8	112	1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM	\$ 6,000.00	15%	\$ 5,100.00	\$ 5,100.00	\$ 6,000.00
ESS 3	8a	112	1	CA00855AA	ADD: 700/800 MHZ	\$ 6,300.00	15%	\$ 5,355.00	\$ 5,355.00	\$ 6,300.00
ESS 3	8b	112	1	X306AC	ADD: QTY (6) GTR 8000 BASE RADIOS	\$ 71,400.00	15%	\$ 60,690.00	\$ 60,690.00	\$ 71,400.00
ESS 3	8c	112	6	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE	\$ 16,700.00	15%	\$ 14,195.00	\$ 85,170.00	\$ 100,200.00
ESS 3	8d	112	1	CA00862AA	ADD: SITE & CABINET RMC W/CAPABILITY OF 7-24 BRS	\$ 2,100.00	15%	\$ 1,785.00	\$ 1,785.00	\$ 2,100.00
ESS 3	8e	112	1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER	\$ 8,400.00	15%	\$ 7,140.00	\$ 7,140.00	\$ 8,400.00
ESS 3	8f	112	1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU	\$ 1,000.00	15%	\$ 850.00	\$ 850.00	\$ 1,000.00
ESS 3	8g	112	2	CA00885AA	ADD: HIGH AVAILABILITY XHUB	\$ 3,500.00	15%	\$ 2,975.00	\$ 5,950.00	\$ 7,000.00
ESS 3	8h	112	1	X882AH	ADD: 7.5 FT OPEN RACK, 48RU	\$ 495.00	15%	\$ 420.75	\$ 420.75	\$ 495.00
ESS 3	9	509	1	TRN7343	SEVEN AND A HALF FOOT RACK	\$ 495.00	20%	\$ 396.00	\$ 396.00	\$ 495.00
SURGE	10	207	1	DSOP820B	PDU, 120V HARDWIRE (8) 20A OUTLET PDU WITH TYPE 3 SAD PROTECTION	\$ 990.00	15%	\$ 841.50	\$ 841.50	\$ 990.00
SURGE	11	207	1	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B	\$ 63.00	15%	\$ 53.55	\$ 53.55	\$ 63.00
SURGE	12	207	2	DSTSJ48CLT	SPD, RJ-45 OR HARDWIRE CONNECTED FOR T1/E1, PROTECTS 4 WIRES	\$ 120.00	15%	\$ 102.00	\$ 204.00	\$ 240.00
SURGE	13	207	2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS	\$ 88.00	15%	\$ 74.80	\$ 149.60	\$ 176.00

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
DC Distrib	122	207	2	DS268132	INVERTER, 1 KVA, 48VDCIN/120VACOUT 2RU RM 19/23 IN NEWMAR 48-1000RM	\$ 2,802.00	15%	\$ 2,381.70	\$ 4,763.40	\$ 5,604.00
DC Distrib	123	207	1	DSDST20A	DISTRIBUTION PANEL (UL) W/ REAR COVER (USES PBA PLUG-IN BREAKERS)	\$ 1,266.00	15%	\$ 1,076.10	\$ 1,076.10	\$ 1,266.00
DC Distrib	124	207	1	DSBBA800	ISOLATED GROUND BUS BAR ASSEMBLY, 800A	\$ 359.00	15%	\$ 305.15	\$ 305.15	\$ 359.00
DC Distrib	125	207	2	DSPBA10	PBA PLUG-IN BREAKER 10 AMP	\$ 55.00	15%	\$ 46.75	\$ 93.50	\$ 110.00
DC Distrib	126	207	4	DSPBA5	PBA PLUG-IN BREAKER 5 AMP	\$ 55.00	15%	\$ 46.75	\$ 187.00	\$ 220.00
CMU	14	351	2	DS428D83I01C48	CONTROL MONITORING UNIT, 796-824 MHZ, 48 VDC	\$ 3,601.00	10%	\$ 3,240.90	\$ 6,481.80	\$ 7,202.00
TTA	15	351	3	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX	\$ 9,879.00	10%	\$ 8,891.10	\$ 26,673.30	\$ 29,637.00
SPARES	16	729	1	DLN6455	CONFIGURATION/SERVI CE SOFTWARE	\$ 25.00	0%	\$ 25.00	\$ 25.00	\$ 25.00
MOSCAD	127	469	1	F4544	SITE MANAGER ADVANCED	\$ 3,000.00	10%	\$ 2,700.00	\$ 2,700.00	\$ 3,000.00
MOSCAD	127c	469	1	VA00905	ADD:24/48 VDC PS TO SM	\$ 120.00	10%	\$ 108.00	\$ 108.00	\$ 120.00
MOSCAD	127a	469	1	VA00872	ADD: SDM ASTRO RTU FW CURR ASTRO REL	\$ 1,850.00	10%	\$ 1,665.00	\$ 1,665.00	\$ 1,850.00
MOSCAD	127b	469	3	V592	AAD TERM BLCK & CONN WI	\$ 90.00	10%	\$ 81.00	\$ 243.00	\$ 270.00
MOSCAD	128	469	1	F4547	SM IO EXPANSION BASIC	\$ 900.00	10%	\$ 810.00	\$ 810.00	\$ 900.00
MOSCAD	128a	469	1	VA00905	ADD:24/48 VDC PS TO SM	\$ 120.00	10%	\$ 108.00	\$ 108.00	\$ 120.00
MOSCAD	129	382	1	F2463	RTU_PER_DEVICE_SW_ LICENSES	\$ 75.00	10%	\$ 67.50	\$ 67.50	\$ 75.00
MOSCAD	129a	382	1	V838	RTU_SW_LIC_PER_TRA K_GPS	\$ 110.00	10%	\$ 99.00	\$ 99.00	\$ 110.00
MOSCAD	129b	382	1	V839	RTU_SW_LIC_PER_NFM- RTU_I-O	\$ 110.00	10%	\$ 99.00	\$ 99.00	\$ 110.00
Zone 2	130	877	1	SQM01SUM0200	MASTER SITE UPGRADE MODEL	\$ -	18%	\$ -	\$ -	\$ -
Zone 2	130a	877	1	CA00996AJ	ADD: NM/ZC LICENSE KEY 7.11	\$ 1,000.00	18%	\$ 820.00	\$ 820.00	\$ 1,000.00
Zone 2	130b	877	1	CA00997AJ	ADD: UCS LICENSE KEY 7.11	\$ 1,000.00	18%	\$ 820.00	\$ 820.00	\$ 1,000.00
Zone 2	130c	877	1	CA01316AA	ADD: UNC ADDTL DEVICE LIC (QTY 10)	\$ 500.00	18%	\$ 410.00	\$ 410.00	\$ 500.00
Zone 1	131	877	1	SQM01SUM0200	MASTER SITE UPGRADE MODEL	\$ -	18%	\$ -	\$ -	\$ -
Zone 1	131a	877	1	CA00996AJ	ADD: NM/ZC LICENSE KEY 7.11	\$ 1,000.00	18%	\$ 820.00	\$ 820.00	\$ 1,000.00

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
Zone 1	131b	877	1	CA01209AB	ASTRO 25 FDMA VOICE SITE	\$ 17,000.00	18%	\$ 13,940.00	\$ 13,940.00	\$ 17,000.00
TX1	135	351	1	DSCC80706	OMNI, CORPORATE COLLINEAR, 6 DBD, 746-870 MHZ, PIM & 25 KW PIP RATED	\$ 2,388.00	10%	\$ 2,149.20	\$ 2,149.20	\$ 2,388.00
TX1	17	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
TX1	18	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
TX1	19	351	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 39.60	\$ 44.00
TX1	20	351	200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORRUGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 1,512.00	\$ 1,680.00
TX1	21	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
TX1	22	351	5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 101.25	\$ 112.50
TX1	23	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
TX1	24	351	7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK	\$ 32.50	10%	\$ 29.25	\$ 204.75	\$ 227.50
TX1	25	207	1	DSTSXFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL	\$ 125.00	15%	\$ 106.25	\$ 106.25	\$ 125.00
TX1	26	207	1	DSGSAKITD	GROUND STRAP KIT - DIN	\$ 34.00	15%	\$ 28.90	\$ 28.90	\$ 34.00
TX1	27	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 78.75	\$ 87.50
TX1	28	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
TX2	136	351	1	DSCC80706	OMNI, CORPORATE COLLINEAR, 6 DBD, 746-870 MHZ, PIM & 25 KW PIP RATED	\$ 2,388.00	10%	\$ 2,149.20	\$ 2,149.20	\$ 2,388.00
TX2	29	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
TX2	30	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00



SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
TX2	31	351	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 39.60	\$ 44.00
TX2	32	351	200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORRUGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 1,512.00	\$ 1,680.00
TX2	33	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
TX2	34	351	5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 101.25	\$ 112.50
TX2	35	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
TX2	36	351	7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK	\$ 32.50	10%	\$ 29.25	\$ 204.75	\$ 227.50
TX2	37	207	1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL	\$ 125.00	15%	\$ 106.25	\$ 106.25	\$ 125.00
TX2	38	207	1	DSGSAKITD	GROUND STRAP KIT - DIN	\$ 34.00	15%	\$ 28.90	\$ 28.90	\$ 34.00
TX2	39	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 78.75	\$ 87.50
TX2	40	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
Txspare	137	351	1	DSCC80706	OMNI, CORPORATE COLLINEAR, 6 DBD, 746-870 MHZ, PIM & 25 KW PIP RATED	\$ 2,388.00	10%	\$ 2,149.20	\$ 2,149.20	\$ 2,388.00
Txspare	41	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
Txspare	42	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
Txspare	43	351	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 39.60	\$ 44.00
Txspare	44	351	200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORRUGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 1,512.00	\$ 1,680.00
Txspare	45	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
Txspare	46	351	5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 101.25	\$ 112.50

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
Txspare	47	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
Txspare	48	351	7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK	\$ 32.50	10%	\$ 29.25	\$ 204.75	\$ 227.50
Txspare	49	207	1	DSTSXFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL	\$ 125.00	15%	\$ 106.25	\$ 106.25	\$ 125.00
Txspare	50	207	1	DSGSAKITD	GROUND STRAP KIT - DIN	\$ 34.00	15%	\$ 28.90	\$ 28.90	\$ 34.00
Txspare	51	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 78.75	\$ 87.50
Txspare	52	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
RX1	138	351	1	DSCC80711	OMNI, CORPORATE COLLINER, 10.5DBD, 746-870MHZ, PIM & 25KW PIP RATED	\$ 4,852.00	10%	\$ 4,366.80	\$ 4,366.80	\$ 4,852.00
RX1	53	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
RX1	54	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX1	55	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX1	56	351	5	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 99.00	\$ 110.00
RX1	57	351	5	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 15.75	\$ 17.50
RX1	58	351	2	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
RX1	59	351	200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORROGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 1,512.00	\$ 1,680.00
RX1	60	351	2	DDN1079	78EZNFM N FEMALE MOT CONNECTOR (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
RX1	61	351	5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 101.25	\$ 112.50
RX1	62	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX1	63	351	200	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 630.00	\$ 700.00

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
RX1	64	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX1	65	351	1	DDN1089	L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX1	66	351	5	DSSG1206B2A	SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT	\$ 19.00	10%	\$ 17.10	\$ 85.50	\$ 95.00
RX1	67	351	1	DSL4SGRIP	L4SGRIP SUPPORT HOIST GRIP 1/2" LDF	\$ 18.25	10%	\$ 16.43	\$ 16.43	\$ 18.25
RX1	68	351	7	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK	\$ 21.00	10%	\$ 18.90	\$ 132.30	\$ 147.00
RX1	69	351	7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK	\$ 32.50	10%	\$ 29.25	\$ 204.75	\$ 227.50
RX1	70	207	1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT	\$ 163.00	15%	\$ 138.55	\$ 138.55	\$ 163.00
RX1	71	207	1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT	\$ 163.00	15%	\$ 138.55	\$ 138.55	\$ 163.00
RX1	72	351	25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT	\$ 2.25	10%	\$ 2.03	\$ 50.63	\$ 56.25
RX1	73	351	2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE	\$ 27.25	10%	\$ 24.53	\$ 49.05	\$ 54.50
RX1	74	351	25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT	\$ 5.05	10%	\$ 4.55	\$ 113.63	\$ 126.25
RX1	75	351	2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR	\$ 32.00	10%	\$ 28.80	\$ 57.60	\$ 64.00
RX2	139	351	1	DSCC80711	OMNI, CORPORATE COLLINER, 10.5DBD, 746-870MHZ, PIM & 25KW PIP RATED	\$ 4,852.00	10%	\$ 4,366.80	\$ 4,366.80	\$ 4,852.00
RX2	76	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
RX2	77	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX2	78	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX2	79	351	5	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 99.00	\$ 110.00

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
RX2	80	351	5	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 15.75	\$ 17.50
RX2	81	351	2	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
RX2	82	351	200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORROGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 1,512.00	\$ 1,680.00
RX2	83	351	2	DDN1079	78EZNFM N FEMALE MOT CONNECTOR (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
RX2	84	351	5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 101.25	\$ 112.50
RX2	85	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX2	86	351	200	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 630.00	\$ 700.00
RX2	87	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX2	88	351	1	DDN1089	L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
RX2	89	351	5	DSSG1206B2A	SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT	\$ 19.00	10%	\$ 17.10	\$ 85.50	\$ 95.00
RX2	90	351	1	DSL4SGRIP	L4SGRIP SUPPORT HOIST GRIP 1/2" LDF	\$ 18.25	10%	\$ 16.43	\$ 16.43	\$ 18.25
RX2	91	351	7	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK	\$ 21.00	10%	\$ 18.90	\$ 132.30	\$ 147.00
RX2	92	351	7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK	\$ 32.50	10%	\$ 29.25	\$ 204.75	\$ 227.50
RX2	93	207	1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT	\$ 163.00	15%	\$ 138.55	\$ 138.55	\$ 163.00
RX2	94	207	1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT	\$ 163.00	15%	\$ 138.55	\$ 138.55	\$ 163.00
RX2	95	351	25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT	\$ 2.25	10%	\$ 2.03	\$ 50.63	\$ 56.25
RX2	96	351	2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE	\$ 27.25	10%	\$ 24.53	\$ 49.05	\$ 54.50

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
RX2	97	351	25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT	\$ 5.05	10%	\$ 4.55	\$ 113.63	\$ 126.25
RX2	98	351	2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR	\$ 32.00	10%	\$ 28.80	\$ 57.60	\$ 64.00
Rxspare	140	351	1	DSCC80711	OMNI, CORPORATE COLLINEAR, 10.5DBD, 746-870MHZ, PIM & 25KW PIP RATED	\$ 4,852.00	10%	\$ 4,366.80	\$ 4,366.80	\$ 4,852.00
Rxspare	99	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
Rxspare	100	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
Rxspare	101	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
Rxspare	102	351	5	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 99.00	\$ 110.00
Rxspare	103	351	5	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 15.75	\$ 17.50
Rxspare	104	351	2	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
Rxspare	105	351	200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORRUGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 1,512.00	\$ 1,680.00
Rxspare	106	351	2	DDN1079	78EZNFM N FEMALE MOT CONNECTOR (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
Rxspare	107	351	5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 101.25	\$ 112.50
Rxspare	108	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
Rxspare	109	351	200	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 630.00	\$ 700.00
Rxspare	110	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
Rxspare	111	351	1	DDN1089	L4TNF-PSA TYPE N FEMALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
Rxspare	112	351	5	DSSG1206B2A	SG12-06B2A 1/2IN SURE GROUND GROUNDING KIT	\$ 19.00	10%	\$ 17.10	\$ 85.50	\$ 95.00
Rxspare	113	351	1	DSL4SGRIP	L4SGRIP SUPPORT HOIST GRIP 1/2" LDF	\$ 18.25	10%	\$ 16.43	\$ 16.43	\$ 18.25

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
Rxspare	114	351	7	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK	\$ 21.00	10%	\$ 18.90	\$ 132.30	\$ 147.00
Rxspare	115	351	7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK	\$ 32.50	10%	\$ 29.25	\$ 204.75	\$ 227.50
Rxspare	116	207	1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT	\$ 163.00	15%	\$ 138.55	\$ 138.55	\$ 163.00
Rxspare	117	207	1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT	\$ 163.00	15%	\$ 138.55	\$ 138.55	\$ 163.00
Rxspare	118	351	25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT	\$ 2.25	10%	\$ 2.03	\$ 50.63	\$ 56.25
Rxspare	119	351	2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE	\$ 27.25	10%	\$ 24.53	\$ 49.05	\$ 54.50
Rxspare	120	351	25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT	\$ 5.05	10%	\$ 4.55	\$ 113.63	\$ 126.25
Rxspare	121	351	2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR	\$ 32.00	10%	\$ 28.80	\$ 57.60	\$ 64.00
Aviat Micr	132	131	1	DQMWMARISMT NRF	Microwave Quote Part 1	\$ 49,294.00	15%	\$ 41,899.90	\$ 41,899.90	\$ 49,294.00
Aviat Micr	133	131	1	DQMWMARISMT NSP	Microwave Quote Part 2	\$ 10,110.00	15%	\$ 8,593.50	\$ 8,593.50	\$ 10,110.00
Aviat Micr	134	131	1	DQMWMARISMT NAD	Microwave Quote Part 3	\$ 34,449.00	15%	\$ 29,281.65	\$ 29,281.65	\$ 34,449.00
Batteries	141	207	2	DS18135210	Battery Plant, 48V, 800Ah @ 8Hr	\$ 19,302.00	15%	\$ 16,406.70	\$ 32,813.40	\$ 38,604.00
Batteries	142	207	2	DS0200142	Battery Disconnect 48V, 400A	\$ 3,116.00	15%	\$ 2,648.60	\$ 5,297.20	\$ 6,232.00
Batteries	143	207	2	DS1890096	Spill Containment Kit	\$ 676.00	15%	\$ 574.60	\$ 1,149.20	\$ 1,352.00
Batteries	145	207	48	DS0180004	Phoenix BMS, 2V Battery Sensor	\$ 118.00	15%	\$ 100.30	\$ 4,814.40	\$ 5,664.00
DC Power S	146	207	1	DS582136800	NetSure 502 48V POWER SYSTEM	\$ 7,628.00	15%	\$ 6,483.80	\$ 6,483.80	\$ 7,628.00
DC Power S	147	207	14	DS1R482000E	Rectifier, eSure, 2000W, -48VDC	\$ 549.00	15%	\$ 466.65	\$ 6,533.10	\$ 7,686.00
Tower	148	262	1	DQ132S2569370 1	Tower Equipment	\$ 49,376.00	30%	\$ 34,563.20	\$ 34,563.20	\$ 49,376.00
Shelter	149	329	1	TT1001	MSB, 12' X 24' CONCRETE BLDG, INCLS UPS & GENERATOR, FULLY COMPLETE	\$ 182,485.00	30%	\$ 127,739.50	\$ 127,739.50	\$ 182,485.00

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
Shelter	149a	329	1	TT01023AA	DEL: 20KVA/16KW UPS (QTY 2)	\$ (44,895.00)	30%	\$ (31,426.50)	\$ (31,426.50)	\$ (44,895.00)
Shelter	149b	329	1	TT01010AA	ADD: FM200 FIRE SUPPRESSION SYSTEM (OD GEN)	\$ 14,856.00	30%	\$ 10,399.20	\$ 10,399.20	\$ 14,856.00
Shelter	150	329	1	DQ282OS14323	Kohler Alt Mfg Kohler Diesel Generator and ATS	\$ 20,414.00	30%	\$ 14,289.80	\$ 14,289.80	\$ 20,414.00
								Total	\$ 886,440.93	\$ 1,077,049.75

## 3.2 VHF EQUIPMENT

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
VHF	1	351	15	L1705	1/2" CELLFLEX LOW-LOSS FOAM-DIELECTRIC COAXIAL CABLE PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
VHF	2	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
VHF	3	351	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 39.60	\$ 44.00
VHF	4	351	300	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORREGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 2,268.00	\$ 2,520.00
VHF	5	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
VHF	6	351	6	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 121.50	\$ 135.00
VHF	7	351	2	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
VHF	8	207	1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP	\$ 160.00	15%	\$ 136.00	\$ 136.00	\$ 160.00
VHF	9	351	25	L1705	1/2" CELLFLEX LOW-LOSS FOAM-DIELECTRIC COAXIAL CABLE PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 78.75	\$ 87.50
VHF	10	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00

SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
VHF	11	351	15	L1705	1/2" CELLFLEX LOW-LOSS FOAM-DIELECTRIC COAXIAL CABLE PER FOOT	\$ 3.50	10%	\$ 3.15	\$ 47.25	\$ 52.50
VHF	12	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
VHF	13	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE	\$ 28.50	10%	\$ 25.65	\$ 25.65	\$ 28.50
VHF	14	351	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING	\$ 22.00	10%	\$ 19.80	\$ 39.60	\$ 44.00
VHF	15	351	300	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORRUGATED CABLE (AVA5-50FX)/FOOT	\$ 8.40	10%	\$ 7.56	\$ 2,268.00	\$ 2,520.00
VHF	16	351	2	DDN1079	78EZNFM N FEMALE MOT CONNECTOR (MOTOROLA SPECIFIC)	\$ 39.75	10%	\$ 35.78	\$ 71.55	\$ 79.50
VHF	17	351	6	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE	\$ 22.50	10%	\$ 20.25	\$ 121.50	\$ 135.00
VHF	18	351	2	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP	\$ 28.50	10%	\$ 25.65	\$ 51.30	\$ 57.00
VHF	19	207	1	DSIS50NXC2MA	RF SPD, 125-1000MHZ DC BLOCK FLANGE MT NM ANTENNA, NF EQUIPMENT SIDE	\$ 78.00	15%	\$ 66.30	\$ 66.30	\$ 78.00
VHF	20	351	25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT	\$ 5.05	10%	\$ 4.55	\$ 113.63	\$ 126.25
VHF	21	351	2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR	\$ 32.00	10%	\$ 28.80	\$ 57.60	\$ 64.00
VHF	22	509	2	TRN7343	SEVEN AND A HALF FOOT RACK	\$ 495.00	20%	\$ 396.00	\$ 792.00	\$ 990.00
VHF	33	207	2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS	\$ 88.00	15%	\$ 74.80	\$ 149.60	\$ 176.00
VHF	23	207	1	DS268132	INVERTER, 1 KVA, 48VDCIN/120VACOUT 2RU RM 19/23 IN NEWMAR 48-1000RM	\$ 2,802.00	15%	\$ 2,381.70	\$ 2,381.70	\$ 2,802.00
VHF	24	207	2	DSDST20A	DISTRIBUTION PANEL (UL) W/ REAR COVER (USES PBA PLUG-IN BREAKERS)	\$ 1,266.00	15%	\$ 1,076.10	\$ 2,152.20	\$ 2,532.00
VHF	25	207	2	DSBBA800	ISOLATED GROUND BUS BAR ASSEMBLY, 800A	\$ 359.00	15%	\$ 305.15	\$ 610.30	\$ 718.00
VHF	26	207	8	DSPBA20	PBA PLUG-IN BREAKER 20 AMP	\$ 55.00	15%	\$ 46.75	\$ 374.00	\$ 440.00
VHF	27	207	4	DSPBA10	PBA PLUG-IN BREAKER 10 AMP	\$ 55.00	15%	\$ 46.75	\$ 187.00	\$ 220.00



SubSys	Item Num	APC	Qty	Nomenclature	Description	Unit List	Disc %	Unit Disc	Ext Disc	Ext list
VHF	28	207	2	DSOP820B	PDU, 120V HARDWIRE (8) 20A OUTLET PDU WITH TYPE 3 SAD PROTECTION	\$ 990.00	15%	\$ 841.50	\$ 1,683.00	\$ 1,980.00
VHF	29	207	2	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B	\$ 63.00	15%	\$ 53.55	\$ 107.10	\$ 126.00
VHF	30	112	1	DLN6781	FRU POWER SUPPLY	\$ 2,200.00	15%	\$ 1,870.00	\$ 1,870.00	\$ 2,200.00
VHF	31	207	2	DQDB224A	ANTENNA 6.0 DB OMNI 150-160MHZ	\$ 1,883.00	15%	\$ 1,600.55	\$ 3,201.10	\$ 3,766.00
VHF	32	207	2	DS1502481330M3	CONVERTER, 48-VOLT TO 13-VOLT DC/DC	\$ 1,688.00	15%	\$ 1,434.80	\$ 2,869.60	\$ 3,376.00
								Total	\$ 22,182.18	\$ 25,788.75

# STATEMENT OF WORK

## 4.1 INTRODUCTION

Motorola has developed this Statement of Work (SOW) to define the principal activities and responsibilities for the implementation of the Maricopa Site Addition project. In addition, a system description has been carefully detailed to provide a comprehensive breakdown of the equipment to be implemented.

Deviations and changes to this SOW are subject to mutual agreement between Motorola and the City of Maricopa, ("Customer"), and will be addressed in accordance with the change provisions of the Contract.

The objective of this project is to add a 16-channel simulcast sub-site to the Regional Wireless Cooperative (RWC) ASTRO 25 Radio Network and is intended to expand Radio Frequency (RF) Coverage in Maricopa and surrounding areas. The sub-site will become part of Simulcast C subsystem in Zone 1 of the RWC multi-zone system.

The planning and implementation of this project requires participation, review and approvals by the RWC. RWC participation, reviews and approval process will be discussed and detailed during the project kickoff meeting.

### 4.1.1 Contract Award (Milestone)

Customer and Motorola execute the contract and both parties receive all the necessary documentation.

### 4.1.2 Contract Administration

#### Motorola Responsibilities

- Assign a Project Manager, as the single point of contact with authority to make project decisions.
- Assign resources necessary for project implementation.
- Set up the project in the Motorola information system.
- Schedule the project kick-off meeting.

#### Customer Responsibilities

- Assign a Project Manager, as the single point of contact responsible for Customer signed approvals.
- Assign other resources necessary to ensure completion of project tasks for which Customer is responsible.
- Liaison with other State agencies, other governmental agencies and Customer vendors, contractors and common carriers.
- Provide unfettered access to Motorola personnel and its subcontractors to all facilities where the system is to be installed during the project. Temporary identification cards, proxy access cards, and keys to gates, doors and rooms shall be issued to Motorola personnel for access to Customer facilities. Unescorted access shall be available 24x7 to all project work sites and City locations involved. Motorola requests facilities keys be provided to the Motorola PM.



- Provide any required parking permits to Motorola personnel for restricted access entry and/or parking.

### 4.1.3 Project Kickoff

#### Motorola Responsibilities

- Conduct a project kickoff meeting during the Contract Design Review (CDR) phase of the project.
- Ensure key project team participants attend the meeting.
- Introduce all project participants attending the meeting.
- Review the roles of the project participants to identify communication flows and decision-making authority between project participants.
- Review the overall project scope and objectives with Customer.
- Review the resource and scheduling requirements with Customer.
- Review the Project Schedule with Customer to address upcoming milestones and/or events.
- Review the teams' interactions (Motorola and the Customer), meetings, reports, milestone acceptance, and Customer's participation in particular phases.

#### Customer Responsibilities

- Customer's key project team participants attend the meeting.
- Review Motorola and Customer responsibilities.

## 4.2 CONTRACT DESIGN REVIEW (CDR)

Motorola's design and the SOW are based on the assumption that the proposed radio channels are made available. All frequency licensing and or modifications to licenses are Customer's or its representative's responsibility.

### 4.2.1 Review Contract Design

#### Motorola Responsibilities

- Meet with Customer project team.
- Review the operational requirements and the impact of those requirements on various equipment configurations.
- Establish a defined baseline for the system design and identify any special product requirements and their impact on system implementation.
- Review the System Design, Statement of Work, Project Schedule, and Acceptance Test Plans, and update the contract documents accordingly.
- Discuss the proposed Cutover Plan and methods to document a detailed procedure.
- Submit design documents to Customer for approval. These documents form the basis of the system, which Motorola will manufacture, assemble, stage, and install.
- Prepare equipment layout plans for staging.
- Provide minimum acceptable performance specifications for microwave, fiber, or copper links.
- Establish demarcation points to define the connection point between the Motorola-supplied equipment and Customer-supplied link(s) and external interfaces where applicable.
- Finalize site acquisition and development plan.
- Conduct site evaluations to capture site details of the system design and to determine site readiness (when necessary).
- Determine each site's ability to accommodate proposed equipment based upon physical capacity.



- Prepare Site Evaluation Report that summarizes findings of above-described site evaluations.

### **Limitations**

- Motorola assumes no liability or responsibility for inadequate frequency availability or frequency licensing issues.
- Motorola is not responsible for issues outside of its immediate control. Such issues include, but are not restricted to, improper frequency coordination by others and non-compliant operation of other radios.
- Motorola is not responsible for co-channel interference due to errors in frequency coordination by APCO or any other unlisted frequencies, or the improper design, installation, or operation of systems installed or operated by others.
- If, for any reason, any of the proposed sites cannot be utilized due to reasons beyond Motorola's control, the costs associated with site changes or delays including, but not limited to, re-engineering, frequency re-licensing, site zoning, site permitting, schedule delays, site abnormalities, re-mobilization, etc., will be paid for by Customer and documented through the change order process.

### **Customer Responsibilities**

- Customer's key project team participants attend the meeting.
- Make timely decisions, according to the Project Schedule.
- Frequency Licensing and Interference:
- Customer, as the licensee, has the ultimate responsibility for providing all required radio licensing or licensing modifications for the system prior to system staging. This responsibility includes paying for FCC licensing and frequency coordination fees.
- Provide the FCC "call sign" station identifier for each site prior to system staging.

### **Completion Criteria**

- Complete Design Documentation, which may include updated System Description, Equipment List, system drawings, or other documents applicable to the project.
- Incorporate any deviations from the proposed system into the contract documents accordingly.
- The system design is "frozen," in preparation for subsequent project phases such as Order Processing and Manufacturing.
- A Change Order is executed in accordance with all material changes resulting from the Design Review to the contract.

## **4.2.2 Design Approval (Milestone)**

Customer executes a Design Approval milestone document.

## **4.3 ORDER PROCESSING**

### **4.3.1 Process Equipment List**

#### **Motorola Responsibilities**

- Validate Equipment List by checking for valid model numbers, versions, compatible options to main equipment, and delivery data.
- Create equipment orders.
- Reconcile the equipment list(s) to the Contract.
- Procure third-party equipment if applicable.

#### **Customer Responsibilities**

- Approve shipping location(s).

## **4.4 MANUFACTURING AND STAGING**

### **4.4.1 Manufacture Equipment**

#### **Motorola Responsibilities**

- Manufacture the Fixed Network Equipment (FNE) and order any third party equipment necessary for the system based on the design and equipment order.

#### **Customer Responsibilities**

- None.

### **4.4.2 Stage System**

The subsystem will be staged at Motorola's Customer Center for Solutions Integration (CCSi) in Schaumburg, IL. Since this is an add-on to the existing system, the staging will be limited. A customer visit and demonstration is not included.

### **4.4.3 CCSi Ship Acceptance (Milestone)**

### **4.4.4 Warehousing and Inventory of Equipment**

Motorola will provide a secure storage location for the project equipment pending its installation and optimization. Customer must inventory the equipment to acknowledge receipt and transfer of the equipment to be stored.

## **4.5 CIVIL WORK**

The project has been engineered and priced based on the assumption that the sites listed below will be utilized. Should Customer request changes to this design, any costs incurred would be the responsibility of Customer. Research into the feasibility of utilizing a site, other than ones listed below, would be required.

### **4.5.1 Site Development at Maricopa Site**

This is a Greenfield site that will consist of a 180 foot self supported tower, a 14 foot x 36 foot equipment shelter, a 100 KW diesel generator w/belly tank in a fenced and locked compound.

#### Site Scope Summary

- Engineering services for site drawings and regulatory approvals – Included.
- Site acquisition services – Not included.
- Zoning Services –Included.
- New shelter size – 12-foot x 24-foot.
- New fenced compound/expansion size – 50-foot x 50-foot.
- Clearing type – Light.

- Road length requiring improvement – 30 feet.
- New fuel tank size – 500 gallons- , Type – Diesel above-ground.
- New generator size – 70 kW, Type – Outdoor.
- New tower to be used for antennas – 180-foot self-supported tower.
- New tower foundation size – 36 cubic yard, Type – Mat.

### **Motorola Responsibilities:**

#### Site Zoning

- Coordinate zoning and permitting of the new tower site such that it is in full compliance with applicable jurisdictional requirements.

#### Site Engineering

Prepare site construction drawings showing the layout of various new and existing site components.

- Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities, etc.).
- Perform a boundary and topographic survey for the property on which the communication site is located or will be located.
- Perform construction staking around the site to establish reference points for proposed construction.
- Prepare a lease exhibit and sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- Prepare zoning drawings that can be used to describe the proposed site installation in sufficient detail.
- Prepare record drawings of the site showing the as-built information.
- Perform a boundary and topographic survey for the property on which the communication site is located or will be located.
- Prepare a 2C/1A letter certifying the accuracy of the surveyed data for the tower.
- Perform construction staking around the site to establish reference points for proposed construction.
- Provide an expert witness for up to 1 day(s) to attend or testify at public meetings and/or hearings to provide expert testimony to assist in obtaining zoning approvals.
- Perform NEPA Threshold Screening, including limited literature and records search and brief reporting, as necessary to identify sensitive natural and cultural features referenced in 47 CFR Chapter 1, subsection 1.1307 that may potentially be impacted by the proposed construction activity. This does not include the additional field investigations to document site conditions if it is determined that the proposed communication facility “may have a significant environmental impact” and thus require additional documentation, submittals, or work. Regional Environmental Review (RER) report submittals if required by FEMA have not been included. Perform Cultural Resource study as needed to identify sensitive historical and archaeological monuments that might be impacted by proposed construction
- Conduct up to 40-foot deep soil boring test at tower location and prepare geotechnical report of soil conditions at locations of the tower foundation. Grouting of boring holes or access by Automatic Traction Vehicle (ATV) - mounted rig is not included.
- Conduct construction inspection of foundation steel prior to pour, materials testing of concrete and field density tests of backfill to ensure quality construction.
- Check tower erection for plumbness, linearity and alignment after installation.
- Perform inspection of the site and the work performed by the Contractor to document that the site is built in accordance with the “Site Plans” and document any deviations or violations.



- Prepare, submit and track application for local permit fees (zoning, electrical, building etc.), prepare FAA filings and procure information necessary for filing.
- Perform geotechnical testing at the shelter foundation location.
- Perform four point soil resistivity testing at the time of site visit.

#### Site Preparation

- Obtain the permits such as electrical, building, and construction permits, and coordinate any inspections with local authorities that may be needed to complete site development work.
- Provide one-time mobilization costs for the construction crews. Any remobilization due to interruptions/delays that are out of Motorola's control will result in additional costs.
- Perform light clearing of brush, grubbing and disposal of vegetation and shrub growth in the site compound area and a 20-foot path around it (3600 square feet).
- Perform medium tree clearing (trees up to 6" in diameter), grubbing and disposal of vegetation and shrub growth in a 15-foot wide access road to the site (not to exceed 30 feet in length).
- Provide earth fill to raise surface level in the site compound (not to exceed 100 cubic yards).
- Supply and install gravel surfacing to a depth of 6 inches, underlain with geotextile fabric within the fenced in site compound area, and a 3-foot path around it (not to exceed 2500 square feet).
- Provide a 15-foot wide access road (not to exceed 30 feet in length), including surface grading and graveling
- Provide silt fence around the compound to control soil erosion (not to exceed 200 linear feet).
- Install straw bale sediment barriers to control soil erosion (not to exceed 200 linear feet).

#### Site Components Installation

- Construct 1 reinforced concrete foundation necessary for a 12-foot x 24-foot shelter.
- Construct 1 concrete slab for 500 gallon above-ground diesel at 3000 psi with reinforcing steel necessary for foundations.
- Construct 1 foundation for the 70 kW generator with reinforcing steel necessary for foundations.
- Supply and install 1 prefabricated concrete shelter 12-foot x 24-foot.
- Supply and install 1 500-gallon above-ground diesel fuel tank(s), fill it with fuel and connect it to the generator.
- Supply and install fuel tank monitors on the tanks to monitor low fuel in tanks and run alarm wiring to the building located within 50 feet of the tank.
- Supply and install 1 standby power generator (70 kW) located within 20 feet of the ATS, including interconnection wiring between the generator, transfer switch, and site electrical service mains.
- Supply and install 1 120/240-volt, 300-amp, single-phase meter pedestal and hookup for electrical service by the local utility.
- Supply and install a perimeter grounding system around the compound and shelter. The ground system is to tie to the fence and all new metal structures within the compound to meet current Motorola's R56 standards.
- Conduct 1 three-point ground resistance test of the site. Should any improvements to grounding system be necessary after ground testing, the cost of such improvements shall be the responsibility of Maricopa AZ.
- Pressure testing of FM-200 system in the field.

#### Tower Work

- Construct mat type tower foundations including excavation, rebar and concrete (not to exceed 36 cubic yards).
- Erect new 180-foot self-supported tower.
- Supply and install grounding for the tower base for self-supported towers

### Antenna and Transmission Line Installation

- Install 6 antenna(s) for the RF system.
- Install 6 side arms for antennas.
- Install 2 GPS antenna(s).
- Install 3 tower top amplifier(s).
- Install 1 4-foot microwave dishes.
- Install 1 6-foot microwave dishes.
- Install up to 600 linear feet of 1/2-inch transmission line.
- Install up to 480 linear feet of 7/8-inch transmission line.
- Perform sweep tests on transmission lines.
- Provide and install six hole hanger blocks and attachment hardware for supporting transmission lines on the antenna support structure every three feet.
- Supply and install 3 ground buss bar at the bottom of the antenna support structure for grounding RF cables before they make horizontal transition.

### Miscellaneous Work

- FAA Filing
- EDR
- Cultural resource report
- SWPP/AQMD Permit Fee
- CMU Block Screening Wall
- SWPP
- Safety

### **Customer Responsibilities:**

- If required, prepare and submit EME plans for the site (as a licensee) to demonstrate compliance with FCC RF Exposure guidelines. As applicable, coordinate, prepare, submit, and pay for all required permits and inspections for the work that is the Customer's responsibility.
- Pay for all utility connection, pole or line extensions, and any easement or usage fees.
- Review and approve site design drawings within 7 calendar days of submission by Motorola or its subcontractor(s). Should a re-submission be required, the Customer shall review and approve the re-submitted plans within 7 calendar days from the date of submittal.
- Pay for the usage costs of power, leased lines and generator fueling (except first fill) both during the construction/installation effort and on an on-going basis.
- Pay for application fees, taxes and recurring payments for lease/ownership of the property.
- Provide personnel to observe construction progress and testing of site equipment according to the schedule provided by Motorola.
- As applicable (based on local jurisdictional authority), the Customer will be responsible for any installation or up-grades of the electrical system in order to comply with NFPA 70, Article 708
- Secure clear and unencumbered title, MOU, or Lease Agreement with the property owner.
- Provide property deed or lease agreement, and boundary survey, along with existing as-built drawings of the site and site components to Motorola for conducting site engineering.
- Provide a right of entry letter from the site owner for Motorola to conduct field investigations.
- Conduct all the testing and documentation (balloon tests, photo simulations, zoning application, expert testimony, zoning drawings etc.) required for the zoning the proposed new tower sites.
- Secure power connection to the site, associated permitting and installation of a meter and disconnect within 50 feet of the proposed shelter location.
- Provide additional temporary space as needed for staging of the construction equipment during the construction of new site facilities (tower, shelter, generator, fuel tank etc.).





## **Assumptions:**

- No prevailing wage, certified payroll, mandatory union workers or mandatory minority workers are required for this work
- All work is assumed to be done during normal business hours as dictated by time zone (Monday thru Friday, 7:30 a.m. to 5:00 p.m.).
- Site has adequate electrical service for the new shelter and tower. Utility transformer, transformer upgrades, line, or pole extensions have not been included.
- Pricing has been based on National codes such IBC or BOCA. Local codes or jurisdictional requirements have not been considered in this proposal.
- Hazardous materials are not present at the work location. Testing and removal of hazardous materials, found during site investigations, construction or equipment installation will be the responsibility of the customer.
- A maximum of 30 days will be required for obtaining approved building permits from time of submission.
- If extremely harsh or difficult weather conditions delay the site work for more than a week, Motorola will seek excusable delays rather than risk job site safety.
- As applicable (based on local jurisdictional authority), the Customer will be responsible for any installation or up-grades of the electrical system in order to comply with NFPA 70, Article 708
- In the absence of geotechnical test data at the sites, normal soil conditions have been assumed. Normal soil is defined as a cohesive soil with net vertical bearing capacity of 4000 pounds per square inch and an allowable net horizontal pressure of 400 pounds per lineal foot of depth to a maximum of 4000 pounds per square foot. Rock, non-cohesive soils or submerged soils are not considered normal soils
- The new tower location will pass the FAA hazard study, zoning, FCC and environmental permitting.
- The restoration of the site surroundings by fertilizing, seeding and strawing the disturbed areas will be adequate.
- Tower and foundation sizing is based on the tower loading requirements as a result of the RF Antenna System design and the Microwave Antenna System design (i.e. - dish sizes and locations obtained from paper path studies). If after physical path studies, the dish sizes and locations change, then Motorola will then review the impact to tower structure and foundations and revise applicable costs.
- If as a result of NEPA studies, any jurisdictional authority should determine that a proposed communications facility "may have a significant environmental impact", the environmental impact studies or field testing and evaluation related to such determination have not been included.
- For new towers greater than 200 feet in overall height, medium intensity strobe lighting has been included. Painting or dual lighting of any new towers has not been included.
- The site location can be finalized and lease agreement can be reached with the property owner within 60 calendar days after the start of the site acquisition effort.
- A waiver to zoning requirements like setbacks, tower height limitations, etc. can be obtained.
- The soil resistivity at the site is sufficient to achieve resistance of ten (10) ohms or less. Communications site grounding will be designed and installed per Motorola's Standards and Guidelines for Communications Sites (R56).
- Underground utilities are not present in the construction area, and as such no relocation will be required.
- Spoils from the tower foundations can be dispersed on the property and will not be required to be transported to a dump location.
- Foundations for the shelter, generator and fuel tank are based "normal soil" conditions as defined by TIA/EIA 222-F. Footings deeper than 30 inches, raised piers, rock coring, dewatering, or hazardous material removal have not been included.



### **Completion Criteria**

- Site development completed per issued for construction (IFC) construction drawings, project requirements, contractual obligations (including any customer/Motorola approved changes) and approved by Maricopa AZ.
- This shall be confirmed by contractor and reviewed with Motorola construction manager and project manager before inspections occur.
- All jurisdictional and contractual required testing and inspections to be performed by the contractor. (Contractual testing and inspections defined and agreed to with project team and customer prior to project kick off; vendor solely responsible for conducting, coordinating and paying for all jurisdictional testing and inspections).
- Motorola site development checklist shall be completed and signed off by contractor prior to customer inspection. (Review with project team and customer and amend checklist as required at project kick off or before work begins).
- Site turn-over package completed and turned over to Motorola (As defined and agreed to with project team and customer).
- All punch list and deficiencies shall be completed prior to customer and Motorola inspections.

## **4.6 SYSTEM INSTALLATION**

Implementation services included as part of this proposal will occur between normal business hours, Monday – Friday, 8:30am-5pm. Should Customer require services to occur during non-business hours, additional costs may apply and will be handled via the change order process.

The installation pricing assumes that existing building facilities have sufficient heating, ventilation and air conditioning (HVAC), space, necessary power and back-up power, along with required cable routing facilities and penetrations to interconnect the hardware. Facility improvements, removal or disposal of existing equipment, and/or temporary installations of equipment have not been included in this proposal unless specifically stated.

### **Motorola General Responsibilities**

- Install System Equipment as specified by the Equipment List, System Description, and System Drawings.
- Bond the supplied equipment to the existing site ground system in accordance with the Motorola R56 Standards and Guidelines for Communication Sites.
- Interface equipment to the RWC ASTRO 25 Radio System Network as detailed in the System Description.

### **Customer General Responsibilities**

- Provide access to the sites, as necessary.

### **4.6.1 Microwave**

A new hop of Aviat ECLIPSE microwave will be provided for connectivity to the RWC network. A secondary site link is required and will be provided by Customer as a leased T1 circuit. The design, installation and commissioning of the microwave link will be subcontracted to Aviat Networks including:

- . Network/System Engineering
- Config Eng / Documentation / Drafting
- Path Survey
- FCC coordination and Licensing

- Field / Program Management Service
- Site Engineering
- Site Survey
- Field Install: General (Radios)
- Ant System Install: General

A single hop ODU-600, L6 GHz, MHSB, outdoor, mounted indoor on rack using unequal split combiner will be installed. The two sites are:

- South Mountain – CL = 20°33' 20" 4.90"N      -112° 03' 35.50"W
- City of Maricopa – CL = 15°33' 03" 55.06"N      -112° 03' 39.21"W

Path Calculation has been completed by Aviat Networks with annual multipath availability 99.99986% using Andrew HP6-59 antenna.

Radio capacity is 8 T1 (12 Mbps) for both T1 and Ethernet.

- DAC-16, capacity up to 16 T1, equipped with 8 T1 for TDM
- DAC GE3, Ethernet cards, RJ-45 interfaces.
- Ethernet demarcation point is RJ-45 at DAC GE3 cards.
- T1 demarcation point is at DSX-1 jackfield
- DSX-1 jackfield is ADC DI-N2GU1 (4 RU) per customer requests.
- All Aviat indoor equipment will be mounted on 7'6" high, 19" wide racks with R56 compliance for rack grounding.
- Aviat Networks will provide antennas, antenna mountings, struts, waveguides and accessories.
- Customer has existing NetBoss, and Aviat will map this hop to existing NetBoss system.
- Radio equipment: ODU-600 indoor mounted using unequal split combiner, breaker panel, DSX-1 jackfield and indoor INUe on 7'6" rack.
- Antennas, antenna mountings, struts, waveguide and accessories.
- Radio Spares
- DC Power – Motorola provided DC power system will be used
- Dehydrator at City of Maricopa site only.
- Labor to map this hop to existing NetBoss system. The addition of new screens and scripts associated with the new sites to the existing server will be done remotely by Netboss.
- Core drilling and installation of 4-port entry plates at both locations.
- Customer will provide their own T1 plan NMS plan, Sync plan and IP plan.

Additional details are provided with the Aviat provided documentation. This proposal assumes existing sites have rack space available and the antenna mounting structures are available and will support the load without modification. It is also assumed that existing dehydrator equipment will support the additional waveguide. Cross connects required to provision T1 circuits that utilize the new microwave hop and the Ethernet transport for NETBOSS network management connectivity is the responsibility of the Customer/RWC

## 4.6.2 DC Power System

The proposal includes quotes for a DC Power System and Battery Backup for the Maricopa sub-site. The Emerson DC Power Solution is capable of providing up to 600A, and has efficiency levels of 96.5%. The 23" shelf system is designed to cover the sub-site's 13kw requirements plus provide redundancy @ 120VAC (14 2000W rectifiers). The DC Power Plant will be used to power all the DC components at the Maricopa sub-site.

Battery backup will be provided by the GNB Absolyte Battery Plant which is rated for 800Ah for 8hrs of backup. The quote also includes at spill containment kit and a battery monitoring unit.

The DC power system will be installed and commissioned by Precision Power Products under subcontract to Motorola.

### 4.6.3 Maricopa Simulcast Sub-Site

The Maricopa sub-site will be added as the sixth sub-site of the Simulcast C simulcast system

Motorola will install site equipment including:

- Three (3) GTR 8000 Expandable Site sub-system chassis'.
- Sixteen (16) GTR 8000 simulcast repeaters.
- Two (2) Site Routers.
- Antenna system including:
  - (3) Transmit antennas, including spare.
  - (3) Receive antennas including spare.
  - (3) Tower top amplifiers, including spare.
  - (1) Redundant GPS antennas
- One (1) Stratum 1 time reference server
- One (1) MOSCAD RTU
- Interface to site network equipment and power.

### 4.6.4 VHF Subsystem

Customer is relocating an existing VHF site to the new equipment shelter. Motorola is providing antenna equipment and DC power for this added equipment.

#### 4.6.4.1 Motorola Responsibilities

- Provide and install antenna and power components as listed on the VHF equipment list.
- Install antenna equipment on the Motorola provided tower in accordance with approved design documents.
- Terminate antenna coaxial cabling at demarcation point (lightning arrestor at shelter entry port).

#### 4.6.4.2 Customer Responsibilities

- Coordinate, relocate, install, and interface VHF radio equipment in Motorola provided equipment shelter.
- Optimize, test and document the relocated VHF radio equipment.
- Performance and maintenance of VHF system equipment.

### 4.6.5 System Installation Acceptance (Milestone)

- All equipment installations are completed and accepted by Customer.

### 4.6.6 System Training

Training is not included as part of this project.



## 4.7 SYSTEM OPTIMIZATION

### 4.7.1 Optimize System

#### Motorola Responsibilities

- Verify that all equipment is operating properly and that all electrical and signal levels are set accurately.
- Verify that all audio and data levels are at factory settings.
- Check forward and reflected power for all radio equipment, after connection to the antenna systems, to verify that power is within tolerances.
- Check audio and data levels to verify factory settings.
- Verify communication links and interfaces between devices for proper operation.
- Test features and functionality are in accordance with manufacturers' specifications and that they comply with the final configuration established during the CDR.
- Integrate the new site equipment into the Simulcast C cell of RWC ASTRO 25 network to ensure proper operation.

#### Customer Responsibilities

- Provide access to the sites as required.
- Provide and install all communication lines and equipment that are not Motorola provided deliverables.
- Provide all required liaison support with the agencies and vendors required to support the solution.
- Ensure that the necessary technical support is made available for installation and testing with third party vendors and interfaces.

## 4.8 AUDIT AND ACCEPTANCE TESTING

Motorola will conduct acceptance testing. This process provides multiple checkpoints for Customer to oversee the overall progress that is being made as the communications system implementation progresses. This testing is composed of Equipment Installation Audits, Functional Testing and Coverage Testing.

The successful completion of the acceptance tests constitutes acceptance of the software and hardware provided by Motorola. Upon completion of this Acceptance Test Plan, Customer representatives participating in and observing the tests will sign off on the ATP, signifying acceptance of the system. If no punchlist items are identified during the acceptance testing process, and Motorola has completed all other project deliverables, Customer authorized signature will represent System Acceptance. If a punchlist of unresolved issues is created as a result of the acceptance testing, they will need to be resolved prior to Final Acceptance.

### 4.8.1 Perform R56 Audit

#### Motorola Responsibilities

- Perform R56 site-installation quality-audits, verifying proper physical installations.
- Create site evaluation report to verify site meets or exceeds requirements, as defined in Motorola's R 56 Standards and Guidelines for Communication Sites.

### **Customer Responsibilities**

- Provide access to the sites.

## **4.8.2 Coverage Testing**

A Coverage Acceptance Test Plan (CATP) is designed to verify that the Maricopa sub-site meets or exceeds the predicted coverage reliability within the area indicated on Motorola's Simulcast coverage map for the site. The CATP defines the coverage testing method and procedure, the coverage acceptance criterion, the test documentation, and the responsibilities of both Motorola and the Customer.

## **4.8.3 System Acceptance Testing Complete (Milestone)**

- Customer approves the completion of all the required tests.
- Loading of the system may begin.
- Warranty Commences.

## **4.8.4 Interference**

Motorola is not responsible for interference caused or received by the Motorola provided equipment except for interference that is directly caused by the Motorola provided transmitter(s) to the Motorola provided receiver(s). Should Customer system experience interference, Motorola can be contracted to investigate the source and recommend solutions to mitigate the issue.

# **4.9 FINALIZE**

## **4.9.1 Cutover**

### **Motorola Responsibilities**

- Motorola and Customer develop a mutually agreed upon cutover plan based upon discussions held during the CDR.
- During cutover, follow the written plan and implement the defined contingencies, as required.
- Conduct cutover meeting(s) with user group representatives to address both how to mitigate technical and communication problem impact to the users during cutover and during the general operation of the system.

### **Customer Responsibilities**

- Attend cutover meetings and approve the cutover plan.

## **4.9.2 Resolve Punchlist**

### **Motorola Responsibilities**

- Work with Customer to resolve punchlist items, documented during the Acceptance Testing phase, in order to meet all the criteria for final system acceptance.

### **Customer Responsibilities**

- Assist Motorola with resolution of identified punchlist items by providing support, such as access to the sites, equipment and system, and approval of the resolved punchlist item(s).



#### **Completion Criteria**

- All punchlist items resolved and approved by Customer.

### **4.9.3 Transition to Service/Project Transition Certificate**

#### **Motorola Responsibilities**

- Review the items necessary for transitioning the project to Motorola's service team.
- Provide a Customer Support Plan detailing the warranty and post warranty support, if applicable, associated with the Contract equipment.

#### **Customer Responsibilities**

- Participate in the Transition Service/Project Transition Certificate (PTC) process.

#### **Completion Criteria**

- All service information has been delivered and approved by Customer.

### **4.9.4 Finalize Documentation**

#### **Motorola Responsibilities**

- Provide or update as-built site manuals.
- The documentation will be limited to the following:
  - Functional Acceptance Test Plan test sheets and results.
  - Equipment Inventory List (paper or disk).
  - ATP Test Checklists.
  - System Block Diagram.
  - RF Site Floor Plan.
  - RF Site Rack Face.
  - Antenna Network Drawings.
  - Site Block Diagrams.

#### **Customer Responsibilities**

- Receive and approve all documentation provided by Motorola.

#### **Completion Criteria**

- All required documentation is provided and approved by Customer.

### **4.9.5 Final Acceptance (Milestone)**

- All deliverables completed, as contractually required.
- Final System Acceptance received from Customer.

## 4.10 PROJECT ADMINISTRATION

### 4.10.1 Project Status Meetings

#### Motorola Responsibilities

- The Motorola Project Manager, or designee, will attend all project status meetings with Customer, as determined during the CDR.
- Record the meeting minutes and supply the report.
- The agenda will include the following:
  - Overall project status compared to the Project Schedule.
  - Product or service related issues that may affect the Project Schedule.
  - Status of the action items and the responsibilities associated with them, in accordance with the Project Schedule.
  - Any miscellaneous concerns of either Customer or Motorola.

#### Customer Responsibilities

- Attend meetings.
- Respond to issues in a timely manner.

#### Completion Criteria

- Completion of the meetings and submission of meeting minutes.

### 4.10.2 Progress Milestone Submittal

#### Motorola Responsibilities

- Submit progress (non-payment) milestone completion certificate/documentation.

#### Customer Responsibilities

- Approve milestone, which will signify confirmation of completion of the work associated with the scheduled task.

#### Completion Criteria

- Customer approval of the Milestone Completion document(s).

### 4.10.3 Change Order Process

Either Party may request changes within the general scope of this Agreement. If a requested change causes an increase or decrease in the cost or time required to perform this Agreement, the Parties will agree to an equitable adjustment of the Contract Price, Performance Schedule, or both, and will reflect the adjustment in a change order. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.







U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# SAFO

Safety Alert for Operators

SAFO 09007  
DATE 3/6/09

Flight Standards Service  
Washington, DC

[http://www.faa.gov/other\\_visit/aviation\\_industry/airline\\_operators/airline\\_safety/safo](http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo)

*A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.*

**Subject:** Night Vision Goggle (NVG) Advisory Pertaining to Certain Red Color Light Emitting Diodes (LED)

**Purpose:** This SAFO advises operators utilizing NVGs that certain LED lighting systems fall outside the combined visible and near-infrared spectrum of NVGs.

**Discussion:** A Flight Safety Flash was issued in 2008 by the Canadian Air Force's Directorate of Flight Safety, which identified some red obstruction lighting systems that were clearly visible to the naked eye but not visible to NVGs. These lighting systems employ LEDs instead of traditional incandescent sources. The use of LEDs is becoming more common for almost all lighting applications because of their energy efficiency and extremely long life.

Aviation Red light ranges from about 610 to 700 nanometers (nm), and NVGs approved for civil aviation (having a Class B Minus Blue Filter) are only sensitive to energy ranging from 665 to about 930 nm. Because LEDs have a relatively narrow emission band and do not emit infrared energy like incandescent lights, it is possible for them to meet FAA requirements for Aviation Red but be below the range in which NVGs are sensitive.

In general terms, NVG users should be aware that LED lighting systems falling outside the combined visible and near-infrared spectrum of an NVG (approximately 665 to 930 nm) will not be visible to their goggles. Crews that fly using NVGs are warned to use extra caution when flying near obstacle areas and to report any hazardous sites to the nearest Flight Standards District Office (FSDO) or the appropriate military Safety Officer.

**Recommended Action:** Pilots, directors of operations, chief pilots, training program managers, and training centers either using, or providing training for NVGs should advise pilots of the limitations outlined in this SAFO and ensure such information is incorporated into the pilot NVG training program.

SECTION 5

# PROJECT SCHEDULE

Project Schedule is included on the page that follows.



## City of Maricopa Site Addition Project Preliminary Project Schedule

Name	2014					2015							
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Maricopa Site Addition Project													
Contract Mobilization													
Contract Design Review													
Civil & Site Development Work													
Order Processing													
Installation and Optimization													
Acceptance Testing & Cutover													
Finalize													

# COVERAGE ACCEPTANCE TEST PLAN

## 6.1 COVERAGE TESTING OVERVIEW

The Coverage Acceptance Test Plan (CATP) is designed to verify that the voice radio system implemented by Motorola meets or exceeds the required coverage reliability within the corporate boundaries of Town of Maricopa as indicated on Motorola's coverage maps. This procedure defines the coverage testing method and procedure, the coverage acceptance criterion, the test documentation, and the responsibilities of both Motorola and Maricopa.

The (CATP) is designed to demonstrate that the voice coverage provided has at least 95 percent coverage reliability indicated on the Motorola coverage maps. Ninety-five (95) percent coverage reliability means that at least 95 percent of the area indicated as being in the coverage area is guaranteed to have radio communications with a Delivered Audio Quality (DAQ) of 3.4 or better.

The radio system coverage testing for Maricopa consists of the following major subsections:

- Automated Digital Testing
  - Supplemental Voice Testing for Failed Grids
- Subjective Voice Testing for Selected Locations

## 6.2 AUTOMATED DIGITAL TEST PROCEDURE

### 6.2.1 Bit Error Rate Testing

#### 6.2.1.1 Introduction

Since the system is a Motorola ASTRO 25/APCO Project 25 digital signaling network, the proposed CATP is based on an industry-standard Talk-Out Bit Error Rate (BER) testing methodology. The tested criteria to provide the 95% / 3.4 DAQ will be 2% BER.

#### 6.2.1.2 Manpower

One team will be needed. The team will be in a Town of Maricopa vehicle and be composed of three individuals:

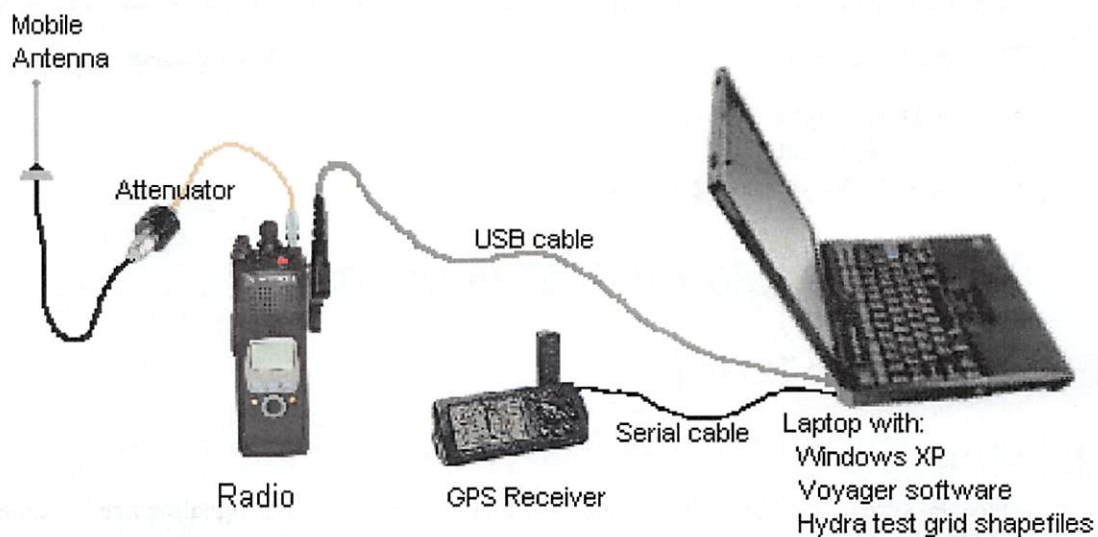
- Driver – Town of Maricopa Employee
- Navigator – Town of Maricopa Employee
- Voyager Test Equipment Operator – Motorola Employee

#### 6.2.1.3 Equipment

Three principal sets of equipment will be required for each drive team.



- Vehicle – Town of Maricopa vehicle.
- Voyager test equipment – Voyager consists of the following:
  - A calibrated digital voice test receiver, connected to an antenna installed in a representative location on the test vehicle. The test receiver will monitor transmissions from the fixed network radio site(s). For the Town of Maricopa, the receiver is an XTS5000 portable radio
  - A Global Positioning System (GPS) receiver, which will provide the computer with the location and speed of the test vehicle.
  - The test equipment will be installed in a standard vehicle. The antenna will be mounted on the vehicle hood, simulating the height of a portable radio on a user’s hip, and will not be adjacent to other large metallic objects, which would distort the antenna pattern.
- Between the antenna and the portable radio is interconnect cabling and an attenuator unit. The purpose of the attenuator is the following:
  - Insert a 12 dB received signal reduction. This attenuation simulates the portable radio operating inside a building of 12 dB density
  - Compensation for cabling and antenna loss differences compared to the portable antenna attached directly to the portable radio
  - The net loss setting for the attenuator is 17 dB
- A laptop computer with Voyager<sup>SM</sup> software and a mapping database, which includes highways and local streets, political boundaries, rivers, and railroads.



#### 6.2.1.4 Schedule

The following is a tentative schedule:

- Day One – Meet at the designated site to pick up the vehicle and have an orientation meeting, outlining the goals of the testing, introduction of the personnel, and assignment of test areas. At this time the Motorola technician will install the Voyager test unit into the vehicle and verify operation.

The team will then commence the testing. The navigator using maps can identify the streets which need to be covered and the best method of reaching all the tile locations.

Testing will continue, with breaks as required, until approximately 5:00 when the team will return to the starting point to turn in the vehicle. The Motorola technician will remove the Voyager test equipment, and download the test results taken that day.

Day Two – Meet at the designated site to pick up the vehicle, and review the experiences of the previous day. At this time the Motorola technician will install the Voyager test unit into the vehicle and verify operation.

Following the meeting, the team will disperse to commence testing. The navigator using maps can identify the streets which need to be covered and the best method of reaching all the tile locations.

Testing will continue, with breaks as required, until approximately 5:00 when the team will return to the starting point to turn in the vehicle. The Motorola technician will remove the Voyager test equipment, and download the test results taken that day.

- Day Three – Meet at the designated site to pick up the vehicle, and review the experiences of the previous day. Depending on the team's progress, areas of testing may be adjusted. If all the designated tiles have been completed, the focus will shift to tiles that failed for a re-test. A voice re-test will be conducted on the failed tiles to verify the performance of the system in those specific areas.

#### 6.2.1.5 Test Procedure

- To determine coverage acceptability, Motorola uses an automated test tool called Voyager. Voyager is composed of an XTS5000 portable radio, GPS unit, radio antenna, and laptop computer. The XTS5000 is attached to the laptop computer and to the external antenna/attenuator. The attenuator compensates for the difference in signal strength between an antenna mounted on the vehicle fender and that of a portable located on the user's hip while inside a building whose structure will degrade signal strength by 12 dB.
- Testing will be conducted in Maricopa, and in areas specifically requested by the customer. A cumulative map which includes all areas will be provided to the Town of Maricopa for review before the testing is conducted. This map will be divided into tiles of 0.3 miles x 0.3 miles. Voyager will be uploaded with a grid map file comprised of these tiles, and will be used to evaluate the performance of the coverage in the areas mentioned above.
- The laptop computer is interfaced to the GPS unit and monitors the vehicle's position. Within the laptop, a grid-map was previously loaded which includes GPS coordinates of the particular test tiles.
- When the laptop computer recognizes, via GPS location, that the vehicle has entered a tile location to be tested, the computer automatically records information on the received signal. The computer will provide a visual indication that a measurement has been completed in a tile.
- For the test, one channel of the radio system is placed in a special digital mode, emitting a pattern conforming to the V.52 test standard, as defined in Technical Service Bulletin
- TSB-88.3-C, Telecommunications Industry Association (TIA). As this pattern is consistent and predictable, the laptop computer can determine the expected bit pattern as opposed to the actual received pattern. The number of bit errors is recorded and the bit error rate for that tile is recorded.
- The team will be provided with maps showing the areas to be tested in detail.



#### 6.2.1.6 Evaluation

Once all the tiles have been tested and recorded, the results are converted into a table identifying the tile location and the achieved bit error rate (BER). A BER of 2% or less is considered a passing level for the tested tile.

### 6.3 VOICE TESTING

#### 6.3.1 Introduction

The Town of Maricopa coverage footprint is to achieve a standard of 95% overall acceptance of the voice quality. The automated BER test equipment provides a means to quickly and accurately measure signal quality at a vastly lower cost in time and manpower over manual methods.

However, some tiles may not achieve the standard of acceptable voice quality of 2% BER. For these tiles, a manual test method has been included. Very often, while the raw Bit Error Rate exceeds the nominal 2% standard, the actual voice can meet or exceed the minimum DAQ 3.4. This is possible as the signaling methods used include error correcting methodologies which can correct over-the-air losses, resulting in a clean transmission. Additionally, location specific interference may be identified. In the case of interference, the failed grid must be removed from the CATP test pass / fail calculations.

#### 6.3.2 Site Determination

From the results of the automated testing above, the failed test tiles are isolated, and the street location of each of the tiles located.

A team of testers will go to each of these locations. Working with them will be experienced individuals at the dispatch center. Together, the two teams will exchange voice radio communications to determine the acceptability from that particular location.

#### 6.3.3 Schedule

The specific schedule for the reexamination of tiles which have failed the BER test is dependent on the number of tiles which must be reexamined.

#### 6.3.4 Manpower

To perform a statistically valid subjective DAQ test, a large group of people is required to ensure high confidence in the results. However, obtaining a large group of people for a subjective listening test is usually impractical; therefore, several (3 to 6) people in a car or van must be used for the test. Since a group this small cannot provide statistically significant results, it is very important that the personnel participating in the subjective test be familiar with the sound of radio conversations.

Two groups of people will be required. Three Town of Maricopa employees with substantial Police radio experience will compose a field team, while two dispatchers will be required to operate a fixed control position. In this case, a dispatch position at the Buckeye dispatch center will be required.

### 6.3.5 Equipment

Field equipment will be composed of RWC's Motorola portable radios programmed for operation on the 700 MHz system. The portable radios will be equipped with remote speaker microphones. In place of the standard antenna, the antenna configuration used for the BER testing above will be utilized. This configuration allows simulation of the portable radio operating within a building of 12 dB loss construction. As noted in the BER description, the antenna is placed on the front hood of a vehicle, simulating an operator carrying the radio at hip height. The attenuator is set at a 17 dB loss.

### 6.3.6 Test Procedure

Fire Station 575 will be used as the fixed control point location. Prior to testing, Maricopa and Motorola will agree upon a procedure to allow each audio transmission to be evaluated for approximately five seconds. For this test, the test audio is to be live radio traffic.

Two test teams will be required:

- Dispatch Center – A minimum of two Town of Maricopa personnel will utilize a dispatch position integrated into the 700 MHz P25 radio system to communicate with field personnel. These individuals are to be experienced dispatch personnel familiar with public safety radio transmission practices. A Motorola observer will also be present.
- Field Personnel – A field test team of at least 2 Maricopa personnel plus a Motorola observer will travel to each failed test tile to communicate with dispatch center personnel and evaluate the transmission quality.

At each grid location, each field test team member will listen to the talk-out audio transmissions from the Dispatch Center personnel, and will record his or her subjective evaluation of the DAQ for the grid. Team members stationed at the Dispatch Center will evaluate talk-in audio quality of transmissions from the test field units in that grid.

Should the exact physical location of the field tester thought to be a contributing factor to poor communications, the field tester is allowed to move up to 25 feet in any direction, and the test reinitiated.

Each team member will maintain a test log to record date, time, and subjective evaluation for each test grid location. Subjective evaluation will be based on the Delivered Audio Quality descriptions in Table 1. The DAQ score for each test grid will be the average of all team members' subjective evaluations for that grid.

**Delivered Audio Quality Definitions**

DAQ Delivered Audio Quality	Subjective Performance Description
1	Unusable, speech present but unreadable.
2	Understandable with considerable effort. Frequent repetition due to noise / distortion.
3	Speech understandable with slight effort. Occasional repetition required due to noise / distortion.
3.4	Speech understandable with repetition only rarely required. Some noise / distortion.
4	Speech easily understood. Occasional noise / distortion.
4.5	Speech easily understood. Infrequent noise / distortion.





DAQ Delivered Audio Quality	Subjective Performance Description
5	Speech easily understood.

### 6.3.7 Evaluation

The DAQ score for each test grid will be used to evaluate whether each grid passes or fails for each equipment configuration. The grid pass / fail evaluations will be used to determine the coverage area reliability.

Coverage acceptance will be based on demonstrating that at least 95% of the grid locations in the coverage test area will provide an audio quality of DAQ-3.4 or better, objective primary, subjective secondary.

During subjective Delivered Audio Quality testing, a test log will be kept by each test team member, in the vehicle(s) and at the control point. The DAQ evaluations for each test grid will be recorded on the test logs. A copy of the test logs will be provided to Maricopa at the conclusion of the coverage test. Motorola will evaluate the subjective test logs to determine whether the coverage test was passed for each test location.

## 6.4 MANPOWER REQUIREMENTS

In the two primary procedures to be utilized, manpower and support will be required from Maricopa. The chart below indicates the vehicle types and number of personnel.

**Town of Maricopa Coverage Acceptance Testing  
Personnel and Equipment Requirements**

	Day 1	Day 2	Day 3/Voice Retest
<b>Voyager Team #1</b>			
4WD Vehicle	Maricopa	Maricopa	Maricopa
Driver	Maricopa	Maricopa	Maricopa
Navigator	Maricopa	Maricopa	Maricopa
Voyager Operator	Motorola	Motorola	Motorola



# WARRANTY AND MAINTENANCE PLAN

Motorola has over 75 years of experience supporting mission critical communications for public safety and public service agencies. Motorola's technical and service professionals use a structured approach to life cycle service delivery and provide comprehensive maintenance and support throughout the life of the system. The value of support is measured by system availability, which is optimized through the use of proactive processes, such as preventive maintenance, fault monitoring and active response management. System availability is a function of having in place a support plan delivered by highly skilled support professionals, backed by proven processes, tools, and continuous training.

## 7.1 THE MOTOROLA SERVICE DELIVERY TEAM

### 7.1.1 Customer Support Manager

Your Motorola Customer Support Manager provides coordination of support resources to enhance the quality of service delivery and to ensure your satisfaction. The Customer Support Manager (CSM) is responsible to oversee the execution of the Warranty and Service Agreement and ensure that Motorola meets its response and restoration cycle time commitments. The CSM will supervise and manage the Motorola Authorized Servicer's functions.

### 7.1.2 Motorola System Technologists

The Motorola System Technologists (ST) are available to assist Motorola's Authorized Servicers when needed for network health and operations.

### 7.1.3 Motorola System Support Center

Located in Schaumburg, Illinois, the System Support Center (SSC) is a key component to the overall management and system maintenance. As detailed in this Customer Support Plan, the following services are provided by the System Support Center depending on the selected service package:

- Network Monitoring.
- Dispatch Service.
- Infrastructure Repair with Advanced Replacement.
- Technical Support.

#### Motorola has proven experience to deliver mission critical network support

- Extensive Experience – Motorola has over 75 years of experience supporting mission critical communications and the Public Safety community.
- Capacity to Respond – Motorola's network of local service centers, repair depots, system support center and parts support enable Motorola to provide quick and effective service delivery.
- Flexibility and Scalability – Motorola's Support Plans are customized to meet individual Customer needs.
- Skills and Process – Motorola uses a well-established, structured, and disciplined approach to provide service delivery. Motorola's team of well-trained and committed people understands the communications technology business.

## 7.1.4 Motorola Local Service Provider

Motorola's authorized service centers are staffed with trained and qualified technicians. They provide rapid response, repair, restoration, installations, removals, programming and scheduled preventive maintenance tasks for site standards compliance and RF operability. Motorola's authorized service centers are assessed annually for technical and administrative competency.

## 7.2 CITY OF MARICOPA

Motorola places great emphasis on ensuring that communications systems, such as the one proposed for the City of Maricopa, meet high standards for design, manufacture and performance. To enhance the value of the communications system being acquired, Motorola offers customized warranty and post-warranty services as outlined in this section.

## 7.3 WARRANTY SERVICES

Motorola will provide warranty services per our standard warranty terms and conditions as outlined within the Communication Systems Agreement within this proposal. In addition to the Standard Commercial Warranty, the enhanced service products that have been selected for the City of Maricopa are listed below along with a brief description.

### 7.3.1 Network Monitoring Service

Network Monitoring Service can help keep your network at optimum availability so it is ready to serve mission critical communications needs. By watching over the network continuously, Network Monitoring Service takes action whenever needed and resolves network problems. We often intervene and correct the problem before you even know a problem exists. Network Monitoring Service provides improved productivity and enhanced network performance, which in turn helps to increase your technology Return-On-Investment.

Using a combination of network monitoring software, automated alerts, and remote diagnostics inquiries, our System Support technologists actively monitor your network to maximize network uptime and overall preparedness...for the expected *and* unexpected. Upon receiving an alert, our team immediately performs a series of diagnostics to assess the problem. Often the situation can be resolved remotely, but when additional attention is required, local field technicians are dispatched immediately to your site to achieve restoration.

Motorola's Network Monitoring service is a vital component of an intelligent communication support plan that keeps your business operating smoothly, your costs down, and assures maximum preparedness at all times.

Specifically, Network Monitoring Service provides:

- Improved network availability
- Remote and timely resolution to minimize downtime
- Cost efficiencies
- Optimize time at site due to assessment and knowledge transfer before dispatch
- Minimize unnecessary trips to site
- Mitigate need for 24x7 operations monitoring center
- Detailed Reports



## 7.3.2 Dispatch Service

Motorola's Dispatch Service ensures that trained and qualified technicians are dispatched to diagnose and restore your communications network. Following proven response and restoration processes, the local authorized service center in your area is contacted and a qualified technician is sent to your site. An automated escalation and case management process is followed to ensure that technician site arrival and system restoration comply with contracted response and restore times. Once the issue has been resolved, the System Support Center verifies resolution and with your approval, closes the case. Activity records are also available to provide a comprehensive history of site performance, issues, and resolution.

## 7.3.3 On-Site Infrastructure Response

Motorola On-Site Infrastructure Response provides local, trained and qualified technicians who arrive at your location to diagnose and restore your communications network. Following proven response and restore processes, Motorola Dispatch contacts the local authorized service center in your area and dispatches a qualified technician to your site. An automated escalation and case management process ensures that technician site arrival and system restoration comply with contracted response times. The field technician restores the system by performing first level troubleshooting on site. If the technician is unable to resolve the issue, the case is escalated to the System Support Center or product engineering teams as needed.

## 7.3.4 Infrastructure Repair

Infrastructure Repair service provides for the repair of all Motorola-manufactured equipment, as well as equipment from third-party infrastructure vendors. All repair management is handled through a central location eliminating your need to send equipment to multiple locations.

Comprehensive test labs replicate your network in order to reproduce and analyze the issue. State-of-the-art, industry-standard repair tools enable our technicians to troubleshoot, analyze, test and repair your equipment. Our ISO9001 and TL9000-certified processes and methodologies ensure that your equipment is quickly returned maintaining the highest quality standards.

Service agreements allow you to budget your maintenance costs on an annual basis. Equipment covered under service agreements also receives higher service priority, which results in quicker repair times.

## 7.3.5 Infrastructure Repair with Advanced Replacement

Infrastructure Repair with our Advanced Replacement upgrade supplements your spares inventory with Motorola's centralized inventory of critical equipment. In advance of Motorola repairing the malfunctioning unit, a replacement unit is sent to you within 24 hours to ensure a spare unit is available. Upon receipt of the malfunctioning unit, Motorola repairs the unit and replaces it in our centralized inventory.

## 7.3.6 Technical Support Service

Motorola Technical Support service provides an additional layer of support through centralized, telephone consultation for issues that require a high level of communications network expertise and troubleshooting capabilities. Technical Support is delivered by the System Support Center (SSC). The SSC is staffed with trained, skilled technologists specializing in the diagnosis and swift resolution of network performance issues. These technologists have access to a solutions database as well as in



house test labs and development engineers. Technical Support cases are continuously monitored against stringent inbound call management and case management standards to ensure rapid and consistent issue resolution. Technical Support service translates into measurable, customer-specific metrics for assured network performance and system availability.

### 7.3.7 Network Preventative Maintenance

Network Preventative Maintenance provides an operational test and alignment on your infrastructure or fixed network equipment to ensure that it meets original manufacturer’s specifications. Trained technicians:

- Physically inspect equipment
- Remove dust and foreign substances
- Clean filters
- Measure, record, align and adjust equipment to meet original manufacturer’s specifications

This service is performed based on a schedule agreed upon between you and Motorola. Network Preventative Maintenance proactively detects issues that may result in system malfunctions and operational interruptions.

## 7.4 POST WARRANTY SERVICES

As Motorola’s continuing commitment to supporting your system, warranty services can be extended after the first year to provide maintenance and service support in future years. Any of the services that we identify can be customized in future years, and are available for purchase either in “System Support Services” packages or as individual service offerings. These system support services significantly benefit the City of Maricopa because the system can be effectively supported after the warranty period, thereby maximizing the operational capabilities and useful life of the system and protecting your investment in the system.

## 7.5 SUMMARY

Whether it’s a routine service call, or a disaster situation, Motorola understands its responsibility and takes pride in its commitment to deliver proven response service to the public safety community. Motorola has the capability to provide the technical, administrative, consultative, and maintenance repair services needed to support, enhance and maintain the effectiveness of your communications network. Motorola’s goal is to provide the City of Maricopa with the qualified resources, to maintain and improve system operation and availability and to deliver world class service support.

Warranty and Post Warranty Service Overview	Warranty Year	Post Warranty Years
Dispatch Service	✓	
On Site Infrastructure Response	✓	
Network Preventative Maintenance	✓	
Infrastructure Repair	✓	
Infrastructure Repair with Advanced Replacement	✓	
Technical Support Service	✓	
Network Monitoring Service	✓	
Security Monitoring Service		

Warranty and Post Warranty Service Overview	Warranty Year	Post Warranty Years
Security Update Service (SUS)		
Performance Management Reports		
Motorola System Management Services		
Software Maintenance Agreement (SMA)		
System Upgrade Agreement (SUA/SUA II)		
Information Assurance (IA) Professional Assessment		
Penetration Testing		
Security 101 Workshop		
Password Management		
Repair Service Advantage (RSA)		
Repair Service Advantage (RSA) Comprehensive		

# PRICING SUMMARY

## 8.1 PRICING SUMMARY

### City of Maricopa City of Maricopa Site Addition

Simulcast Subsystem			
Equipment		\$	594,009.58
Outsourced Services		\$	36,870.78
Microwave Subsystem			
Equipment		\$	79,775.05
Outsourced Services		\$	81,801.43
DC Power SubSystem			
Equipment		\$	57,091.10
Outsourced Services		\$	33,312.21
Site Development			
Equipment (Shelter, tower & generator)		\$	155,565.20
Construction Services		\$	144,676.85
VHF System			
Equipment		\$	22,182.18
Services (Antenna install and DC power add-on)		\$	29,932.00
Motorola Services			
	<u>Days</u>	<u>Rate</u>	<u>Extended</u>
Construction Management	32.00	\$ 1,670.00	\$ 53,440.00
Project Management	88.00	\$ 1,670.00	\$ 146,960.00
Engineering	49.00	\$ 1,670.00	\$ 81,830.00
System Technologist	69.00	\$ 1,670.00	\$ 115,230.00
Documentation	10.50	\$ 1,408.00	\$ 14,784.00
Misc Expenses			\$ 2,100.00
Freight / Shipping			\$ 10,264.52
Misc. Materials			\$ 7,405.41
CCSi Staging			\$ 21,693.12
Upgrade Operations			\$ 3,963.96
Coverage Testing			\$ 19,189.19
12 Month Enhanced Warranty Service			\$ 10,645.16
<b>System Total</b>			<b>\$ 1,722,721.74</b>
System Discount (for order of all items as proposed by 10/31/14 with shipment by 12/31/14)			\$ (95,994.38)
System Total After Discount			<b>\$ 1,626,727.36</b>
Estimated Taxes (Based on 65% of Project Value @ 8.7%)			\$ 91,991.43
<b>System Total including Taxes</b>			<b>\$ 1,718,718.79</b>

Integration with the Regional Wireless Cooperative, (RWC) may require additional work by the RWC including potential changes to fees, and operations and maintenance costs. These costs are not reflected in this proposal and should be discussed with the RWC Executive Director.

OAM&P Equipment is not included.





## 8.2 PAYMENT SCHEDULE

Except for a payment that is due on the Effective Date, Customer will make payments to Motorola in accordance with the contract payment terms. Customer will make payments when due in the form of a check, cashier's check, or wire transfer drawn on a U.S. financial institution and in accordance with the following:

15% of the contract price upon submission and customer approval of Contract Design Review (CDR)

40% of the contract price upon delivery and customer approval of equipment

20% of the contract price upon completion of Civil/Site Development

10% of the contract price upon completion of Installation

10% of the Contract Price upon System Acceptance or start of Beneficial Use

5% of the Contract Price upon Final Acceptance

Motorola reserves the right to make partial shipments of equipment and to request payment upon shipment of such equipment. In addition, Motorola reserves the right to invoice for installations or civil work completed on a site-by-site basis, when applicable.



SECTION 9

# TERMS AND CONDITIONS

This proposal is offered under the terms and conditions of the City of Phoenix/Motorola Solutions Master Communications System Agreement, #124391.



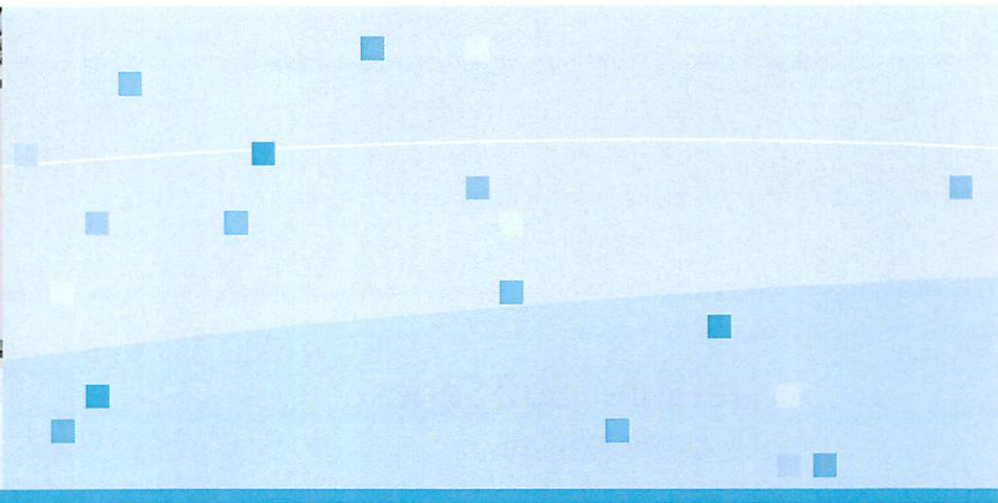
SECTION 10

# DC POWER INFORMATION

DC Power information is included on the pages that follow.

NetSure® 502 Series  
DC Power System





## Key Features

- **High efficiency** – 96.5%, lower operating costs as a result of reduced power consumption
- **Supports Ethernet, SNMP, and RS485 communication interfaces** – enables remote control & monitoring
- **NetSure® rectifiers are designed to operate from -40°C to +80°C, providing a minimum 1600 W output at 65°C** – suitable for harsh environmental conditions
- **Extremely wide AC voltage range window** – 85VAC to 300VAC
- **Several distribution configuration options** – battery disconnect breakers, load breakers, and GMT fuses up to 15A to meet application needs
- **NEBS Level 3 and UL Listed** – complies with industry standards
- **Monitoring and battery test and charge functions** – advanced battery management features and AC service monitoring
- **Configuration file capability** – minimizes installation time and allows planned network conformity



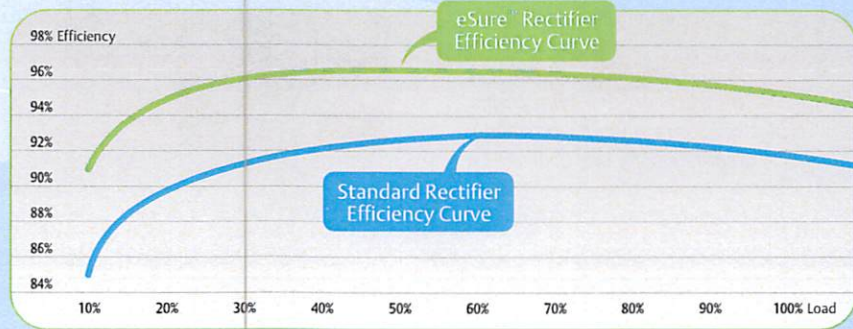
eSure™ rectifiers from Emerson provide efficiency levels up to 96.5%, reducing heat and energy loss over 50%.

The NetSure® 502 DC Power Solution is a flexible system capable of providing DC power through the use of 2000W rectifiers and a variety of output distribution options. The system is available in a bulk output configuration, integrated distribution configuration and a distribution panel style configuration. The NetSure® 502 is available in both 19" and 23" rack-mount configurations, suited for up to 600 amp power requirements in the most harsh environments. The system is supported by a single ACU+ or SCU+ controller that provides all control and operational conditions, as well as historical site data and external signal conditioning and monitoring. Each initial rectifier shelf includes a slot for the controller and space for the rectifiers. Distribution is either provided by output bus bars, fuses or breakers located in the power shelf, or an externally mounted distribution panel.

Distribution options include load low-voltage disconnect (LLVD), battery low-voltage disconnect (BLVD), or no low-voltage disconnect. Plug-in rectifiers, AC connectivity and DC load outputs enhance the overall flexibility of the system by minimizing installation and start-up time. This dynamic system also offers alternative AC input configurations, relay rack configurations, battery tray options, and pre-configured output load kits.

The NetSure® 502 is designed for 40 to 600 amp loads. This cost-effective solution is NEBS Level 3 compliant and UL Listed. Rated for continuous operation from -40°C to +80°C, this system is designed for the harsh outside plant environment, as well as customer premise FTTx, wireless back-haul, microwave, and DLC applications.

This graph demonstrates eSure™ ultra high efficiency of 96.5% versus standard rectifier efficiency around 93%



The NetSure® 502 system is ideal for wireline and wireless applications such as switch sites, co-location, huts and large vaults or enclosures, as well as FTTx electronics.

## eSure™ Rectifiers

Ultra high efficiency of 96.5% is achieved with the eSure™ R48-2000e rectifier. eSure™ rectifiers from Emerson deliver the most reliability and highest efficiency in the industry, reducing power consumption and lowering operation cost.

The NetSure® 502 Series supports eSure™ rectifiers and standard rectifiers. The R48-2000e and R48-2000 are both modular, high frequency constant power rectifiers designed with the latest patented switch-mode technology using DSP (Digital Signal Processor) functionality. Use of DSP technology results in fewer components and optimized operation. Plug'n'play technology allows for easy system configuration. System capacity can be increased by simply plugging an additional rectifier into an existing shelf or

a newly added expansion shelf — no adjustments or setup are required. The NetSure® 502 rectifiers provide load power, battery float current and battery recharge current. The rectifiers are monitored and controlled by the ACU+ or SCU+. The modular design of these units facilitates power plant sizing to application needs. Beyond reducing operating costs, Emerson has maximized the value of eSure™ rectifiers by making them backwards compatible with existing NetSure® DC Power Systems. Both unit types can be used in a system together.



The eSure™ rectifier provides up to 100% of rated power at 55°C. As the temperature increases from 55°C to 80°C, the thermal power limit circuit linearly decreases power. In the typical operating range, eSure™ rectifiers have a power factor greater than .99, total harmonic distortion less than 5%, and efficiencies up to 96.5%. Each hot-swappable rectifier has an integral multi-speed cooling fan and a tri-LED status indicator.

## Environmental Endurance

### Great output power at high temperatures

NetSure® 502 rectifiers deliver high output power in relation to ambient temperature conditions, making them especially suitable for high-temperature environments. In a system with rectifiers operating at 65°C, the output is still a minimum 80% of full power.

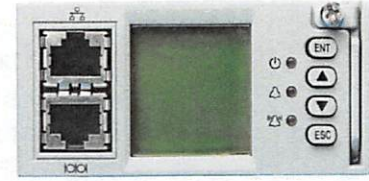
### Extremely wide AC voltage range window

The AC voltage input range vs. rectifier output is another extraordinary feature of this small system. The rectifier's power output ranges from 85VAC to 300VAC. Between 176-300VAC, the output is 100% of full power.

*Designed for global use, the ACU+ or SCU+ withstands high telecom standards, providing great reliability and availability.*



ACU+ Controller



SCU+ Controller

As load demand grows, the system can be easily expanded with additional modular components.

### Rectifier Shelves

The rectifier shelves integrated into the NetSure® 502 system are 3.5" (2 RU) high and available in 19" and 23" widths. These shelves provide front to back ventilation and can be mounted directly above or below other electronic equipment, maximizing revenue-generating space. Each unit will operate from 120/208/240VAC and is equipped to accommodate plug-in AC connections or line cords. DC output connection options for each shelf include plug-in DC jumpers for GMT load, two-hole compression lugs or bus bar terminations for larger conductors for connection to local or remote distribution and batteries. The shelf with rectifiers is NEBS Level 3 compliant, UL Listed and meets FCC Class B EMI/RFI requirements.



### Controller

The ACU+ and SCU+ are powerful control units that enable remote monitoring of the main AC supply, DC power plant, battery backup and site environment.

The controller enables advanced battery management such as sophisticated boost charge control, remaining capacity testing, constant current discharge testing and scheduled discharge testing. With basic energy saving functions, the SCU+ is a cost-efficient system component. For more sophisticated site monitoring the ACU+ is available as an option. Information and alarms from a specific site are monitored or checked with a web browser or SNMP. When using a web browser, no additional software is needed and the web browser login is password protected.

### Distribution

Output distribution for the NetSure® 502 is available in three different forms. Bulk distribution can be provided through lug landing points on the rear or top of the shelf. Internal distribution is attained through GMT fuses or circuit breakers. Internal distribution options include: 13 GMT fuses composed of (5) 15A positions and (8) 10Amp positions; or (4) load circuit breakers (0 to 100A) and (5) 10A GMT fuses; or (2) load circuit breakers (0 to 100A) and (2) battery disconnect circuit breakers (0-125A) and (5) 10A GMT positions. External distribution panel options for the (1) row panel include: (24) load circuit breaker positions or (18) load circuit breaker positions plus (6) battery disconnect positions or (16) load positions and (8) battery disconnect positions for a 23" arrangement; and (19) load circuit breaker positions or (14) load circuit breaker positions plus (5) battery disconnect positions for a 19" arrangement.

Options for the (2) row panel include (39) load breaker positions and (9) battery disconnect positions for the 23" shelf and (29) load breaker positions and (9) battery disconnect positions for the 19" models.

All distribution options can be outfitted with a (20) position GMT panel that provides either 80A or 40A on A and 40A on B load. All internal and external distribution panel options are available with low-voltage disconnect capability.

The NetSure® 502's extensive battery management capabilities, easy configuration and maintenance are all backed by the resources and quality reputation of a worldwide service organization.

## NetSure® 502 systems come in many different configurations



- 1 AC input wiring
- 2 eSure™ rectifier (R48-2000e)
- 3 Standard rectifier (R48-2000)
- 4 ACU+ controller
- 5 Distribution panel

This highly flexible DC power system is available in bulk output shelves, integrated distribution shelves or externally mounted distribution panel systems. These alternatives are optimal for rack-mounting in any building, shelter or cabinet installation.

NetSure® 502 is easily integrated into any Emerson outdoor enclosure when a pre-manufactured space-efficient outdoor solution is needed. The system can also be shipped loose or mounted in a relay rack with battery trays. The three following core configurations define the combination of rectifier and distribution shelves and determine the ultimate capacity of the system.

### Bulk Output Distribution

582136800



The bulk solution provides an easy method for upgrading inefficient and/or obsolete rectifiers without the expense of buying a new DC plant. When distribution is already available and bulk -48VDC power is needed, these (2) new configurations are ideal. Bulk output connection points are provided on the rear or top of these shelves. Optional AC input is available through top or rear access to the system. Up to 400A of power is provided in up to 6 RU of space. Mount the system in a 19" or 23" rack, connect your load cables, plug-in AC cords, add rectifiers and you are ready to provide power.

### Internal Distribution

582136700

Our most compact system measures 2RU high, with distribution capability and rectifiers in the same shelf. Available in 19" and 23" widths, the system provides distribution space for GMT fuses up to 15A or a combination of 100A circuit breakers and GMT fuses. Configuration options include battery low voltage disconnect (BLVD), load low voltage disconnect (LLVD) or no low voltage disconnect. An external GMT fuse panel with (20) positions is available in both an A and A/B configuration.



### External Distribution Panel

582136800



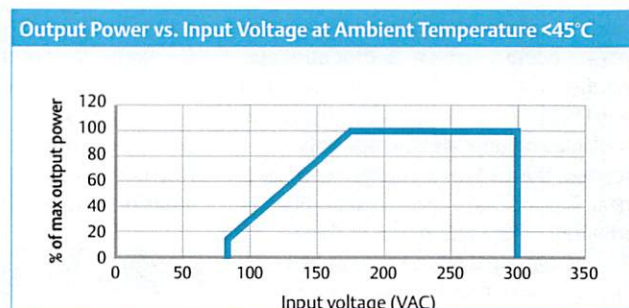
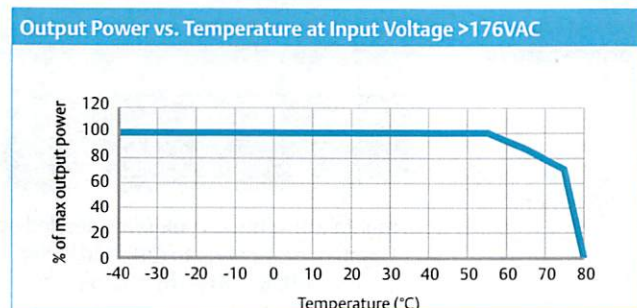
If multiple distribution points are needed our 23" system provides up to (39) load bullet breaker positions and up to 9 battery disconnect positions. In a 19" system, there are up to (29) load bullet breaker positions and (9) battery disconnect positions. Bullet breakers up to 250A can be used in this panel. An optional GMT fuse panel is available for GMT fuses. This system offers up to 600A output current capacity in 14 RU of space.



## System Specifications, NetSure® 502

Input				
Nominal System Voltage	120, 208, 240VAC			
Output Capacity	19" Integrated up to 80A 23: Integrated up to 120A 19" Rear Bulk Systems up to 365A 23" Rear Bulk Systems up to 450A		19" & 23" Top Bulk Systems up to 400A 19" & 23" Externally Mounted Distribution Panel Systems up to 600A	
Framework Type	Relay Rack (can be mounted in enclosures)			
Mounting Dimensions	Equipment	Height	Width	Depth
	Rear Bulk Output Shelves	2 RU/shelf	19" or 23"	13.6"
	Top Bulk Output Shelves	Up to 6 RU	19" or 23"	12.5"
	Integrated Distribution System	2 RU/shelf	19" or 23"	12.0"
	Externally Mounted Distribution System	Up to 15 RU	19" or 23"	13.1"
Access	Rear Bulk Output Shelves – Rear for installation, front for operation and maintenance Top Bulk Output System – Top for installation, front for operation and maintenance Integrated Distribution System – Front for installation, operation and maintenance Externally Mounted Distribution System – Rear, front and top for installation, front for operation and maintenance			
Control	ACU + or SCU+ Controller			
Environmental				
Operating Temperature	-40°F to +176°F (-40°C to +80°C) see rectifier specification for any derating			
Storage	-40°F to +176°F (-40°C to +80°C)			
Humidity	0 to 95%, non-condensing			
Ventilation	Fan-cooled front to rear			
EMI/RFI	Conforms to FCC rules Part 15, Subpart B, Class B and EN55022 Class B, radiated and conducted			
Safety Compliance	UL 60950 Recognized (US & Canada) – Rear Bulk Distribution System and Integrated Distribution System UL 1801 Listed (US & Canada) – Top Bulk and External Distribution Panel System NEBS Level 3			

## eSure™ Rectifier Diagrams (R48-2000e)



**Emerson Network Power**  
offers a complete spectrum of best-in-class  
reliable power, precision environmental and  
connectivity solutions for today's telecommunica-  
tions and data network infrastructure

## Rectifier Specifications, R48-2000 and R48-2000e

	R48-2000	R48-2000e
<b>AC Input Rectifier</b>		
Nominal Voltage	120, 208, 240VAC	
Operating Voltage Range	85 to 300VAC extended range to 300VAC without damage	
Frequency	45 Hz to 65 Hz	
Power Factor (PF)	0.99 ≥ to 50% load	
Total Harmonic Distortion	<5% from 50 to 100% of rated load	
Input Current	Max 13A	
Inrush Current	Inrush current does not exceed 150% of the rated input steady state peak value.	
Operating Efficiency	92%	96.5%
<b>DC Output</b>		
Output Voltage Range	-42 to -58VDC	
Constant power limiting operation 2000W @ -48VDC	See derating chart for voltages less than 176VDC or temperatures higher than 45°C.	See derating chart for voltages less than 176VDC or temperatures higher than 55°C.
Output Current	41.7A @ -48VDC	
Regulation	Steady state output voltage remains within +/-1% for any combination of input voltage and temperature from 5% to 100% load	
Voice Band Noise	Does not exceed 32dBmC output noise from 0% to 100% load	Does not exceed 38dBmC output noise from 20% to 70% load
Wide Band Noise	Does not exceed 250mv peak-to-peak, or 100mv rms per Telcordia GR-947-CORE	
Psophometric Noise	<1mV at 0 to 100% of rated load	<2mV at 20 to 70% of rated load
Protection	High Voltage Shutdown fixed and selective capability. Fixed – requires manual restart. Selective – If rectifier detects over voltage it will turn off. After 5 seconds it will restart; if it encounters an over voltage within 5 minutes it will turn off and remain off until reset.	
<b>Environmental</b>		
Temperature	-40 to +80°C, -40 to 176°F	
Altitude	2000m, 6560 ft at full power	
British Thermal Unit (BTU)	678.4 BTU/Hour	326.9 BTU/Hour
Ventilation	Front to back with speed-controlled fan (field replaceable)	
Audible Noise	The rectifier does not produce sound levels above 53dB(A), measured 0.6m in front of the rectifier, at the same horizontal line as the middle of the rectifier at 25°C	No sound above 50dB(A), measured 0.6m in front of the rectifier at 25°C
<b>Status /Alarm Indicators and Monitoring</b>		
Visual Indicators	Green LED: Normal Operation Red LED: Failure	Yellow LED: Alarm Flashing Red LED: Fan Failure
Status Settings	Controller establishes rectifier settings	
<b>Rectifier Physical Specifications</b>		
Mounting	Plugin installation	
Dimensions (H x W x D)	3.39" x 3.33" x 10.71" (86 x 84.5 x 272 mm)	
Weight	5.3lbs (2.4kg)	
Safety Compliance	UL 60950 Recognized (US & Canada)	

## Additional Information

For additional specification, engineering and installation information, request specification number 582136700 (integrated distribution configuration) or 582136800 (bulk and external distribution configurations) or 1R482000e (eSure™ rectifier) and 1R482000 (standard rectifier).

For ordering information on the complete system, request SAG582136700 or SAG582136800.

Emerson (NYSE: EMR), based in St. Louis, Missouri (USA), is a global leader in bringing technology and engineering together to provide innovative solutions for customers in industrial, commercial, and consumer markets around the world. The company is comprised of five business segments: Process Management, Industrial Automation, Network Power, Climate Technologies, and Commercial & Residential Solutions. For more information, visit: [Emerson.com](http://Emerson.com).

Emerson Network Power, a business of Emerson (NYSE:EMR), maximizes reliability, deployment speed and operational efficiency for communications networks. A trusted industry leader in smart infrastructure technologies, Emerson Network Power provides innovative, rapidly deployable solutions that deliver efficiency and uncompromised reliability regardless of network demands. Our solutions are supported globally by local Emerson Network Power service technicians. Learn more about Emerson Network Power products and services at: [EmersonNetworkPower.com/EnergySystems](http://EmersonNetworkPower.com/EnergySystems).

Learn more about Emerson Network Power products and services at: [EmersonNetworkPower.com](http://EmersonNetworkPower.com).

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EMERSON. CONSIDER IT SOLVED.™

SECTION 11

# SHELTER INFORMATION

Shelter Information is included on the pages that follow.





PROPERLY PROTECT FIXED EQUIPMENT FROM THE ELEMENTS

# MOTOROLA BUILDING ENCLOSURES

One of the critical factors for providing reliable communications during normal and emergency situations is to adequately secure and protect your equipment from the environment. Motorola's equipment enclosures enhance system performance by minimizing equipment malfunction downtime due to environmental changes such as a lightning strike during a storm.

To provide organizations with an enclosure that meets your unique equipment requirements, Motorola has developed two choices in building designs: Motorola Standard Buildings (MSB) and Motorola Alternative Buildings (MAB).

**Cost effective designs** – Motorola building enclosures are designed to meet most industry and local codes, ensure efficient equipment installation, maximize interior space and reduce installation time. In addition, the MAB enclosure provides a low cost base solution with the ability to add the upgrades you choose.

**Scalable packages to meet your needs** – Begin with a basic MAB model and modify it with specific upgrades to tailor the building for your unique requirements or choose the more complete MSB enclosure. The designs have already been drafted and pre-approved to meet state building codes, reducing the approval and certification process.



**SOLUTION DATA SHEET**  
MOTOROLA BUILDING ENCLOSURES

**Predesigned and equipment ready –**

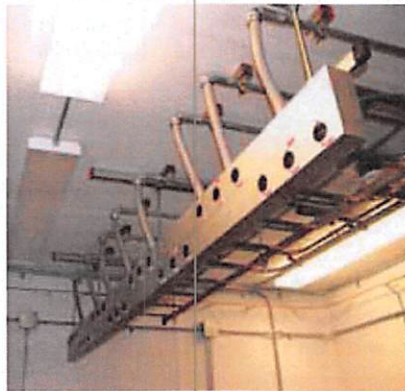
Our building systems have been pre-designed to meet the most current edition of Motorola's R56 Standards and Guidelines for Communication Sites, including cabling facilities, back-up power sources, grounding, and complete electrical systems and surge suppression. Your fixed radio equipment can be installed at the building manufacturing plant or on site.



Building electrical entry points have appropriate surge protection to protect the equipment from outside surges and spikes.

**Specific electrical configurations for wireless equipment –**

The power requirements are based on the load calculations for each specific building type and system configuration. Individual load distribution centers allow for proper allocation of electrical power and easy identification of the breakers. Separate receptacles with dedicated circuits are installed for convenient powering of the equipment.



For convenient powering of the equipment, individual receptacles with dedicated power circuits are installed in a raceway system above the equipment racks.

**Backup power for emergency operations –**

Uninterruptible Power Supply (UPS) is designed to prevent critical equipment downtime. The UPS instantly powers the equipment load in case of power failure until a stable power source is available. Different UPS sizes are recommended depending on the building size and power requirements. Building configuration has been sized with an outdoor standby generator with an automatic transfer switch in case of utility power failure.



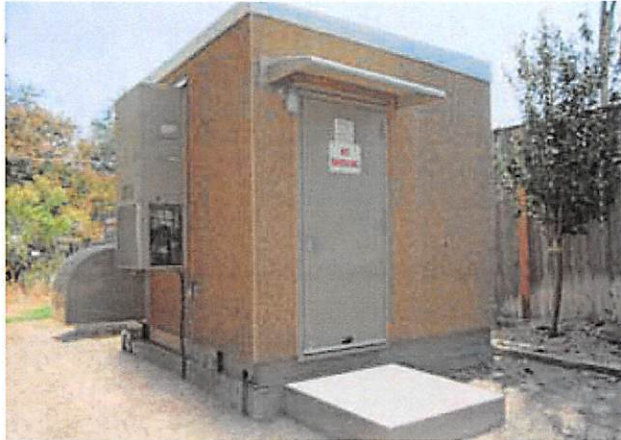
Motorola Alternative Building 10x12 foot with an optional outdoor generator based on the selected equipment load configuration.

**Single point grounding –** The enclosures are built with Motorola's specifications for single point grounding, which requires all internal equipment grounds to terminate on a single ground bar and for all cable penetrations into the shelter to also ground to the same bar.

**Multiple manufacturing locations reduce shipping costs –** Multiple strategically located facilities manufacture MSB and MAB enclosures, which can reduce freight cost and speed delivery, as well as provide you with prompt warranty support.

**BUILDING SPECIFICATIONS**

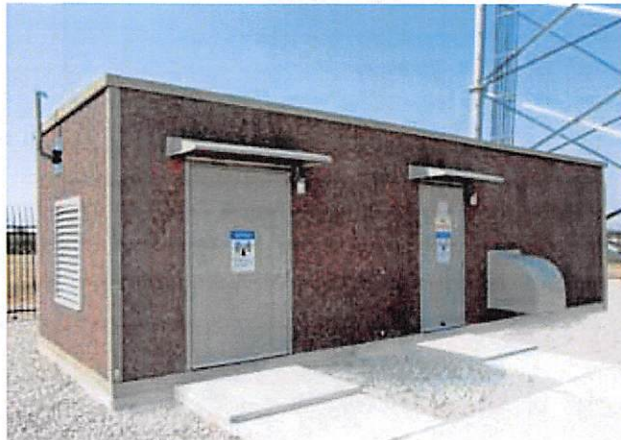
Motorola offers a comprehensive portfolio of building enclosures that addresses the needs of today’s communication environment. Whether you need a building to be constructed on site or fully assembled, Motorola has the right combination of expertise, options and resources to protect and house your fixed network equipment.



**Motorola Alternative Building (MAB)** – is a lightweight fiberglass aggregate panel shelter, fully scalable and tailored to your specific requirements.

**MOTOROLA ALTERNATE BUILDING (MAB) AVAILABILITY**

BUILDING SIZE (W X L)	GENERATOR	RACK CAPACITY
10 x 12 ft	External Generator Optional	4
10 x 16 ft	External Generator Optional	6
12 x 16 ft	External Generator Optional	8



**Motorola Standard Building (MSB)** – shelter sets the industry standard as an all inclusive concrete shelter that provides maximum protection for your equipment.

**MOTOROLA STANDARD BUILDING (MSB) AVAILABILITY**

BUILDING SIZE (W X L)	GENERATOR	RACK CAPACITY
12 x 10 ft	External Generator Included	4
12 x 16 ft	External Generator Included	8
12 x 24 ft	External Generator Included	12
12 x 32 ft	External Generator Included	16
12 x 36 ft	External Generator Included	20
24 x 32 ft	External Generator Included	32

**SOLUTION DATA SHEET**  
**MOTOROLA BUILDING ENCLOSURES**

**FEATURES**

	<b>MOTOROLA ALTERNATIVE BUILDING (MAB)</b>	<b>MOTOROLA STANDARD BUILDING (MSB)</b>
Floor and Loadings	200psf wood with i-beam skid perimeter Optional concrete upgrade	300psf concrete design
Roof and Loading	100psf galvaneal steel with membrane	150psf solid concrete
Seismic Design	Group 1 – Category D of International Building Code (IBC) Seismic Design optional upgrade	Group 1 – Category D of International Building Code (IBC) Seismic Design optional upgrade
Walls and Loadings	120 MPH wind loading; galvaneal steel with exposed aggregate fiberglass panels exterior	150 MPH wind loading; 4 in solid concrete with exposed aggregate exterior; level 4 bullet resistant; 2 hour fire rated
Grounding	Meets or exceeds R-56	Meets or exceeds R-56
Electrical Service	Integrated load center includes TVSS, power panel	Utility power panel, TVSS, enclosed circuit breakers as safety disconnect all separate components
Surge Protection	Type 1 Transient Voltage Surge Suppressor Type 2 surge suppression optional upgrade	Type 1A and Type 2 surge protection Primary surge protection for control wiring/generator Type 3 surge suppression optional upgrade
Exterior Outlets	One 20A GFI duplex outlet	Two 20 A GFI duplex outlets
HVAC	Fresh air, thermostat controlled exhaust fan system Optional single or dual HVAC upgrade	Redundant (2 units) system HVAC economizer optional upgrade
Emergency Lighting	One twin bulb with battery EXIT sign located over doorway	One twin bulb with battery EXIT sign located over doorway
Alarms	No standard alarms Optional Upgrades available	Standard: Smoke, Power Fail, High/Low temp, intrusion, tower lights, HVAC, TVSS, Generator, Automatic transfer switch, UPS alarms, and external ground bar anti-theft relay
Safety Equipment	Eye wash and first aid kit Optional upgrade for fire extinguishers	Eye wash and first aid kit and 2 fire extinguishers per room
Floor Insulation	R-11	R-4
Wall Insulation	R-11	R-11
Ceiling Insulation	R-19	R-19
Generator	Optional Upgrade available	Standard Indoor generator room optional upgrade
UPS	Optional Upgrade available	Standard
Cable Tray Size	18 in Wide	24 in Wide
Warranty	2 year structural 2 year interior (HVAC, generator, TVSS, UPS) Optional Structural Warranty Upgrade	10 year structural 2 year interior (HVAC, generator, TVSS, UPS)



SECTION 12

# MICROWAVE INFORMATION

Microwave Information is included on the pages that follow.

DC Power Calculations

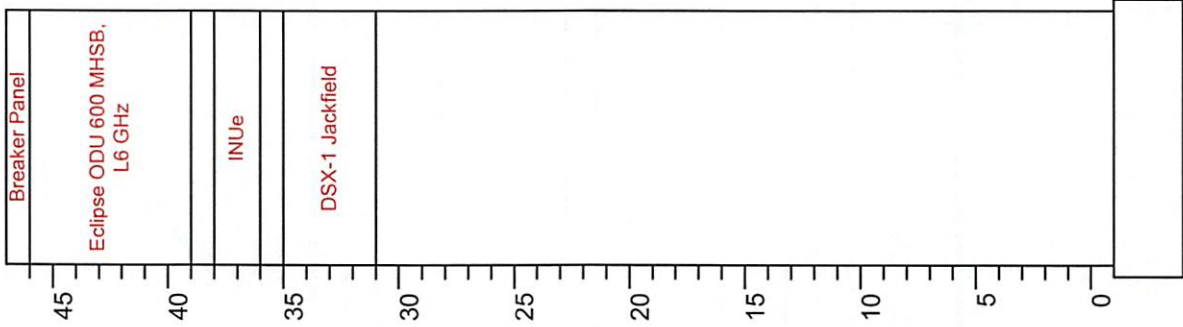
COMMUNICATIONS EQPT	EQPT POWER CONSUMPTION (Amps) @ 48VDC:	Brkr/Fuse Size (Amps)	South Mountain		City of Maricopa	
			QTY	AMP	QTY	AMP
<b>INUe and NTU</b>						
INUe e/w 2RU Fan card, NCC and NPC	0.44	15.00	1	0.44	1	0.44
Aux	0.02		1	0.02	1	0.02
DAC 16x, 3DS3	0.05		2	0.10	2	0.10
DAC GE3	0.27		2	0.54	2	0.54
Fan, 1RU or 2RU	0.04		1	0.04	1	0.04
NCC	0.23		1	0.23	1	0.23
NPC	0.17		1	0.17	1	0.17
RAC60E	0.28		2	0.56	2	0.56
ODU600,6-11GHz MHS, MHS-SD	1.88		2	3.77	2	3.77
DSX-1 Jackfield	0.50	1.00	1	0.50	1	0.50
<b>Fuse/Breaker Requirements</b>						
10.0A					2	
15.0A			2		2	
<b>STATION LOAD (AMPS)</b>			<b>6.37</b>		<b>6.37</b>	

Customer:  
 Proposal: NA140423-38411  
 Date:4/28/2014

Aviat Networks  
 5200 Great America Parkway  
 Santa Clara CA

ISSUE	ENG NAME	DATE
A	B Nguyen	04-28-2014

7' 6"

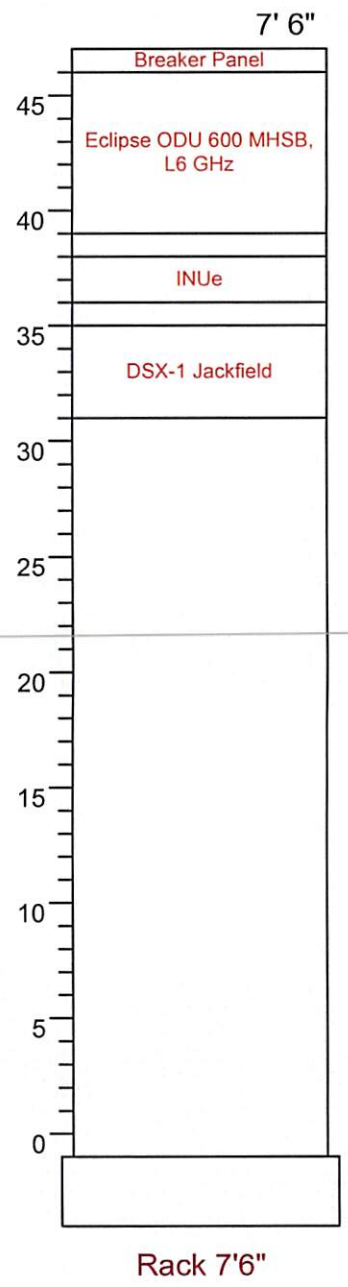


Rack 7'6"



Aviat Networks	
<b>Motorola Western Division</b>	
Microwave	
South Mountain	
Rack Profile	
ENG BY: B Nguyen	REVA
DWN BY: B Nguyen	DATE: 04-28-2014
SYSTEM ID:	Page 1 of 2
NA140423-38411	

ISSUE	ENG NAME	DATE
A	B Nguyen	04-28-2014



Aviat Networks	
<b>Motorola Western Division</b>	
Microwave	
City of Maricopa	
<b>Rack Profile</b>	
ENG BY: B Nguyen	REV A
DWN BY: B Nguyen	DATE: 04-28-2014
SYSTEM ID:	Page 2 of 2
NA140423-38411	

# TOWER INFORMATION

Tower Information is included on the pages that follow.



**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
15' LRE with 4' lightning rod (arm=7.75')	180	6" Pivot Side Arm (50" pipe)	160
CC807-06	180	CC807-11	160
6" Pivot Side Arm (50" pipe)	180	6" Pivot Side Arm (50" pipe)	160
CC807-06	180	CC807-11	160
6" Pivot Side Arm (50" pipe)	180	6" Pivot Side Arm (50" pipe)	160
CC807-06	180	6" Pivot Side Arm (50" pipe)	150
6" Pivot Side Arm (50" pipe)	180	CC807-11	150
CC807-06	170	6" Pivot Side Arm (50" pipe)	150
6" Pivot Side Arm (50" pipe)	170	CC807-11	150
CC807-06	170	6" Pivot Side Arm (50" pipe)	100
6" Pivot Side Arm (50" pipe)	170	PAR6-59 w/ Radome	80
CC807-11	160	PAR6-59 w/ Radome	80

**SYMBOL LIST**

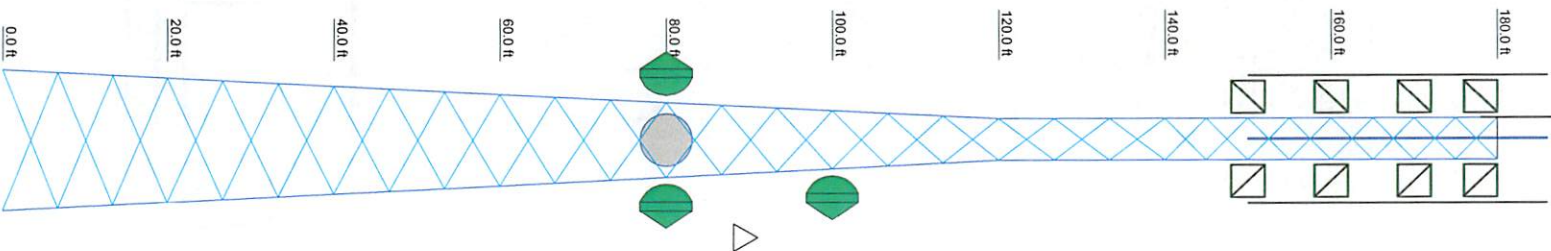
MARK	SIZE	MARK	SIZE
A	P- 4.00" - 0.75" conn.-20' -C-Trans-68-4B-(Pirod 226184)	B	P- 5.00" - 0.75" conn.-Trans-20' -C-(Pirod 226200)

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

**TOWER DESIGN NOTES**

1. Tower is located in Maricopa County, Arizona.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 91.1%



ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 199 K  
 UPLIFT: -175 K  
 SHEAR: 19 K

AXIAL  
 21 K

SHEAR  
 31 K

MOMENT  
 2820 kip-ft

TORQUE 11 kip-ft

REACTIONS - 90 mph WIND

Section	T9	T8	T7	T6	T5	T4	T3	T2	T1	
Legs	P- 6.00" - 0.75" conn.-20' -C-(Pirod 226206)		P- 5.00" - 0.75" conn.-20' -C-(Pirod 226192)			B	A	P- 2.50" - 0.75" conn.-20' -C-(Pirod 226160)		
Leg Grade	A572-50									
Diagonals	L3x3x3/16	L2 1/2x2 1/2x3/16		L2x2x3/16			L2x2x1/8			
Diagonal Grade	A36									
Top Girts	N.A.								L3x3x1/4	
Face Width (ft)	17	15	13	11	9	7			5	
# Panels @ (ft)	21 @ 6.66667							8 @ 5		
Weight (K)	12.3	2.3	2.0	1.7	1.4	1.3	1.3	0.9	0.6	0.7

**Valmont Structures, Inc.** - Specialty Structures Group

1545 Pidco Drive  
 Plymouth, IN 46563  
 Phone: (574) 936-4221  
 FAX: (574) 936-6458

Job: **Quotation 256937-01**

Project: V-17.0 x 180' - Chandler AZ Maricopa County

Client: Motorola Solutions      Drawn by: HMA

Code: TIA-222-G                      Date: 05/19/14

Path: C:\Users\jstevens\Documents\Quotation\256937-01\256937-01.dwg      Scale: NTS

Dwg No. E-1