# Exhibit B-1 Mandatory Technical Requirements

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## Exhibit B-1 Mandatory Technical Requirements

**BIDDER INSTRUCTIONS:** *Bidders may choose to submit a response to any categories/sub-categories. Each category/sub-category will be evaluated and awarded separately. Each category/sub-category includes specifications for a sample product. Bidders must indicate in the space provided whether their sample product complies with the requirement. Bidder may provide clarification or comment in the space provided. Exhibit B-1 must not be altered. Bidders not submitting a bid in a category/sub-category must indicate "NO BID" for the relevant category/sub-category. Exhibit B-1 must be completed and submitted with Bidder's response.*

*Bidders may offer additional products/services in the space below provided for each category/sub-category. Bidder will be required to submit a complete list of products/services in each category/sub-category for approval within fifteen (15) days of award.*

*Only Radio Manufacturers who receive an award in 1.7 Sub-Category: Base Station/Repeater and Category 3: Dispatch Console may have the opportunity to offer a turnkey (complete) radio solution and advance to the next evaluation phase. A radio solution may include an upgrade to existing system or a brand new system.*

*"**P25**" or "**Project 25**" is defined as the suite of standards for digital radio communications for public safety as defined by the Department of Homeland Security.*

## Exhibit B-1 Mandatory Technical Requirements

### 1. CATEGORY: RADIO

#### 1.1 RADIO SUB-CATEGORY: SINGLE -BAND PORTABLE RADIO (P25)

**Sub-Category Description:** *Phase I 12.5 Digital Trunking capable, backwards compatible. Software – Defined Radio Architecture.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled *"RadioSubCategory-Single-BandPortableP25"*). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTSALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** BK Technologies, Inc. **Product Model Name**: BKR 5000 **Product Number**: BKR5000-T3

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | *Current TIA/EIA standards for Public Safety Radio systems, and* | Y | |
| **2.** | *Current P25 CAP compliance found at the following link,* https://www.dhs.gov/science-and-technology/approved-grant-eligible-equipment, *and* | Y | |
| **3.** | *Capable of operating on P25 Phase I trunked and/ or conventional (analog/ P25) systems, and* | Y | |
| **4.** | *Capable of operating on Public Safety spectrum at 136 to 174 MHz for interoperability, and* | Y | |
| **5.** | *Capable of operating using Encryption Standard (AES-256).* | Y | |
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| **6..** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | Y | |
| **7..** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | Y | |
| **8..** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | Y | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| KNG2/KNG2-P150, KNG2-P150T2, KNG2-P150CMD;<br>BKR/BKR5000-T1, BKR500-T2;<br>BKR9000-T1, BKR9000-T2, BKR9000-T3 | KNG2 VHF single band portable<br><br>BKR 5000 series VHF single band portable<br>BKR 9000 series VHF, UHF and 700/800 single band portable |
| KNG2/KNG2-P400, KNG2-P400CMD, KNG2-P400T2, KNG2-P500 | Port,G2,UHF,5W,5000Ch,380-470MHz single band portable; Port,G2,UHF,5W,5000Ch,440-520MHz single band portable |
| KNG2/KNG2-P800, KNG2-P800T2 | Port,G2,700/800,3W,5000Ch,764-870MHz single band portable |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* BK includes a standard warranty of 2 years on the radio at no charge. |

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| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* BK offers an extended warranty to 3 years on radio only. Must be purchased at same time as radio purchase. |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* BK offers an extended warranty to 5 years on radio only. Must be purchased at same time as radio purchase. |

### 1.2 RADIO SUB-CATEGORY: SINGLE -BAND MOBILE RADIO (P25)

**Sub-Category Description:** *Phase I Digital Trunking capable, backwards compatible. Software – Defined Radio Architecture.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*RadioSubCategory-Single-BandMobileP25*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS. ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** BK Technologies, Inc. **Product Model Name**: KNG-M150 **Product Number**: KNG-M150

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | *Current TIA/EIA standards for Public Safety Radio systems, and* | Y | |
| **2.** | *Current P25 CAP compliance found at the following link,* https://www.dhs.gov/science-and-technology/approved-grant-eligible-equipment, *and, and* | Y | |
| **3.** | *Capable of operating on P25 Phase I trunked and/ or conventional (analog/ P25) systems, and* | Y | |
| **4.** | *Capable of operating on Public Safety spectrum at 136 to 174 MHz, and* | Y | |
| **5.** | *Capable of operating using Encryption Standard (AES-256).* | Y | |
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| **6.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | Y | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | Y | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | Y | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| KNG/KNG-M150R | Mobile,Digital,TrunkMount,VHF136-174MHz,5000Ch,50W; |
| KNG/KNG-M400, KNG-M400R; KNG-M500, KNG-M500R | Mobile,Digital,UHF,380-470MHz,5000Ch,50W; Mobile,Digital,TrunkMount,UHF,380-470MHz,5000Ch,50W; Mobile, Digital,UHF,440-520MHz,5000Ch,50W; Mobile,TrunkMount,Digital,UHF,440-520MHz,5000Ch,50W |
| KNG/KNG-M800, KNG-M800R | Mobile, Digital,763-870MHz, 5000Ch, 30/35W; Mobile,TrunkMount,Digital,VHF 763-780MHz-5000Ch,30/35W |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* BK includes a standard warranty of 2 years on the radio at no charge. |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* BK offers an extended warranty to 3 years on radio only. Must be purchased at same time as radio purchase. |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |

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| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* BK offers an extended warranty to 5 years on radio only. Must be purchased at same time as radio purchase. |

### 1.3 Radio Sub-Category: Single-Band Desktop Radio (P25)

**Sub-Category Description:** *Phase I Digital Trunking capable, backwards compatible. Software – Defined Radio Architecture.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*RadioSubCategory-Single-BandDesktop-ConsoleRadioP25*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** BK Technologies, Inc. **Product Model Name**: KNG-B150 **Product Number**: KNG-B150

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA standards for Public Safety Radio systems, and* | Y | |
| **2.** | *Current P25 CAP compliance found at the following link,* https://www.dhs.gov/science-and-technology/approved-grant-eligible-equipment, *and, and* | Y | |
| **3.** | *Capable of operating on P25 Phase I trunked and/ or conventional (analog/ P25) systems, and* | Y | |
| **4.** | *Capable of operating on Public Safety spectrum at 136 to 174 MHz, and* | Y | |
| **5.** | *Capable of operating using Encryption Standard (AES-256).* | Y | |
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| **6.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | Y | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | Y | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | Y | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| KNG/KNG-B400<br>KNG KNG-B500 | Base,Digital,UHF,380-470MHz,5000Ch,50W<br>Base,Digital,UHF,440-520 MHz,5000Ch,50W |
| KNG/KNG-B800 | Base,Digital,UHF, 763-870 MHz, 5000Ch,30/35W |
| KNG/KNG-M150 | KNG single band VHF mobile w/ additional power supply (not listed) |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* BK includes a standard warranty of 2 years on the radio at no charge. |

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|---|---|
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* BK offers an extended warranty to 3 years on radio only. Must be purchased at same time as radio purchase. |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* BK offers an extended warranty to 5 years on radio only. Must be purchased at same time as radio purchase. |

### 1.4 Radio Sub-Category: Multi-Band Portable Radio (P25)

**Sub-Category Description:** *P25 Phase I FDMA 12.5 kHz and 6.25 kHz P25 Phase II TDMA capable, backwards compatible. Software – Defined Radio Architecture*.

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled *"RadioSubCategory-Multi-BandPortableP25"*). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS.. ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** BK Technologies, Inc. **Product Model Name**: BKR 9000 **Product Number**: BKR9000-T3

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA standards for Public Safety Radio systems, and* | Y | |
| **2.** | *Current P25 CAP compliance found at the following link,* https://www.dhs.gov/science-and-technology/approved-grant-eligible-equipment, *and, and* | Y | Product is scheduled for P25 CAP compliance testing, to be completed by anticipated contract award. |
| **3.** | *Capable of operating on P25 Phase I trunked and/ or conventional (analog/ P25) systems, and* | Y | |
| **4.** | *Capable of operating on Public Safety spectrum at 136 to 174 MHz, and* | Y | |
| **5.** | *Capable of operating using Encryption Standard (AES-256).* | Y | |
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| **6.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | Y | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | Y | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | Y | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| BKR 9000/BKR9000-T1 | Basic radio unit model 1, top display only no keypad |
| BKR 9000/BKR9000-T2 | Basic radio unit model 2, top display & front display, nav keypad |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* BK includes a standard warranty of 2 years on the radio at no charge. |

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|---|---|
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* BK offers an extended warranty to 3 years on radio only. Must be purchased at same time as radio purchase. |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* BK offers an extended warranty to 5 years on radio only. Must be purchased at same time as radio purchase. |

### 1.5 Radio Sub-Category: Multi-Band Mobile Radio (P25)

**Sub-Category Description:** *P P25 Phase I FDMA 12.5 kHz and 6.25 kHz P25 Phase II TDMA capable, backwards compatible. Software – Defined Radio Architecture.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled *"RadioSubCategory-Multi-BandMobileP25"*). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS. ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: **Product Number**:

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA standards for Public Safety Radio systems, and* | | **NO BID** |
| **2.** | *Current P25 CAP compliance found at the following link,* https://www.dhs.gov/science-and-technology/approved-grant-eligible-equipment, *and, and* | | |
| **3.** | *Capable of operating on P25 Phase I trunked and/ or conventional (analog/ P25) systems, and* | | |
| **4.** | *Capable of operating on Public Safety spectrum at 136 to 174 MHz, and* | | |
| **5.** | *Capable of operating using Encryption Standard (AES-256).* | | |
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| **6.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
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**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |

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| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 1.6 Radio Sub-Category: Multi-Band Desktop Radio (P25)

**Sub-Category Description:** *P25 Phase I FDMA and P25 Phase II TDMA capable backwards compatible. Software – Defined Radio Architecture*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*RadioSubCategory-Multi-BandDesktop-ConsoleRadio*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS. ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA standards for Public Safety Radio systems, and* | | **NO BID** |
| **2.** | *Current P25 CAP compliance found at the following link,* https://www.dhs.gov/science-and-technology/approved-grant-eligible-equipment, *and, and* | | |
| **3.** | *Capable of operating on P25 Phase I trunked and/ or conventional (analog/ P25) systems, and* | | |
| **4.** | *Capable of operating on Public Safety spectrum at 136 to 174 MHz, and* | | |
| **5.** | *Capable of operating using Encryption Standard (AES-256).* | | |
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| **6.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
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**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |

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| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 1.7 Radio Sub-Category: Base Station/Repeater (P25)

**Sub-Category Description:** *P25 Phase I FDMA backwards compatible. Software – Defined Radio Architecture.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*RadioSubCategory-BaseStation-Repeater*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTSALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA standards for Public Safety Radio systems, and* | | **NO BID** |
| **2.** | *Current P25 CAP compliance found at the following link,* https://www.dhs.gov/science-and-technology/approved-grant-eligible-equipment, *and, and* | | |
| **3.** | *Capable of operating on P25 Phase I trunked and/ or conventional (analog/ P25) systems, and* | | |
| **4.** | *Capable of operating on Public Safety spectrum at 150 to 174 MHz, and* | | |
| **5.** | *Capable of operating using Encryption Standard (AES-256).* | | |
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| **6.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
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**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |

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| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## Exhibit B-1 Mandatory Technical Requirements

### 2. Radio Category: Conventional Analog Portable (Non-P25)

#### 2.1 Radio Sub-Category: Conventional Analog Portable (Non-P25)

**Sub-Category Description**: *Conventional Analog Portable radio. Minimum channel capacity of 4 transmit and 4 receive. Software – Defined Radio Architecture.*

***IMPORTANT NOTE:*** *Products in this sub-category may not qualify for federal funding.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*RadioSubCategory-ConventionalAnalogPortable*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

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***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS. ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** BK Technologies, Inc. **Product Model Name**: BKR 5000 **Product Number**: BKR5000-T3

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder's Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA-603-C standards for Public Safety Radio systems* | Y | |
| **2.** | *Code of Federal Regulations Title 47 Telecommunications Chapter I Federal Communications Commission Rules and regulations,* | Y | |
| **3.** | *Part 15 Radio Frequency Devices (47CFR15) Part 90, Private Land Mobile Radio Service (47CFR90).* | Y | |
| **4.**. | *Output* Power 1-5 Watts (adjustable minimum range) | Y | |
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| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | Y | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | Y | |
| **7.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | Y | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| KNG2/KNG2-P150, P400, P500, P800 | Port,G2,VHF,6W,5000Ch,136-174MHz; Port,G2,UHF,5W,5000Ch,380-470MHz; Port,G2,UHF,5W,5000Ch,440-520MHz; Port,G2,700/800,3W,5000Ch,764-870MHz |
| BKR/BKR5000-T1, BKR5000-T2 | BKR5000 Base Radio Unit Model I Top Display Only,No Keypad; BKR5000 Base Radio Unit Model II Top Display & Front Display, Nav Keypad |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* BK includes a standard warranty of 2 years on the radio at no charge. |

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| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* BK offers an extended warranty to 3 years on radio only. Must be purchased at same time as radio purchase. |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* BK offers an extended warranty to 5 years on radio only. Must be purchased at same time as radio purchase. |

### 2.2 Radio Sub-Category: Conventional Analog Mobile (Non-P25)

**Sub-Category Description:** *Conventional Analog Mobile Radio: Minimum channel capacity of 32 transmit and 32 receive. Software – Defined Radio Architecture.*

***IMPORTANT NOTE:*** *Products in this sub-category may not qualify for federal funding.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*RadioSubCategory-ConventionalAnalogMobile*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.
***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS. ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** BK Technologies, Inc. **Product Model Name**: KNG-M150 **Product Number**: KNG-M150

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder's Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA-603-C standards for Public Safety Radio systems* | Y | |
| **2.** | *Code of Federal Regulations Title 47 Telecommunications Chapter I Federal Communications Commission Rules and regulations,* | Y | |
| **3.** | *Part 15 Radio Frequency Devices (47CFR15) Part 90, Private Land Mobile Radio Service (47CFR90).* | Y | |
| **4.** | Output *Power* 2-30 Watts (adjustable minimum range) | | |
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| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | Y | |
| **5.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | Y | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | Y | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| KNG/KNG-M150R | Mobile,Digital,TrunkMount,VHF136-174MHz,5000Ch,50W; |
| KNG/KNG-M400, KNG-M400R; | Mobile,Digital,UHF,380-470MHz,5000Ch,50W; Mobile,Digital,TrunkMount,UHF,380-470MHz,5000Ch,50W; |
| KNG-M500, KNG-M500R | Mobile, Digital,UHF,440-520MHz,5000Ch,50W; Mobile,TrunkMount,Digital,UHF,440-520MHz,5000Ch,50W |
| KNG/KNG-M800, KNG-M800R | |

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* BK includes a standard warranty of 2 years on the radio at no charge. |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* BK offers an extended warranty to 3 years on radio only. Must be purchased at same time as radio purchase. |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* BK offers an extended warranty to 5 years on radio only. Must be purchased at same time as radio purchase. |

### 2.3 Radio Sub-Category: Conventional Analog Desktop (Non-P25)

**Sub-Category Description:** *Conventional Analog Desktop Radio: Minimum channel capacity of 32 transmit and 32 receive. Software – Defined Radio Architecture.*

***IMPORTANT NOTE:*** *Products in this sub-category may not qualify for federal funding.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled ["*RadioSubCategory-ConventionalAnalogDesktop*"]. For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** BK Technologies, Inc. **Product Model Name**: KNG-B150 **Product Number**: KNG-B150

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA-603-C standards for Public Safety Radio systems* | Y | |
| **2.** | *Code of Federal Regulations Title 47 Telecommunications Chapter I Federal Communications Commission Rules and regulations,* | Y | |
| **3.** | *Part 15 Radio Frequency Devices (47CFR15) Part 90, Private Land Mobile Radio Service (47CFR90).* | Y | |
| **4.** | Output *Power* 2-30 Watts (adjustable minimum range) | Y | |
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| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | Y | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | Y | |
| **7.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | Y | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| KNG/KNG-B400<br>KNG KNG-B500 | Base,Digital,UHF,380-470MHz,5000Ch,50W<br>Base,Digital,UHF,440-520 MHz,5000Ch,50W |
| KNG/KNG-B800 | Base,Digital,UHF, 763-870 MHz, 5000Ch,30/35W |
| KNG/KNG-M150 | KNG single band VHF mobile w/ additional power supply (not listed) |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* BK includes a standard warranty of 2 years on the radio at no charge. |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty". ".* BK offers an extended warranty to 3 years on radio only. Must be purchased at same time as radio purchase. |

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| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty". ".* BK offers an extended warranty to 5 years on radio only. Must be purchased at same time as radio purchase. |

### 2.4 Radio Sub-Category: Conventional Analog Base Station/Repeater (Non-P25)

**Sub-Category Description**: *Conventional Analog Base Station/Repeater: Minimum channel capacity of 4 transmit and 4 receive. Software – Defined Radio Architecture.*

***IMPORTANT NOTE:*** *Products in this sub-category may not qualify for federal funding.*

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled *"RadioSubCategory-ConventionalAnalogBaseStation-Repeater")*. For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***PROPOSED PUBLIC SAFETY RADIO EQUIPMENT MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS. ALL PROPOSED EQUIPMENT OF THE SUB-CATEGORY REQUIREMENTS BELOW ARE PASS/FAIL. PROPOSED EQUIPMENT NOT MEETING THE SUB-CATEGORY REQUIREMENTS WILL NOT BE FURTHER EVALUATED.***

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | *Current TIA/EIA-603-C standards for Public Safety Radio systems* | | **NO BID** |
| **2.** | *Code of Federal Regulations Title 47 Telecommunications Chapter I Federal Communications Commission Rules and regulations,* | | |
| **3.** | *Part 15 Radio Frequency Devices (47CFR15) Part 90, Private Land Mobile Radio Service (47CFR90).* | | |
| **4.** | *Output* Power 2-30 Watts (adjustable minimum range) | | |
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| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **7.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
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**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |

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| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## Exhibit B-1 Mandatory Technical Requirements

### 3. Category: Vehicular Repeater Systems (VRS) P25

**Category Description:** *Radio / Subcategory Description: Vehicular Repeater Systems (VRS) P25 Trunking capable, backwards compatible, (to analog conventional) and encryption capable. Personnel, while out of their vehicles, will use their existing portable radios to operate the VRS in the vehicle and provide communications with dispatch. The portable radio will activate the VRS which will function as a repeater and control the existing mobile radio in the vehicle. The mobile will provide communications with dispatch through existing base stations.*

The following specifications are the minimum target product requirements for this category of public safety communication equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled *"VRS"*). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**For bidding purposes, Bidders are to offer a model for the VHF (136-174MHz) band**.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **Transmitter** | | |
| 1.1. | Frequency Range (MHz) | **NO BID** | **NO BID** |
| 1.1.1. | Bidder's model identified above must be capable of being ordered in any of the following bands:<br>VHF (136-174MHz)<br>UHF (380-470MHz) Range1<br>UHF (450-520MHz) Range2<br>(769-775MHz) (799-805MHz)<br>(806-824MHZ) 851-869MHZ) | | |
| 1.2. | Rated RF Output Power minimum: adjustable range | | |
| 1.2.1. | VHF UHF 700/800 250 mW-2 Watts | | |
| 1.3. | Carrier Frequency Stability. (-30° to +60° C) - ±1.5 PPM | | |
| 1.4. | Modulation Limiting: | | |
| 1.4.1. | ±2.5 kHz (12.5 kHz) | | |
| 1.4.2. | ±4 kHz (NPSPAC) | | |
| 1.5. | FM Hum and Noise Ratio: 40 dB | | |

| | | | |
|---|---|---|---|
| 1.6. | Conducted Spurious Emissions: -50 dBc | | |
| 1.7. | Channel Spacing KHz: 12.5 | | |
| 1.8. | Time-Out-Timer, factory adjusted for one minute. The electronic transmission timer shall limit the duration of each VRS transmission, whether initiated locally or remotely. The timer shall be adjustable to time-out over the minimum range of 1 to 4 minutes. Interruption of the transmitter circuit shall cause the timer to reset within 100 milliseconds. | | |
| **2.** | **RECEIVER** | | |
| 2.1. | Frequency Range (MHz) Simplex | | |
| 2.1.1. | Bidder's model identified above must be capable of being ordered in any of the following bands:<br>VHF (136-174 MHz)<br>UHF( 380-470 MHz) Range 1<br>UHF(450-520 MHz) Range 2<br>(769-775 MHz) (799-805MHz)<br>(806-824MHz) (851-869MHz) | | |
| 2.2. | Reference Sensitivity: 0.35 uV | | |
| 2.3. | Carrier Frequency Stability. (-30° to +60° C) - ±1.5 PPM | | |
| 2.4. | Adjacent Channel Rejection @ 30kHz: 60dB | | |
| 2.5. | Spurious Response Rejection: 70dB (12.5KHz | | |
| 2.6. | Intermodulation Rejection: 60dB | | |
| **3.** | **USER MANUAL** | | |
| 3.1. | Operator Manual | | |
| 3.1.1. | Provide a hardcopy of the manual | | |
| 3.1.2. | Provide soft copy on digital media (CD, DVD or flash drive or web download). | | |
| 3.2. | Manual Contents | | |
| 3.2.1. | Location of all switches, controls and indicators. | | |
| 3.2.2. | Step-by-step instructions to operate all equipment features. | | |
| **4.** | **GENERAL REQUIREMENTS** | | |

| | | | |
|---|---|---|---|
| 4.1. | The VRS shall include all necessary cables and connectors to interface with the mobile radio of choice. The make and model of the mobile radio acquired on a separate bid and required to interface with the VRS, will be supplied within two weeks of purchase order issuance. | | |
| 4.2. | When the VRS is turned on it shall not automatically be placed in repeat mode. | | |
| 4.3. | Operational Requirements | | |
| 4.3.1. | Repeater Prioritizing Logic | | |
| 4.3.2. | Control logic in the VRS shall exist to enable multiple VRS units within range of each other to negotiate which of the VRS units will be the Master repeater unit for the group in order to prevent interference from multiple repeaters transmitting simultaneously. | | |
| 4.3.3. | When the repeat mode is activated, the VRS shall automatically rebroadcast the received signal from the mobile to the portable radios. | | |
| 4.3.4. | When the repeat mode is activated, the VRS shall automatically route the signal received from the portable to the mobile radio. The mobile radio shall then retransmit the signal to the mountain top base station. | | |
| 4.3.5. | If no other units are on the scene, the VRS will assume master status and repeat radio traffic as described above. | | |
| 4.3.6. | When additional units arrive on the scene and are activated, one VRS shall assume master status and all other VRS's shall automatically cease repeating radio traffic. | | |
| 4.3.7. | When the master VRS leaves the scene or is disabled, the remaining VRS's shall select another master by a method that results in only one VRS assigned master status. | | |
| 4.3.8. | If a unit arrives on the scene that is still in master status, then there shall be a method that results in only one of the master status VRS's assigned master status. | | |
| 4.3.9. | If the mobile radio in the master unit is keyed locally, the transmission shall be repeated to portable radios and the status of all VRS's shall be preserved. | | |

| | | | |
|---|---|---|---|
| **5.** | **PHYSICAL REQUIREMENTS** | | |
| 5.1. | The VRS configured for dash mount or trunk mount. | | |
| 5.2. | Controls | | |
| 5.2.1. | Controls mounted separately or included in the mobile control head as a user installable option. | | |
| 5.2.2. | Activate repeat mode. | | |
| 5.3. | Indicators | | |
| 5.3.1. | Indicators mounted separately or included in the mobile control head as a user installable option. | | |
| 5.3.2. | A repeat-mode-activated indicator. | | |
| **6.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
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| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

## Exhibit B-1 Mandatory Technical Requirements

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## Exhibit B-1 Mandatory Technical Requirements

### 4. Category: Dispatch Consoles

**Category Description:** *Dispatch Consoles, Radio Dispatch Console Systems*

The following specifications are the minimum target product requirements for this category/subcategory of public safety communication equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled *"DispatchConsole"*). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **Software-Based Dispatch Console System** | | |
| 1.1. | Software-Only operator position;-system/hardware does not require an external interface sub-system; console positions are connected on an IP network to communicate with other console positions and communicate with digital radios and IP gateways to analog radios. | **NO BID** | **NO BID** |
| 1.2. | Runs on current generation personal or desktop computer and current generation operating system. | | |
| 1.3. | Support for multiple monitors. | | |
| 1.4. | Programmable Graphical User Interface (GUI). | | |
| 1.5. | Support for Project-25 Digital Fixed Station Interface (DFSI) to connect digital base radios to IP network. | | |
| 1.6. | 16-key keypad for DTMF and other paging functions. | | |
| 1.7. | Per-line call history. | | |
| 1.8. | Instant Recall Recorder of last 10 minutes of select and un-select audio received. | | |
| 1.9. | Interface to speakers, microphones, headset adapter box, and foot switch. | | |
| 1.10. | Intercom between dispatch console positions. | | |
| 1.11. | Alert tones, multiple programmable. | | |
| 1.12. | ANI display and/or UID interface. | | |

| | | | |
|---|---|---|---|
| 1.13. | Display of selected functions or talkgroups on a dispatch console will be displayed on all associated consoles. | | |
| 1.14. | Support for Project-25 Digital Fixed Station Interface (DFSI) to connect digital base radios to IP network. | | |
| 1.15. | Radio to IP gateway device to connect analog base radios to IP network. | | |
| 1.16. | Console system with minimum 2 or more operator positions. | | |
| 1.17. | Console system with minimum 4 radio channels and/or 4call modules. | | |
| 1.18. | Capable of cross patching call modules together. | | |
| **2.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **3.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **4.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|

| | |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## 5. Category: Microwave Radio

### 5.1 Microwave Sub-Category: Carrier Grade, Packet data (Native IP)

**Sub-Category Description:** *Includes: Point-to-Point digital microwave radio equipment to operate on Part 101 licensed frequencies above 5925 MHz; available in all-indoor or split system , capable of space diversity, fixed or adaptive modulation,; providing native IP with minimum MTU size of 2048, capable of transporting emulated TDM, with high throughput capacity; supporting N+1 hot standby, and/or XPIC, and/or ring redundancy; along with required bandwidth management/ routing equipment and software; and with antennas, feedline systems, hardware (which may be from other manufacturers) to provide a complete system.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: 6 GHz microwave radio, all-indoor installation, space diversity, providing 150 Mbps data throughput, and 1+1 hot-standby. For evaluation purposes only, all antenna system components and hardware, and routing equipment provided by the customer.**

The following specifications and equipment configuration describes requirements for a target product Mission Critical Public Safety Equipment. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*MicrowaveSubCategory-Carrier Grade-PacketData-NativeIP*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Description** | | |
| 1.1. | Frequency Range: 5925 – 6425 MHz (Lower 6 GHz band) Plus 11 and 18 GHz Part 101 frequency bands | **NO BID** | **NO BID** |
| 1.2. | Radio Type: Packet Data (Native IP) | | |
| 1.3. | Link Throughput: 150 Mb per second data minimum | | |
| 1.4. | Operate on a 30MHz RF channel, at 128QAM. | | |
| 1.5. | Configuration: All-indoor or split system installation | | |
| 1.6. | Electrical Power: Customer Supplied -48 VDC | | |
| 1.7. | Licensing: Bidder to assume coordination and licensing successfully completed. | | |
| **2.** | **Technical Standards** | | |

| | | | |
|---|---|---|---|
| 2.1. | Frequency Tolerance: per FCC 101.107 | | |
| 2.2. | Channel Bandwidth: per FCC 101.109 | | |
| 2.3. | Emission limitations: per FCC 101.111 | | |
| 2.4. | Transmit Power: per FCC 101.113 | | |
| 2.5. | Operating Environment: per Telcordia GR-63 as applicable. | | |
| **3.** | **OPERATIONAL PARAMETERS** | | |
| 3.1. | Transmit RF Power: < 22 dBm optional > 30 dBm. | | |
| 3.2. | Should be Capable of Automatic TX Power Control. | | |
| 3.3. | Minimum Receive Threshold Level at TX/RX Unit Port: <-65dBm. | | |
| **4.** | **RESILIENCY AND PROTECTION** | | |
| 4.1. | 1+1 Hot Standby TX/RX plus Space Diversity. | | |
| **5.** | **NETWORK** | | |
| 5.1. | Interface: Copper Gig E Port or Optical Port. | | |
| 5.2. | Monitoring: SNMP Traps | | |
| **6.** | **SERVICE MANUALS** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **8.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION**<br>*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | | | |

## Exhibit B-1 Mandatory Technical Requirements

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 5.2 Microwave Sub-Category: Network Grade

**Sub-Category Description:** *Point-to-Point digital microwave radio equipment to operate on Part 101 licensed frequencies above 5925 MHz; capable of fix or adaptive modulation, RF power above +15 dBm; providing native packet data with high throughput capacity supporting emulated TDM over packet data; minimum MTU size of 2048; integrated or non-integrated antenna systems; along with required bandwidth management/routing equipment and software; and with antennas, feedline systems, hardware (which may be from other manufacturers) to provide a complete system.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: 11 GHz microwave radio, split indoor-outdoor installation, providing 100 Mbps raw data throughput, non-integrated antenna system. For purposes of evaluation only, all antenna system components and hardware, and routing equipment provided by the customer.**

The following specifications and equipment configuration describes requirements for the example products above. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font and labeled ["*MicrowaveSubcategory-NetworkGrade*"]. For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Description** | | |
| 1.1. | Frequency Range: 5925-6425 MHz (6 GHz band) 10.7 – 11.7 GHz (11 GHz band). | **NO BID** | **NO BID** |
| 1.2. | Radio Type: IP Packet. | | |
| 1.3. | Link Throughput: 100 Mb per second raw data. | | |
| 1.4. | Modulation & Bandwidth: as determined by bidder to achieve the specified link throughput. | | |
| 1.5. | Configuration: Split Indoor-Outdoor Installation. | | |
| 1.6. | Outdoor Mounting: feed location of antenna (antenna make and model shall be specified but not priced to provide equal comparison). | | |
| 1.7. | Electrical Power: Customer Supplied -48 VDC. | | |
| 1.8. | Licensing: Bidder to assume coordination and licensing successfully completed. | | |

| | | | |
|---|---|---|---|
| **2.** | **TECHNICAL STANDARDS** | | |
| 2.1. | Frequency Tolerance: per FCC 101.107 | | |
| 2.2. | Channel Bandwidth: per FCC 101.109 | | |
| 2.3. | Emission limitations: per FCC 101.111 | | |
| 2.4. | Transmit Power: per FCC 101.113 | | |
| 2.5. | Operating Environment: per Telcordia GR-63 and IEC 60721 class 4M5 IP67 as applicable. | | |
| **3.** | **OPERATIONAL PARAMETERS** | | |
| 3.1. | Transmit RF Power: >15 dBm minimum. | | |
| 3.2. | Should be Capable of Automatic TX Power Control. | | |
| **4.** | **NETWORK** | | |
| 4.1. | Interface: Copper Gig E Port or Optical Port. | | |
| 4.2. | Monitoring: SNMP Traps. | | |
| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **7.** | **SHIPPING REQUIREMENTS -** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION**<br>*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | | | |
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** | | |

| | |
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| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 5.3 Microwave Sub-Category: Native IP, Sub 5.925 GHz

**Sub-Category Description:** *Point-to-Point digital microwave radio equipment to operate on Part 15 unlicensed frequencies and on Part 90 and Part 101 licensed frequencies above 1 GHz and below 5.925 GHz; capable of RF power above +20 dBm; providing native packet data and analog interfaces; with mid to high throughput capacity; minimum MTU size of 2048; along with required bandwidth management/routing equipment and software.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Quantity one (1) Terminal – 4.9 GHz microwave radio, providing 20 Mbps data throughput.**

The following specifications and equipment configuration describes requirements for the example product above. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font and labeled ["*MicrowaveSubCategory-NativeIP-Sub5.925*"]. For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***Note:*** Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name:** Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Description** | | |
| 1.1. | Frequency Range: 4940 – 4990 MHz (4.9 GHz licensed public safety band). | **NO BID** | **NO BID** |
| 1.2. | Radio Type: Packet Data. | | |
| 1.3. | Link Throughput: >20 Mb per second data. | | |
| 1.4. | Modulation & Bandwidth: as determined by bidder to achieve the specified link throughput. | | |
| 1.5. | Outdoor Mounting: feed location of antenna (antenna make and model shall be specified but not priced to provide equal comparison). | | |
| 1.6. | Electrical Power: Customer Supplied -48 VDC. | | |
| **2.** | **Technical Standards** | | |

| | | | |
|---|---|---|---|
| 2.1. | Frequency Tolerance: per FCC 90.1201 through 90.1217 or most current standards. | | |
| 2.2. | Channel Bandwidth: per FCC 90.1201 through 90.1217 or most current standards. | | |
| 2.3. | Emission limitations: per FCC 90.1201 through 90.1217 or most current standards. | | |
| 2.4. | Transmit Power: per FCC 90.1201 through 90.1217 or most current standards. | | |
| 2.5. | Operating Environment: per Telcordia GR-63 as applicable and IEC 60721 class 4M5 IP67. | | |
| **3.** | **OPERATIONAL PARAMETERS** | | |
| 3.1. | Transmit RF Power: >15 dBm. | | |
| 3.2. | Manual Transmitter Power Adjustment. | | |
| **4.** | **NETWORK** | | |
| 4.1. | Interface: Interface should be capable of supporting copper Ethernet or Optical interface supporting IP. | | |
| 4.2. | Monitoring: SNMP Traps. | | |
| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **7.** | **SHIPPING REQUIREMENTS:** F.O.B. All Destinations. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION** | | | |

## Exhibit B-1 Mandatory Technical Requirements

| *(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 5.4 Microwave Sub-Category: Native IP, 900 MHz

**Sub-Category Description:** *Point-to-Point digital radio equipment to operate on Part 90 and Part 101 licensed frequencies below 3 GHz; capable of RF power above +25 dBm; providing native packet data with low throughput capacity; minimum MTU size of 2048; with digital and analog interfaces; along with antennas and associated hardware.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Quantity one (1) Terminal – 900 MHz digital radio, providing >300 Kbps data throughput.**

The following specifications and equipment configuration describes requirements for the example products above. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font and labeled ["*MicrowaveSubCategory-NativeIP-900*"]. For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Description** | | |
| 1.1. | Frequency Range: 928 - 960 MHz (900 MHz licensed OFS band with 9 MHz T-R split). | **NO BID** | **NO BID** |
| 1.2. | Radio Type: Packet Data. | | |
| 1.3. | Link Throughput: >300 Kb per second data. | | |
| 1.4. | Modulation & Bandwidth: as determined by bidder to achieve the specified link throughput. | | |
| 1.5. | Outdoor Mounting: feed location of antenna (antenna make and model shall be specified but not priced to provide equal comparison). | | |
| 1.6. | Electrical Power: Customer Supplied -48 VDC. | | |
| **2.** | **Technical Standards** | | |

| | | | |
|---|---|---|---|
| 2.1. | Frequency Tolerance: per FCC 101.107 or most current standards. | | |
| 2.2. | Channel Bandwidth: per FCC 101.109 or most current standards. | | |
| 2.3. | Emission limitations: per FCC 101.111 or most current standards. | | |
| 2.4. | Transmit Power: per FCC 101.113 or most current standards. | | |
| 2.5. | Operating Environment: per Telcordia GR-63 as applicable and IEC 60721 class 4M5 IP67 or most current Operating Environment standards. | | |
| **3.** | **OPERATIONAL PARAMETERS** | | |
| 3.1. | Transmit RF Power: >25 dBm. | | |
| 3.2. | TX Power Control Range: >15 dB Capability of manual transmitter power adjustment. | | |
| 3.3. | Optional N+1 redundancy and receive diversity. | | |
| **4.** | **NETWORK** | | |
| 4.1. | Interface: Capable of supporting copper Ethernet or Optical interface supporting IP. | | |
| 4.2. | Monitoring: SNMP Traps. | | |
| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **7.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION** | | | |

## Exhibit B-1 Mandatory Technical Requirements

| *(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 5.5 Microwave Radio Sub-Category: Carrier Grade, Native Time Division Multiplex (TDM)

**Sub-Category Description:** *Microwave Radios, Carrier Grade, TDM — includes: Point-to-Point digital microwave radio equipment to operate on Part 101 licensed frequencies above 5925 MHz; available in all-indoor or split system , capable of space diversity, fix or adaptive modulation; providing native TDM interface with high throughput capacity; supporting N+1 hot standby, and/or XPIC, and/or ring redundancy; along with required bandwidth management / routing equipment and software; and with antennas, feedline systems, hardware (which may be from other manufacturers) to provide a complete system.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Lower 6 GHz microwave radio, all-indoor installation, space diversity, providing three (3) DS-3 throughput, and 1+1 hot-standby. All antenna system components and hardware, and routing equipment provided by the customer.**

The following specifications and equipment configuration describes requirements for the example product above. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font and labeled ["*MicrowaveSubCategory-CarrierGrade-TDM*"]. For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Description** | | |
| 1.1. | Frequency Range: 5925 – 6425 MHz (Lower 6 GHz band) plus 11 and 18 GHz Part 101 frequency bands. | **NO BID** | **NO BID** |
| 1.2. | Radio Type: Native Time Division Multiplexed (TDM). | | |
| 1.3. | Link Throughput: Three(3) DS-3. | | |
| 1.4. | Operate on a 30MHz RF channel, at 128QAM. | | |
| 1.5. | Configuration: All-Indoor Installation. | | |
| 1.6. | Indoor Mounting: Customer supplied standard 19 inch wide — 84 inch tall equipment rack. | | |
| 1.7. | Electrical Power: Customer Supplied -48 VDC. | | |

| | | | |
|---|---|---|---|
| 1.8. | Licensing: Bidder to assume coordination and licensing successfully completed. | | |
| **2.** | **TECHNICAL STANDARDS** | | |
| 2.1. | Frequency Tolerance: per FCC 101.107. | | |
| 2.2. | Channel Bandwidth: per FCC 101.109. | | |
| 2.3. | Emission limitations: per FCC 101.111. | | |
| 2.4. | Transmit Power: per FCC 101.113. | | |
| 2.5. | Operating Environment: per Telcordia GR-63 as applicable. | | |
| **3.** | **OPERATIONAL PARAMETERS** | | |
| 3.1. | Transmit RF Power: >28 dBm, optional <30 dBm. | | |
| 3.2. | Should be Capable of Automatic TX Power Control. | | |
| 3.3. | Minimum Receive Threshold Level at TX/RX Unit Port: <-65dBm. | | |
| **4.** | **RESILIENCY AND PROTECTION** | | |
| 4.1. | 1+1 Hot Standby TX/RX plus Receive Diversity. | | |
| **5.** | **NETWORK** | | |
| 5.1. | Interface: Copper DS-3. | | |
| 5.2. | Monitoring: SNMP Traps. | | |
| 5.3. | Optional DS-3 to T1 Multiplex. | | |
| **6.** | **SERVICES MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for use by supporting technician. | | |
| **7.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |

| | | | |
|---|---|---|---|
| **8.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

| **ADDITIONAL PRODUCTS FOR CONSIDERATION**<br>*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |

| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
|---|---|
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## 6. Category: Interoperability Gateway Devices

**Category Definition:** *Devices that interface multiple radios, of multiple makes and models, to analog telephones, to IP telephone networks, and to other devices; allowing multiple simultaneous voice communications to facilitate incident interoperability between respondents equipped with otherwise incompatible technologies; fixed, mobile, and portable devices; analog, digital, or IP-based devices; along with associated firmware and software, interface devices, connecting cables, and accessories.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Quantity one (1) — IP Gateway Device Configured to Support a Mobile Command Post.**

The following specifications and equipment configuration describes requirements for the example product above. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled ["*Category-Interoperability-Gateway*"]. For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

***Note:*** Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Features** | | |
| 1.1. | The device creates a Local Interoperability System, linking devices such as radios, telephones, or satellite phones into a unified communications system. | **NO BID** | **NO BID** |
| 1.2. | The device shall be configured with software control, supporting remote radios, SIP devices, and connections to other Local Interoperability Systems. | | |
| 1.3. | The device shall be capable of interfacing any standard radio, as described above, to any analog or digital public telephone network (PSTN) or private branch exchange (PBX). | | |
| 1.4. | The device shall allow a minimum of four (4) cross-connect nets at one time (Talk-groups). | | |

| | | | |
|---|---|---|---|
| **2.** | **MOUNTING** | | |
| 2.1. | Customer supplied standard 19 inch equipment rack (84 inch tall). | | |
| **3.** | **POWER** | | |
| 3.1. | ~12 VDC from Customer supplied power system. | | |
| 3.2. | AC powered equipment shall be provided with an inverter to support operation on DC power. | | |
| **4.** | **CONTROLLER / OPERATING SYSTEM** | | |
| 4.1. | The Operating System shall use a current version Windows-based operating system to provide a user-friendly interface depicting system operations, allowing programming of features, and providing password protection of features. (Customer supplied PC.). | | |
| 4.2. | The Operating System shall allow connection or disconnection of any channel to any other channel. | | |
| 4.3. | The Operating System shall provide for the programming of all interface features, such as public telephone interface, SATCOM interface, cellular interface, and two-way radio interface. | | |
| 4.4. | The Operating System shall provide the ability to create and store specific interoperability response combinations for pre-planning. | | |
| 4.5. | All Call: the Operating System shall provide for a quick and easy broadcast of emergency messages over all channels simultaneously. | | |
| 4.6. | IP (RoIP) Interface. | | |
| 4.7. | RJ-45 connector. | | |
| 4.8. | 10/100 base-T Ethernet, 100 Mbps. | | |
| 4.9. | Audio delay and jitter buffers to handle network latency. | | |
| 4.10. | Embedded COR, PTT, and audio vocoder. | | |
| **5.** | **LOCAL OPERATOR CONTROL** | | |
| 5.1. | Local control to modify configuration or select from available stored configurations. | | |
| 5.2. | Local speaker, with volume control and speaker on/off. | | |
| 5.3. | Microphone input with PTT. | | |

| | | | |
|---|---|---|---|
| 5.4. | Headphone connection. | | |
| **6.** | **IP TELEPHONE (SIP) INTERFACE** | | |
| 6.1. | Standard: RFC 3261 or current modifications. | | |
| 6.2. | SIP Support Vocoders: GSM and G711u, with auto-detect/select if the primary codec is not available. | | |
| **7.** | **TONE REMOTE INTERFACE** (analog) | | |
| 7.1. | Standard: EIA tone remote. | | |
| 7.2. | RJ-11 jack or terminals. | | |
| 7.3. | Interface: selectable 2-Wire or 4-Wire, with selectable 600 ohm termination or hi-Z for parallel operation. | | |
| 7.4. | Levels: -20 dBm to +10 dBM, with AGC and/or compression to compensate for variations. | | |
| **8.** | **RADIO INTERFACES** | | |
| 8.1. | Bidder shall supply interface cables to connect a wide range of user radios to the Gateway system. | | |
| **9.** | **CONFIGURATION**: Bidder shall provide the following configuration a hypothetical mobile command post for a multi-agency event. (***See illustration below***) | | |
| 9.1. | Interface to one (1) Kenwood TK-5710-G conventional mobile radio. | | |
| 9.2. | Interface to one (1) Motorola XLT 5000 conventional mobile radio. | | |
| 9.3. | Interface to one (1) ICOM 9511T conventional mobile radio. | | |
| 9.4. | Interface to one (1) Motorola APX 6500 trunked mobile radio. | | |
| 9.5. | Interface to one (1) Relm-BK KNG-P150 conventional portable radio. | | |
| 9.6. | Interface to one (1) Codan/Daniels MT-4E base radio, which links to tactical repeaters. | | |
| 9.7. | Interface to one (1) SIP telephone. | | |
| 9.8. | Interface to one (1) Tone Remote external dispatch console. | | |
| **10.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |

| | | | |
|---|---|---|---|
| **11.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **12.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

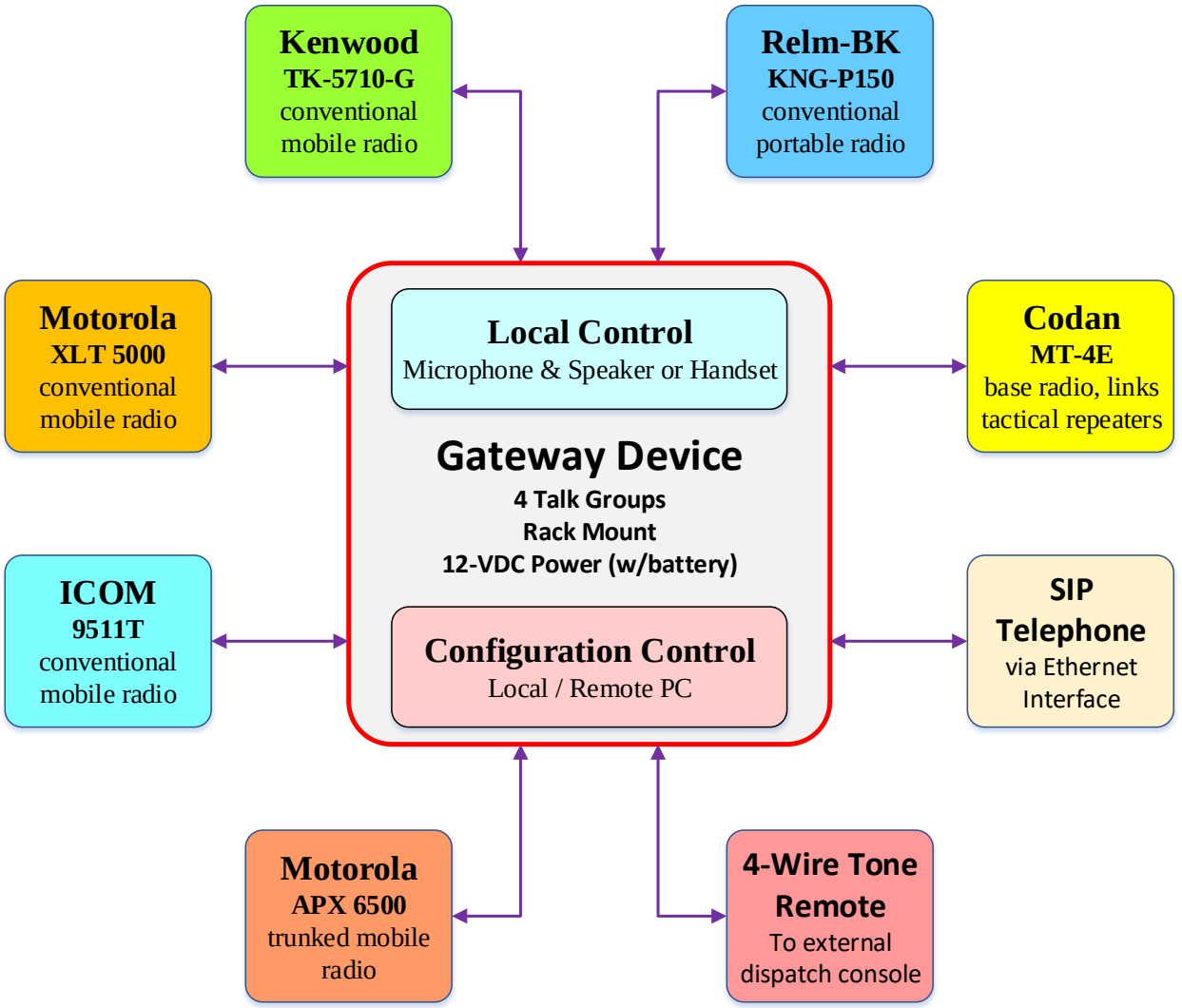
*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |


Kenwood
TK-5710-G
conventional
mobile radio
Relm-BK
KNG-P150
conventional
portable radio
Motorola
XLT 5000
conventional
mobile radio
Local Control
Microphone & Speaker or Handset
Codan
MT-4E
base radio, links
tactical repeaters
Gateway Device
4 Talk Groups
Rack Mount
12-VDC Power (w/battery)
ICOM
9511T
conventional
mobile radio
Configuration Control
Local / Remote PC
SIP
Telephone
via Ethernet
Interface
Motorola
APX 6500
trunked mobile
radio
4-Wire Tone
Remote
To external
dispatch console

## 7. CATEGORY: POWER SUPPLY PRODUCTS AND SOLUTIONS

***Instructions:*** *Responses to the Power Systems Solutions 7.1 and 7.2 will be captured in Exhibit B-2 System Solution Narratives. Bidder may submit a solution for either of the categories below. Each category will be evaluated and awarded separately.*

**7.1 DC POWER SYSTEM SOLUTIONS**

**7.2 VRLA (VALVE REGULATED LEAD ACID) BATTERY SYSTEMS SOLUTIONS**

### 7.3 Rack-Mounted Distribution Panels

**Sub-Category Description:** *Rack-Mounted Power Distribution Panels providing protected outputs.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Quantity one (1) — Rack-Mounted Power Distribution panel with six (6) protected outputs.**

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Requirements** | | |
| 1.1 | Rack mounting (19 in.) | **NO BID** | **NO BID** |
| 1.2 | Circuit protection (breakers with alarming for tripped breakers) | | |
| 1.3 | Buss bar power connections and returns | | |
| 1.4 | Voltage (12, 24, or 48 VDC) | | |
| **2.** | **Service Manual** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **3.** | **Warranty** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **4.** | **Shipping Requirements:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**Additional Products for Consideration**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| Product Model Name/Number | Description |
|---|---|
| | |

| | |
|---|---|
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 7.4 CONVERTERS/INVERTERS

#### 7.4.1 VOLTAGE CONVERTERS

**Sub-Category Description:** *Rack mounted DC to DC converters.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Quantity one (1) — Voltage Converter converting 48 VDC to 24 VDC output.**

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **GENERAL REQUIREMENTS** | | |
| 1.1 | Rack-mounted | **NO BID** | **NO BID** |
| 1.2 | Capable of converting: | | |
| 1.2.1 | 12 VDC to 24 VDC or 48 VDC | | |
| 1.2.2 | 24 VDC to 12 VDC or 48 VDC | | |
| 1.2.3 | 48 VDC to 12 VDC or 24VDC | | |
| 1.3 | Minimum output (10 amps) | | |
| **2.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **3.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **4.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION** | | | |

## Exhibit B-1 Mandatory Technical Requirements

| *(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 7.4.2 INVERTERS

**Sub-Category Description:** *Rack mounted DC to AC inverters.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Quantity one (1) — Voltage Inverter converting 48 VDC to 120 VAC output.**

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **GENERAL REQUIREMENTS** | | |
| 1.1 | Rack-mounted | **NO BID** | **NO BID** |
| 1.2 | Capable of converting: | | |
| 1.2.1 | 12 VDC to 120 VAC or 240 VAC | | |
| 1.2.2 | 24 VDC to 120 VAC or 240 VAC | | |
| 1.2.3 | 48 VDC to 120 VAC or 240 VAC | | |
| 1.3 | Minimum output (5 amps) | | |
| **2.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **3.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **4.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION**<br>*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | | | |

## Exhibit B-1 Mandatory Technical Requirements

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## 8. CATEGORY: TEST EQUIPMENT

### 8.1 TEST EQUIPMENT SUB-CATEGORY: MULTIFUNCTION RADIO TEST SET

**Sub-Category Definition:** *Specialized high-accuracy multi-function test instrument for the testing of two-way radios. Includes: portable instruments, rugged field service instruments, laboratory instruments, along with related test adapters and accessories.*

**For evaluation purposes, all Bidders must offer a product meeting the following example product: Quantity one (1) — Compact multifunction instrument for testing and alignment of two-way radios (AKA: Radio Service Monitor).**

The following specifications and equipment configuration describes requirements for the example products above. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled "*TestEquipSubCategory-Multifunction-Radio-Test-Set*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **SUMMARY OF FUNCTIONS** | | |
| 1.1. | AM/FM/P-25 Monitor | **NO BID** | **NO BID** |
| 1.2. | AM/FM/P-25 Generator | | |
| 1.3. | Duplex Generator | | |
| 1.4. | Signal Strength Meter | | |
| 1.5. | RF Power Meter | | |
| 1.6. | Spectrum Analyzer | | |
| 1.7. | Tracking Generator | | |
| 1.8. | RF Cable Fault Locator | | |
| 1.9. | RF Frequency Counter | | |
| 1.10. | Frequency Error Meter | | |

| | | | |
|---|---|---|---|
| 1.11. | AM Modulation Meter | | |
| 1.12. | FM Deviation Meter | | |
| 1.13. | SINAD/Distortion Meter | | |
| 1.14. | Audio Synthesizer | | |
| 1.15. | Oscilloscope | | |
| 1.16. | Digital Voltmeter | | |
| **2.** | **TIME-BASE** | | |
| 2.1. | Temperature Stability = ±0.15 ppm at -20° C to 70° C | | |
| 2.2. | Aging = 0.5 ppm First Year / 0.3 ppm After First Year | | |
| **3.** | **RF GENERATOR (RECEIVER TEST)** | | |
| 3.1. | Port Input Protection | | |
| 3.1.1. | GEN Port: +20 dBm (Input Power Alarm Typical) | | |
| 3.1.2. | T/R Port: +49 dBm CW (Input Power Alarm Typical) | | |
| 3.1.3. | T/R Port: >+90° C (Temperature Alarm Typical) | | |
| 3.2. | Frequency | | |
| 3.2.1. | Range = 2 MHz to 1000 MHz | | |
| 3.2.2. | Accuracy = Same as time-base | | |
| 3.3.3. | Resolution = 1 Hz | | |
| 3.3. | Output Level. | | |
| 3.3.1. | Range<br>– T/R Port: -50 to -125 dBm<br>– GEN Port: -5 to -65 dBm | | |
| 3.3.2. | Accuracy = +-2 dB or better. | | |
| 3.3.3. | Resolution = 1 dB | | |
| 3.4. | Signal Purity | | |
| 3.4.1. | Port VSWR < 1.5:1 (all ports) | | |
| 3.4.2. | SSB Phase Noise = -90 dBc/Hz at 20 kHz offset | | |
| 3.4.3. | Spurious<br>– Harmonics = -20 dBc maximum,<br>– Non-Harmonics = -35 dBc maximum<br>(±20 kHz offset from carrier; 0 to 1 GHz) | | |

| | | | |
|---|---|---|---|
| 3.4.4. | Residual FM<br>– <20 Hz rms in 300 Hz to 3 kHz BW<br>– | | |
| 3.4.5. | Residual AM <1% rms in 300 Hz to 3 kHz BW | | |
| 3.5. | Modulation Types | | |
| 3.5.1. | 1 kHz Tone | | |
| 3.5.2. | Private Line | | |
| 3.5.3. | Digital Private Line (w/ DPL Invert) | | |
| 3.5.4. | Single Tone | | |
| 3.5.5. | DTMF | | |
| 3.5.6. | Paging - Two-Tone & 5/6 Tone | | |
| 3.5.7. | External microphone & input connector | | |
| 3.6. | FM Modulation | | |
| 3.6.1. | Deviation Range = 0 to 75 kHz | | |
| 3.6.2. | Total Harmonic Distortion < 3% | | |
| 3.6.3. | Resolution < 10 Hz | | |
| 3.6.4. | Accuracy < ±10% (2 kHz to 50 kHz deviation) | | |
| 3.7. | AM Modulation | | |
| 3.7.1. | Range = 0 to 90% | | |
| 3.7.2. | Resolution < 1% | | |
| 3.7.3. | Total Harmonic Distortion < 3% (20% to 90% mod) | | |
| 3.7.4. | Accuracy < 10% of setting (20% to 90% mod) | | |
| **4.** | **RF RECEIVER (TRANSMITTER TEST)** | | |
| 4.1. | Port Input Protection | | |
| 4.1.1. | ANT Port: +20 dBm (Input Power Alarm Typical) | | |
| 4.1.2. | T/R Port: +49 dBm CW (Input Power Alarm Typical) | | |
| 4.1.3. | T/R Port: >+90° C (Temperature Alarm Typical) | | |
| 4.2. | Frequency | | |
| 4.2.1. | Range = 2 MHz to 1000 MHz | | |
| 4.2.2. | Accuracy = Same as Time-base | | |

| | | | |
|---|---|---|---|
| 4.2.3. | Resolution = 1 Hz | | |
| 4.3. | Input Amplitude | | |
| 4.3.1. | Sensitivity with pre-amplifier<br>– ANT: -110 dBm for 10 dB SINAD<br>– T/R: -40 dBm for 10 dB SINAD | | |
| 4.3.2. | Minimum Level Receiver Measurements with pre-amplifier<br>– ANT: -80 dBm for RF Error Meter<br>– T/R: -40 dBm for RF Error Meter | | |
| 4.3.3. | DEMOD Meters<br>– Modulation<br>– Distortion<br>– SINAD<br>– AF Counter | | |
| 4.4. | IF Bandwidth | | |
| 4.4.1. | FM:<br>– 6.25 kHz to 25 kHz<br>– | | |
| 4.4.2. | AM:<br>– 6.25 kHz to 25 kHz<br>– | | |
| 4.5. | RF Frequency Error Meter | | |
| 4.5.1. | Units = Hz, PPM | | |
| 4.5.2. | Range = ±200 kHz, ±1000 PPM | | |
| 4.5.3. | Resolution = 1 Hz | | |
| 4.5.4. | Accuracy = Time-base ±1 Hz | | |
| 4.6. | RF Power Meter (RF Power Into T/R Port) | | |
| 4.6.1. | Maximum Input Level = 50 Watts continuous | | |
| 4.6.2. | Input RF Power Alarm = +49 dBm | | |
| 4.6.3. | Temperature Alarm > +90° C | | |
| 4.6.4. | Meter Range = +20 to +53 dBm | | |
| 4.6.5. | Display Units = Watts, dBm | | |
| 4.6.6. | Resolution = 0.01 W, 0.1 dBm | | |

| | | | |
|---|---|---|---|
| 4.6.7. | Accuracy < 10% of reading | | |
| 4.7. | FM Deviation Meter | | |
| 4.7.1. | Range = ±500 Hz to +- 75 Hz | | |
| 4.7.2. | Meter Type = Peak+, Peak-, (Peak-Peak)/2, RMS | | |
| 4.7.3. | Resolution = 0.1 Hz | | |
| 4.7.4. | Accuracy < ±5% of reading, 1 kHz to 10 kHz Dev. | | |
| 4.8. | AM Percent Meter | | |
| 4.8.1. | Range = 5% to 100% | | |
| 4.8.2. | Meter Type = Peak+, Peak-, (Peak-Peak)/2, RMS | | |
| 4.8.3. | Resolution = 0.1% | | |
| 4.8.4. | Accuracy = ±5% of reading | | |
| 4.9. | SINAD Meter | | |
| 4.9.1. | Measurement Sources = Audio IN, DEMOD | | |
| 4.9.2. | Audio Frequency Notch = 1 kHz | | |
| 4.9.3. | Reading Range = 0 dB to 60 dB | | |
| 4.9.4. | Resolution = 0.1 dB to .0.1 dB | | |
| 4.9.5. | Accuracy < ±1.5 dB, | | |
| 4.10. | Distortion Meter | | |
| 4.10.1. | Measurement Sources = AUD IN, DEMOD | | |
| 4.10.2. | Audio Frequency Notch = 1 kHz | | |
| 4.10.3. | Reading Range = 0% to 100% | | |
| 4.10.4. | Resolution = 0.1% | | |
| 4.10.5 | Accuracy = ±10% of reading | | |
| 4.11. | Audio Frequency Counter | | |
| 4.11.1. | Measurement Sources = AUD IN, DEMOD | | |
| 4.11.2. | Frequency Range = 15 Hz to 20 kHz | | |
| 4.11.3. | Resolution = 0.1 Hz | | |
| 4.11.4. | Accuracy < ± 1 Hz | | |
| 4.12. | Audio Frequency Level Meter | | |

| | | | |
|---|---|---|---|
| 4.12.1. | Measurement Sources = AUD IN, SCOPE | | |
| 4.12.2. | Input Range =<br>– Audio In Range = 3 V, 30 V<br>– Scope Range = 2 VDC, 40 VDC | | |
| 4.12.3. | Frequency Range = 200 Hz to <5 kHz | | |
| | – | | |
| 4.12.5. | Accuracy < ±5% AUD IN Port | | |
| 4.13. | Oscilloscope | | |
| 4.13.1. | Source = SCOPE, AUD IN, DEMOD | | |
| 4.13.2. | Bandwidth = 5 kHz | | |
| 4.14. | Digital Multimeter (DMM) | | |
| 4.14.1. | Functions<br>– AC/DC Voltmeter<br>– | | |
| | | | |
| 4.14.3. | Accuracy < ±5% AC, < ±2% DC | | |
| 4.15. | Power | | |
| 4.15.1. | AC adapter and/or a vehicle adapter. | | |
| 4.15.2. | DC Input Voltage Range = 12 to 32 VDC (12-24 nominal) | | |
| 4.15.3. | Battery Power, with full display backlight and field swappable. | | |
| 4.15.4 | Battery Recharge, with unit on = 4 hours or less | | |
| 4.16. | Environmental — tested in accordance with MIL-PRF-28800F, Class 3 | | |
| 4.16.1. | Storage Temperature = -20° C to +60° C with battery | | |
| 4.16.2. | Operating Temperature = 0°C to +40°C with battery | | |
| 4.16.3. | Operating Relative Humidity = 5% to 80% | | |
| 4.16.4. | Operating Altitude = up to 10,000 feet | | |
| 4.16.5. | Shock = 30 G (Functional Shock) | | |
| 4.16.6. | Vibration = 5 to 500 Hz random vibrations | | |
| 4.17. | Physical | | |

| | | | |
|---|---|---|---|
| 4.17.1. | Dimensions = less than 14 in x 12 in x 8 in (width x height, depth) | | |
| 4.17.2. | Weight = less than 20 pounds | | |
| 4.17.3. | Case = Hard transit case | | |
| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **7.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |

| | |
|---|---|
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 8.2 Test Equipment Sub-Category: Specialized RF Instruments

**Sub-Category Definition:** *Specialized high-accuracy radio frequency instrument for the analysis of radio systems. Includes: Signal generators, signal analyzers, spectrum analyzers, vector network analyzers, power meters, antenna measurement instruments; and related specialized instruments, configured as portable instruments, rugged field service instruments, laboratory instruments; along with related test adapters and required accessories.*

**Example Product: Quantity one (1) — Portable & Spectrum Analyzer — a field instrument for the analysis of RF systems and the identification of interference.**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12-point font labeled *"ExhibitB1-TestEquipment8.2").* For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **Physical /Environmental** | | |
| 1.1. | Dimensions: < 12" x 12" x 4" | NO BID | NO BID |
| 1.2. | Weight: < 8 lbs | | |
| 1.3. | Transit Shock/Drop: MIL-PRF-28800F Class 2 | | |
| 1.4. | Operating Temperature: -10°C to +55°C | | |
| 1.5. | Operating Altitude: > 12,000 feet | | |
| 1.6. | RF Port Connectors: Type N, Female, 50 ohm | | |
| 1.7. | RF Input: > +20 dBm (100 mw) | | |
| **2.** | **Power** | | |
| 2.1. | External AC: 110/220 V nominal | | |
| 2.2. | External DC = 12 V nominal | | |
| 2.3. | Internal Battery > 3 hours run time | | |

| | | | |
|---|---|---|---|
| **3.** | **USER INTERFACE** | | |
| 3.1. | Display:<br>– > 6.5" flat panel,<br>– Daylight viewable,<br>– 99.999% good pixels. | | |
| 3.2. | Intuitive User menus | | |
| 3.3. | Help files accessible from the user screen | | |
| 3.4. | PC Interface to configure and access files | | |
| 3.5. | Output files in standard format (PDF, DOC, etc.) | | |
| 3.6. | Data Interface: USB port | | |
| 3.7. | Data Storage, Internal: > 150 traces & settings | | |
| 3.8. | Data Storage, External: USB device capacity > 16GB | | |
| **4.** | **SPECTRUM ANALYZER** | | |
| 4.1. | Frequency Range: > 100 kHz to 3.0 GHz | | |
| 4.2. | Reference Aging: ±1 ppm / year | | |
| 4.3. | Tuning Resolution: 1 Hz | | |
| 4.4. | Spectral Purity: < –85 dBc @ 30 kHz | | |
| 4.5. | Sweep Time: 2.0 s, full span; 1 ms, zero span | | |
| 4.6. | Resolution Bandwidth: 100 Hz to 1 MHz RBW | | |
| 4.7. | Video Bandwidth: 10 Hz to 300 kHz VBW | | |
| 4.8. | Amplitude Accuracy: < ± 1.5 dB | | |
| 4.9. | Dynamic Range: > 60dB, intermod-free | | |
| 4.10. | Noise Floor: -135 dBm | | |
| **5.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |

| | | | |
|---|---|---|---|
| | Provide additional warranty options below. | | |
| **7.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

| **ADDITIONAL PRODUCTS FOR CONSIDERATION**<br>*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |

| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
|---|---|
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## Exhibit B-1 Mandatory Technical Requirements

### 9. Category: Monitoring & Alarm Equipment

#### 9.1 Monitoring & Alarm Sub-Category: Environmental

**Sub-Category Definition:** *Automated communication systems for collecting and transmitting environmental data for emergency notification (fire, flood, volcanic eruption, tsunami, etc.), along with all associated hardware, software, and accessories to complete and maintain the system.*

**Example Product: Quantity one (1) — Remote Automated Weather Station (RAWS) per NFDRS Standards**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled *"ExhibitB1-Monitoring-9.1").* For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | Remote Automatic Weather Station should include the following: National Fire Danger Rating System NFDRS Remote automated Weather Station (RAWS) per National Wildfire Coordination Group standard PMS 426-3. | **NO BID** | **NO BID** |
| **2.** | Dedicated Data Acquisition System for AWS. (data logger). | | |
| **3.** | The data logger should have battery-backed SRAM for CPU usage, program storage, and data storage for up to at least one million data values with upgradeable memory size at a later date without any hardware replacements and with inherent noise reducing facility. It should be compatible with 12VDC power supply and should have programming and math functions capability for deriving calculated parameters with high program execution rate of up to 100 Hz for making fast measurements. It should have ability | | |

| | | | |
|---|---|---|---|
| | to implement conditional statements in the data logger programming. The Histogram instruction is required to process input data as either a standard histogram (frequency distribution) or a weighted value histogram. It should be possible to calculate the standard deviation of the Source over the output interval and store the results in a Data Table. The data logger should have ability to reject the 50Hz noise for accurate measurements. Special Software with Data logger should be provided to monitor various sensors. | | |
| **4.** | **SOFTWARE:** Special Software should be provided with Data logger to monitor various sensors. | | |
| **5.** | **RANGE AND AUTO RANGING:** Support of +/-5VDC range and should have auto ranging facility apart from making measurements on following ranges specific to a channel: e.g., ±5000 mv, ±2500 mv, ±250 mv, ±25 mv, ±7.5 mv, ±2.5 mv, with resolution on the most sensitive range better than 0.5 microvolt. | | |
| **6.** | **SWITCHED VOLTAGE EXCITATIONS:** The system should have switched outputs provided for precision excitation voltages. | | |
| **7.** | **DIGITAL I/O PORTS:** Minimum eight ports should be provided for frequency measurements, digital control, and triggering. | | |
| **8.** | **SWITCHED 12 VOLT:** Two independent 12 V unregulated sources switched on & off under program control. | | |
| **9.** | **OPERATING TEMPERATURE RANGE:** -55° to +50°C | | |
| **10.** | **ENCLOSURE:** The data logger should be housed in a weatherproof enclosure of NEMA-IV rating. | | |
| **11.** | **POWER SUPPLY:** Charger/Regulator 12VDC | | |
| **12.** | **WALL ADAPTOR:** AC-DC 120 VAC TO 18 VDC | | |
| **13.** | **CORD WITH TYPE-C PLUG** | | |
| **14.** | **BATTERY:** 12V 7AH (minimum) | | |
| **15.** | **SENSORS:** (All sensors should be compatible with data logger, include mounting hardware and have a cable sufficient to allow mounting, and Operating Temperature: (40° to +60°C). | | |
| **16.** | **AIR TEMPERATURE & RELATIVE HUMIDITY SENSOR COMBINED** | | |

| | | | |
|---|---|---|---|
| 16.1. | Relative Humidity Measurement Range:0 to 100% RH, non-condensing. | | |
| 16.2. | Output Signal Range: 0 to 2 V dc max. | | |
| 16.3. | Typical Long-Term Stability: Better than 1% RH per year | | |
| 16.4. | Voltage: 12 V dc Nominal or equivalent | | |
| 16.5. | Current Consumption: max 4 mA | | |
| 16.6. | PRT based Measurement Range: -40° to +60°C | | |
| 16.7. | Output signal range: 0 to 1.0 V | | |
| **17**. | **ATMOSPHERIC PRESSURE SENSOR:** | | |
| 17.1. | Pressure Range 600 to 1100 hPa (mbar) | | |
| 17.2. | Operating Temperature -50 to +60°C Accuracy at least ±0.5 hPa (mbar) at -50 to +60°C. | | |
| **18.** | **SOLAR RADIATION SENSOR:** - Pyranometer based | | |
| 18.1. | Light Spectrum Waveband: 400 to 1100 nm | | |
| 18.2. | Sensitivity: Typically 80 per1000 | | |
| 18.3. | Wm-2 Linearity: Maximum deviation of 1% up to 3000 W m-2 Accuracy: ±5% | | |
| 18.4. | Tipping Bucket Rain Gauge | | |
| 18.5. | Tips at 0.1 mm increments (0.004 in) Orifice diameter is max 24.5 cm (9.66 in) Accuracy is ±1% at rates up to 1 in per hr. | | |
| 18.6. | Output: Momentary switch closure activated by tipping bucket mechanism. | | |
| 18.7. | Environmental Limits: Temperature: 0° to +50°C and Humidity: 0 to 100% The bucket should have leveling arrangement for horizontal mounting. | | |
| **19.** | **WIND SPEED AND DIRECTION SENSOR:** (Identify type, i.e. propeller, ultrasonic, etc.) (The sensor should be made out of rigid UV-stabilized thermoplastic with corrosion proof stainless steel and anodized aluminum fittings. The sensor should have stainless steel precision-grade ball bearings for the propeller shaft and vertical shaft bearings). | | |
| 19.1. | Wind Speed Range: 0-100 m/s | | |

| | | | |
|---|---|---|---|
| 19.2. | Accuracy: ±0.3 m s | | |
| 19.3. | Starting threshold: 1.0 m/s | | |
| 19.4. | Wind Direction Range: 0-360° | | |
| 19.5. | Accuracy: ±3° Starting threshold: 1.1 m/s | | |
| 19.6. | Damping ratio: max 0.25 Output: Analog dc voltage from potentiometer linearity 0.25% | | |
| **20.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **21.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options below. | | |
| **22.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
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| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |

| | |
|---|---|
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 9.2 Monitoring & Alarm Sub-Category: Radio Network

**Sub-Category Definition:** *IP and analog radio network monitoring software & hardware, SCADA software & hardware, SNMP manager and agent software & hardware, remote terminal units (RTU), RF and radio site sensors.*

**Example Product: Quantity one (1) — Hypothetical radio system monitoring (RSM) configuration.**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled *"ExhibitB1-Monitoring9.2").* For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1**. | **Overall Specification** | | |
| 1.1. | The RSM shall provide indications, alarms and status of the equipment and systems being monitored that facilitate timely, precise interpretation of abnormal or failed conditions within the radio network | **NO BID** | **NO BID** |
| 1.2. | The RSM shall consist of (a) server software {physical or virtual servers}, (b) IP and analog transmission paths, and (c) interfaces to remote equipment and/or sensors. | | |
| 1.3. | The RSM shall integrate into a single unified system alarm and status messages from multiple types of equipment from multiple manufacturers — such as radio repeaters, microwave radios, IP switches, power supplies, solar controllers, generators, HVAC equipment, and access control systems. | | |
| 1.4. | The RSM shall be designed to minimize the loss of status, alarm, and event messages during transmission to the server. | | |

| | | | |
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| 1.5. | The RSM shall easily configured and expanded to accommodate additional inputs and monitored sites. | | |
| **2.** | **RSM SERVER** | | |
| | The RSM server software shall operate on a virtual-server environment. (Customer supplied and managed server). | | |
| | The RSM server shall operate within the network security and antivirus requirements of the customer agency. (Customer supplied and managed firewall and antivirus). | | |
| 2.3. | The RSM server shall support multiple simultaneous access to status and alarm information. | | |
| 2.3.1. | Interface via a PC client for configuration and monitoring. | | |
| 2.3.2. | Interface via web client for access to monitoring. | | |
| 2.3.3. | Interface via smart phone application for access to monitoring. | | |
| 2.4. | The RSM server shall support multiple password protected user accounts to manage system access. | | |
| 2.4.1. | Control access to (a) specific monitored equipment, (b) specific types of groups of equipment, or (c) specific sites, or (d) any combination. | | |
| 2.4.2. | Provide multiple levels of access: (a) view only, (b) view and remote control, (c) view, remote control, and configure. | | |
| 2.5. | The RSM server software shall record and process alarm and status data according to individualized and categorized scripts, which include: severity of alarm, time of day, season, and on-call duty assignments. | | |
| 2.5.1. | RSM software shall provide logs of monitored parameters, alarms, and alarm responses. (Log capacity not specified; assumed to be a server capacity issue). | | |
| 2.6. | The RSM server shall provide external messaging in response to alarm and status data: | | |
| 2.6.1. | Messaging via SMTP (email) | | |
| 2.6.2. | Messaging via SMS (text) | | |
| 2.6.3. | Messaging via SNMP traps (to other systems). | | |
| 2.6.4. | Messaging via SIP phone (voice messages). | | |

| | | | |
|---|---|---|---|
| 2.7. | The RSM server shall provide response escalation, sending additional messages and including additional recipients if the required acknowledgment is not received in the defined response time. | | |
| 2.8. | The RSM configuration shall be expandable to accommodate future additional sites and monitor inputs. | | |
| **3.** | **HYPOTHETICAL RADIO SYSTEM —** The hypothetical radio system consists of a central dispatch center and two radio sites, with a separate radio shop that maintains the radio system. | | |
| **4.** | **RADIO SHOP —** located on the same campus and with IP network connectivity to, the Dispatch Center. The radio shop has the following resources that shall be integrated into RSM: | | |
| 4.1. | PC workstation (customer supplied) dedicated to configuration and monitoring of RSM. | | |
| 4.2. | Test radio for evaluation and maintenance of the radio system. RSM shall be configured to provide off-site access to the test radio for radio system evaluation as follows: | | |
| 4.2.1. | Channel Change, via four separate contact closures to steer channel selection. | | |
| 4.2.2. | PTT, via contact closure | | |
| 4.2.3. | Transmit Indicator (TX) | | |
| 4.2.4. | Receive Signal Strength Indicator (RSSI) | | |
| **5.** | **DISPATCH CENTER** — site is AC powered with backup generator, UPS, and DC power system. RSM shall monitor the following equipment and test points: | | |
| 5.1. | Backup Generator, which communicates using MODBUS protocol. RSM shall display the following: (all sensors provided as part of generator). | | |
| 5.1.1. | Fuel Level | | |
| 5.1.2. | Engine Temperature | | |
| 5.1.3. | Oil Pressure | | |
| 5.1.4. | Output Voltage | | |
| 5.1.5. | Output Current | | |

| | | | |
|---|---|---|---|
| 5.2. | Uninterruptible Power System, which communicates using SNMP. RSM shall display the following: | | |
| 5.2.1. | Incoming AC Line Voltage | | |
| 5.2.2. | Output AC line voltage | | |
| 5.2.3. | Output AC load | | |
| 5.3. | 12VDC Power System with battery backup. RSM shall display the following: | | |
| 5.3.1. | Output DC voltage | | |
| 5.3.2. | Output DC current | | |
| 5.3.3. | Battery Load Current (0-30 A) | | |
| 5.4. | Equipment Room Sensors | | |
| 5.4.1. | Room Temperature Sensor | | |
| 5.4.2. | Door Alarm (contact closure, customer supplied) | | |
| 5.4.3. | Room smoke alarm (contact closure, customer supplied) | | |
| 5.5. | Codan MT-4E base radio, which provides analog link to radio #1 at site #1. RSM shall display the following: | | |
| 5.5.1. | Transmit Indicator (TX) | | |
| 5.5.2. | Receive Signal Strength Indicator (RSSI) | | |
| 5.5.3. | Forward & Reflected RF Power — taken from an antenna line sensor installed at the output of filter cavities and circulators. | | |
| 5.6. | IP Microwave to Radio Site #2, which communicates using SNMP. RSM shall report alarm indications provided by the SNMP. | | |
| **6.** | **RADIO SITE #1 —** Site is a solar powered with 12 VDC power system. Site communicates with Dispatch Center via analog radio. RSM shall monitor the following equipment and test points: | | |
| 6.1. | MorningStar Pro-Star solar power controller. RSM shall display the following: | | |
| 6.1.1. | Solar Array Voltage (0-150 V) | | |
| 6.1.2. | Output Voltage (nominal 12 V) | | |
| 6.1.3. | Charge Current (0-30 A) | | |
| 6.1.4. | Battery Load Current (0-30 A) | | |

| | | | |
|---|---|---|---|
| 6.2. | Building Alarms | | |
| 6.2.1. | Room Temperature Sensor | | |
| 6.2.2. | Door Alarm (contact closure, customer supplied) | | |
| 6.2.3. | Smoke Alarm (contact closure, customer supplied) | | |
| 6.2.4. | Water Intrusion Alarm (contact closure, customer supplied) | | |
| 6.3. | Codan MT-4E repeater radio. RSM shall display the following: | | |
| 6.3.1. | Transmit Indicator (TX) | | |
| 6.3.2. | Receive Signal Strength Indicator (RSSI) | | |
| 6.3.3. | Forward & Reflected RF Power — antenna line sensor installed at the output of filter cavities and circulators, which provides RS232 and Ethernets port – UDP/IP or SNMP interfaces (customer supplied) | | |
| 6.4 | RSM shall also provide capability to detect faults at remote site and to automatically reset, reboot or start backup site equipment without external user intervention. | | |
| **7.** | **RADIO SITE #2** — Site is AC powered with 12 VDC and 48 VDC power systems. Site communicates with Dispatch Center via Ethernet microwave. RSM shall monitor the following equipment and test points: | | |
| 7.1. | Backup Generator, which communicates using MODBUS protocol. RSM shall display the following: (all sensors provided as part of generator) | | |
| 7.1.1. | Fuel Level | | |
| 7.1.2. | Engine Temperature | | |
| 7.1.3. | Oil Pressure | | |
| 7.1.4. | Output Voltage | | |
| 7.1.5. | Output Current | | |
| 7.2. | +12VDC Power System with battery backup. RSM shall display the following: | | |
| 7.2.1. | Output DC voltage | | |
| 7.2.2. | Output DC current | | |
| 7.2.3. | Battery Load Current (0-60 A) | | |

| | | | |
|---|---|---|---|
| 7.3. | -48VDC Power System with battery backup. RSM shall display the following: | | |
| 7.3.1. | Output DC voltage | | |
| 7.3.2. | Output DC current | | |
| 7.3.3. | Battery Load Current (0-60 A) | | |
| 7.4. | Building Alarms | | |
| 7.4.1. | Room Temperature Sensor | | |
| 7.4.2. | Door Alarm (contact closure, customer supplied) | | |
| 7.4.3. | Smoke Alarm (contact closure, customer supplied) | | |
| 7.4.4. | Water Intrusion Alarm (contact closure, customer supplied) | | |
| 7.5. | IP Microwave to Radio Site #1, which communicates using SNMP. RSM shall report alarm indications provided by the SNMP. | | |
| 7.6. | Quantity = 3, Motorola Quantar base radios, configured with RF *combiner* and receive multicoupler with one transmit and one receive antenna. | | |
| 7.6.1. | Transmit Indicator (TX) {one per radio} | | |
| 7.6.2. | Receive Signal Strength Indicator (RSSI) {one per radio} | | |
| 7.6.3. | Forward & Reflected RF Power — TX antenna line sensor installed at the output of filter cavities and circulators, which provides RS232 and Ethernets port – UDP/IP or SNMP interfaces (customer supplied) | | |
| 7.7. | RSM shall also provide capability to detect faults at remote site and to automatically reset, reboot or start backup site equipment without external user intervention. | | |
| **8.** | **SERVICE MANUAL** - One (1) set system documentation, operations and service manuals, printed or electronic copy, for technician. | | |
| **9.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |

| | | | |
|---|---|---|---|
| **10.** | **SHIPPING REQUIREMENTS:** F.O.B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
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| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## Exhibit B-1 Mandatory Technical Requirements

### 10. Category: Furniture, Dispatch Console

**Category Definition:** *Specialized dispatch center workstations, CPU enclosures, and auxiliary furniture such as storage units, printer cabinets, files, and tables.*

**Example Product: Quantity one (1) — 911-Center Dispatch Workstation with partitioned screens.**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled *"ExhibitB1-ConsoleFurniture").* For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **Console Furniture** | | |
| 1.1. | Electric Height Adjustable Desks – This is for height adjustable desks specific to 24/7 environments. | **NO BID** | **NO BID** |
| 1.2. | Console furniture unit in a corner configuration, in a cockpit design.<br>Monitor surface to accommodate up to Quantity and size of flat screen monitors for "Dispatch Consoles." | | |
| 1.3. | Work surfaces shall have lifting equipment weight capacity of 500 lbs. to prevent damage from users sitting / leaning on or using the surface as an aid in standing. Minimum which does not include weight of work surface.<br>Console must demonstrate stability at full extension. Maximum deflection of ½" is allowed when a horizontal load of 100 lbs. is applied to the center of each work surface. | | |
| 1.4. | Adjustment speed to be minimum 1.5"/second. | | |

| | | | |
|---|---|---|---|
| 1.5 | Safety finger clearance of 1½" minimum between stationary returns and moving surfaces. | | |
| 1.6 | Controller shall not be located where it can be damaged by chair arms.<br>Location under front edge of keyboard surface is unacceptable. | | |
| 1.7 | Controller shall include collision detection technology which will detect sudden changes in load to identify obstructions in the path of the moving surface. Collision detection technology to cause work surface to stop on detection of obstruction and reverse direction approximately 10cm to avoid entrapment of obstruction. Collision detection shall function in both upward and downward directions, and on both surfaces. | | |
| 1.8 | Surface must lower to 5th percentile seated female elbow height dimension (22.5") according to ANSI/HFES 100 -2007. Provide elevation drawing of both surfaces. | | |
| 1.9 | Surface must raise to at least standing elbow height for 95th percentile male user (46.5") from the floor to the home row of keyboard. ANSI/HFES 100 -2007. | | |
| 1.10 | All surfaces, moving and fixed height, must be non-glare, 3-D Laminate.<br>Edges shall be continuous from top through to the bottom of the surface with chamfer style edge. No seams between laminate and edge will be acceptable due to buildup of germs. | | |
| **2.** | **ADJUSTABLE MONITOR RACK -** 27/7 furniture usually has several monitors that are used by the dispatcher and need to be ergonomic for optimum health. | | |
| 2.1. | Parabolic monitor rack shall be curved to match the cockpit shape of the workstation and achieve as close to equal focal lengths from the user's eyes to the face of each monitor as possible and position monitors for a view angle perpendicular to the screen. ANSI/HFES 100 -2007. | | |
| 2.2. | Parabolic monitor rack shall be available in various sizes to accommodate up to 50" monitors and an individual weight of 70lbs on a single or dual level mount for future ready consoles. | | |

| | | | |
|---|---|---|---|
| 2.3. | Monitor rack platform shall be mounted on a movable platform which will permit a 10" focal length adjustment – from 19.7" to 29.7" with a maximum of 5lbs push/pull effort required to move all monitors simultaneously. ANSI/HFES100 -2007. | | |
| 2.4. | LCD mounts shall provide for all VESA monitor mount sizes. | | |
| 2.5 | Monitor rack shall be designed to permit stacking of a single monitor up to a complete additional row without removal or disassembly of any existing monitors or any portion of the base unit. | | |
| 2.6 | Vendor shall supply premium cable extensions as required to reach CPUs in CPU cabinets and provide adequate length to extend CPUs for service. | | |
| **3.** | **DATA DOCK -** This is a quick connect and disconnect for keyboards, mice, etc. and must be done by the operator. | | |
| 3.1. | A data dock shall be located on the work surface to provide easy, instant operator accessible location to plug in keyboards, mice and USB charging ports. | | |
| 3.2. | Data dock shall have at least (8) locations for USB, two (2) powered USB locations for charging and two (2) locations for RJ11, RJ45 or DB9 ports. | | |
| **4.** | **CPU ENCLOSURES** – Computers must be stored in cabinetry which keeps them off of the floor, cool, and lockable. | | |
| 4.1. | CPU cabinets, drawer pedestals and other caseworks must be made of a material and construction to withstand 500 pounds of weight when freestanding and not requiring a wall system to support it. Doors shall be a dent free material such as a laminate with continuous face through edge material. | | |
| 4.2. | CPU enclosures shall be available in a vertical tower or lower cabinet (29" standard work surface height) off to the side of the immediate user workspace. CPU enclosure shall be available in sizes to accommodate tower and mini-tower cases up to 8" wide x 18" high and available in 1, 2, 3, 4, 5, or 6 unit capacity depending on requirements. | | |

| | | | |
|---|---|---|---|
| 4.3 | CPU enclosures shall not be located underneath a height adjustable surface due to potential crush zones. | | |
| 4.4 | CPU enclosures shall be equipped as standard with active ventilation fans using quiet, 28db (decibel) 45 cfm fans to keep electronic equipment cool. | | |
| 4.5. | CPU enclosures shall have an internal motion sensing LED service light as standard equipment. | | |
| **5.** | **DRAWERS AND OTHER STORAGE** – Same performance specification as 4.1 | | |
| 5.1. | Drawer Configuration - 1 File drawer (12”) and 1 File drawer (12"). Optional drawer configurations /depths to be available. Please list common sizes. | | |
| 5.2. | All drawers to have full extension 100 lb. rated - soft close - steel ball bearing drawer slides. | | |
| 5.3. | Mobile peds shall have a weighted base to keep it from tilting when drawers are open. | | |
| **6.** | **SUPPORT ADJUSTMENT** | | |
| 6.1. | Adjustment speed shall not be less than 1.25” per second and not greater than 1.5” per second. | | |
| 6.2. | Adjustment controls to be flush mounted into surface or beneath work surface and have a smooth surface for easy cleaning. | | |
| 6.3. | Lifting system must operate quietly. Max sound level of 50 db. | | |
| **7.** | **WIRING MANAGEMENT.** This is for both electrical and data cabling. All cabling must be well managed and clean with easy access when needed. | | |
| 7.1. | An appropriate vertical and horizontal cable management system will be essential to maintain the equipment cables to prevent cables from being pinched and damaged. Cable pathways must be easy for the tech to access from the front of the console. Consoles which require rear access will not be considered. | | |
| 7.2. | Monitor and Keyboard/Mouse cables must have separate pathways from the computer to the end point for easy access when needed. | | |

| | | | |
|---|---|---|---|
| 7.3. | Cable entry path from computer cabinet to the console must have an opening large enough for all cables and a hand to fit through. | | |
| 7.4. | Cabling shall be guided from CPU cabinet or panel enclosure to the monitor surface of the adjustable table in an energy chain with easy flip-up cable channel access. | | |
| 7.5. | Keyboard cabling shall be guided from cabinet through energy chain to keyboard surface without any exposed cables. | | |
| 7.6. | Cabling shall be guided through a 3rd energy chain from the back of the monitor surface to the focal depth platform to keep cables organized during focal depth adjustments. | | |
| 7.7. | Vendor shall supply 3-5 power bars with a total of about 45 outlets at each station. Power bar cords must be long enough to reach through the station and down into the floor to plug into a power receptacle. Two power bars shall be located close to the monitors to keep monitor power cords short. Colored labels shall be supplied to differentiate between UPS and building power circuits. | | |
| 7.8. | Station must have ability to mount power receptacles in cabinets or internal panel frame. | | |
| **8.** | **HOUSING AND FRAMEWORK.** Any portion of the furniture must withstand the day to day abuse of a 24/7 room. | | |
| 8.1. | Housing and framework must be of enough strength to prevent sagging or deflection and capable of sustaining the accumulated weight of monitors, CPUs and associated hardware. All metal framework will be painted or powder coated, with a durable finish. Panel partitions must be attached to the console to assure unified construction for stability and grounding. Must meet ANSI/BIFMA X5.6 and X5.9. Provide test results. | | |
| **9.** | **PANEL SYSTEM**. Specified to provide for minimal cable management, visual separation of tasks and both sound barrier and sound absorptive functions. Consoles without panel divider systems do not meet base bid requirements. | | |
| 9.1. | Internal Cable management within the panel frame system is required. | | |

| | | | |
|---|---|---|---|
| | Must have separate horizontal pathways to run electrical and cat5 type cabling from one station to another if needed. | | |
| 9.2. | Stackable panel frames - Panel heights shall be vertically modular - The system shall be constructed in a manner to allow additional segments to be "stacked" on base panel frames to change panel heights for future change or reconfiguration. | | |
| 9.3. | Panel Segments and Panel Top Caps are to be user removable/replaceable without tools. | | |
| 9.4. | Acoustical panel construction – all panels above work surface height shall be of acoustical construction. Panels shall have a minimum of .55 NRC (noise reduction coefficient) rating and Class A flame spread/smoke developed certification. Provide testing results. | | |
| 9.5. | Optional panel segment types shall be painted or powder coat paint durable finish, fabric over steel, airflow and clear or frosted glass. Please state which are available. | | |
| **10.** | **PERSONAL ENVIRONMENT -** Each station shall have a fan, heater and task lights controllable by the operator through an easy to reach controller. | | |
| 10.1. | Fans shall be moveable to maximize cooling. | | |
| 10.2. | Heaters shall not exceed 500 watts of electrical to minimize total power draw of the station. | | |
| 10.3. | Task lights shall be LED and dimmable. Lights that just light the keyboard area are preferred. | | |
| **11.** | **OPTIONAL EQUIPMENT AND ACCESSORIES** | | |
| 11.1. | R-56 Grounding | | |
| 11.2. | Cup holder which can be placed out of the way to prevent hitting knees. | | |
| 11.3. | Status indicator light with options between 1 and 4 total lights. Must be mountable in different places on the station to maximize viewing in the room depending on need. | | |
| 11.4. | Clear or smoked acrylic on top of the panel system. | | |

| | | | |
|---|---|---|---|
| 11.5. | Option of under lit with LED lights. Logo or descriptions can be etched into acrylic. | | |
| **12.** | **WARRANTY AND CUSTOMER SERVICE** | | |
| 12.1. | Describe your warranty. | | |
| 12.2 | Describe a typical call for customer service during normal work hours. | | |
| 12.3. | Describe a typical call for customer service during off work hours. | | |
| 12.4. | Where do parts ship from? | | |
| 12.5. | Manufacturer of consoles shall assume primary responsibility for warranty claims – deference to third party suppliers is not acceptable. Customer agrees to assist in troubleshooting procedure. | | |
| **13.** | **DELIVERY, INSTALLATION AND TRAINING** | | |
| 13.1. | Based on the information provided, please identify vendor lead time for manufacturing and delivery of this product to the project location. | | |
| 13.2. | All bids to include delivery and installation charges. | | |
| 13.3. | Vendor shall schedule a delivery and installation timeline in the form of a GANTT chart. | | |
| **14.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

## Exhibit B-1 Mandatory Technical Requirements

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## 11. Category: Equipment Shelters

### 11.1 Equipment Shelter Sub-Category: Ballasted

**Sub-Category Definition:** *Equipment shelters of various sizes specifically designed and constructed for extreme installation locations and to be installed with minimal soil disruption and without site-build foundation; along with necessary accessories and appurtenances, including antenna mast, RF shielding, and grounding systems.*

**Example Product: Quantity one (1) — 40 ft.² equipment shelter equipped for helicopter transport.**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Shelters11.1-Ballasted*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| Item No. | Performance Requirement | Bidder Complies Y/N | Bidder Clarifications and Comments |
|---|---|---|---|
| **1.** | **General Requirements** | | |
| 1.1. | Shelter area: ~40 ft.² (±10%) | **NO BID** | **NO BID** |
| 1.2. | Shelter height: >7 ft | | |
| 1.3. | Temperature range: -50°F to +150°F | | |
| 1.4. | Rated Wind Velocity: (2" radial ice): >150 mph | | |
| **2.** | **Design and Construction** | | |
| 2.1. | Shelter shall be impact resistant to flying debris at the rated wind velocity. | | |
| 2.2. | Shelter shall be installed without conventional foundation and with only minimal ground disruption – for installation in sensitive locations. | | |

| | | | |
|---|---|---|---|
| 2.3. | Shelter shall provide for lightning protection and grounding features that meet or exceed current industry applicable standards. | | |
| 2.4. | Floor Load: >180 lbs-ft.$^2$ | | |
| 2.5. | Roof Load: >100 lbs-ft.$^2$ | | |
| 2.6. | Roof Impact Resistance: >100 lbs-ft.$^2$ with no damage to exterior or interior of the roof or shelter. | | |
| 2.7. | Roof and wall exteriors shall be constructed to provide full weather resistance and resistance to flying embers from adjacent fire; asphalt roofing and other combustible materials shall not be used. | | |
| 2.8. | Screened Ventilation shall adequately provide to permit occupancy by persons in the event adverse weather prohibits travel. | | |
| 2.9. | Cable entry panel: two each, 4-inch ports | | |
| 2.10. | Vendor shall note that compliance with state specific requirements for Factory Assembled Structures will be addressed in individual state Participating Agreements. | | |
| 2.11. | Vendor may offer integration of components from other manufacturers (HVAC, generators, UPS, equipment racks, cable trays, etc.) as an additional service so as to deliver a complete shelter. | | |
| **3.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **4.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION** | | | |

## Exhibit B-1 Mandatory Technical Requirements

| *(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 11.2 EQUIPMENT SHELTER SUB-CATEGORY: CONCRETE

**Sub-Category Definition:** *Equipment shelters of various sizes constructed of precast concrete, specifically designed and constructed for extreme installation locations.*

**Example Product = Quantity one (1) — 40 ft.² equipment shelter**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Shelters11.2-Concrete*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **GENERAL REQUIREMENTS** | | |
| 1.1. | Shelter area: ~40 ft.² (±10%) | **NO BID** | **NO BID** |
| 1.2. | Shelter height: >7 ft | | |
| 1.3. | Temperature range: -50°F to +150°F | | |
| 1.4. | Rated Wind Velocity: (2" radial ice): >150 mph | | |
| **2.** | **DESIGN AND CONSTRUCTION** | | |
| 2.1. | Shelter shall be impact resistant to flying debris at the rated wind velocity and bullet resistant (30:06 @ point-blank range) | | |
| 2.2. | Floor Load: >200 lbs-ft.² | | |
| 2.3. | Roof Load: >100 lbs-ft.² | | |
| 2.4. | Roof Impact Resistance: >200 lbs-ft.² with no damage to exterior or interior of the roof or shelter. | | |

| | | | |
|---|---|---|---|
| 2.5. | Adequate Screened Ventilation shall be provided to permit occupancy by persons in the event adverse weather prohibits travel. | | |
| 2.6. | The structure shall be of precast steel reinforced concrete (5000 psi) panels with welded connections. | | |
| 2.7. | All exterior metallic components and fasteners shall be stainless steel or hot-dipped galvanized. | | |
| 2.8. | Roof shall be coated/sealed with an elastomeric coating. | | |
| 2.9. | All joints shall be sealed inside and outside with an elastomeric caulking. | | |
| 2.10. | Flooring: commercial grade floor tile | | |
| 2.11. | Doors: galvanized steel primed & painted, 16-gauge door with 14-gauge frame. | | |
| 2.12. | Cable entry panel: six each, 4-inch ports | | |
| 2.13. | Shelter shall provide for Lightning Protection and grounding features that meet or exceed current industry applicable standards | | |
| 2.14. | Vendor shall supply Foundation Design based on customer supplied soils report. | | |
| 2.15. | Vendor shall note that compliance with state specific requirements for Factory Assembled Structures will be addressed in individual state Participating Agreements. | | |
| 2.16. | Vendor may offer integration of components from other manufacturers (HVAC, generators, UPS, equipment racks, cable trays, etc.) as an additional service so as to deliver a complete shelter. | | |
| **3.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **4.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the | | |

| | | | |
|---|---|---|---|
| | Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

| **ADDITIONAL PRODUCTS FOR CONSIDERATION**<br>*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |

| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
|---|---|
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 11.3 EQUIPMENT SHELTER SUB-CATEGORY: FIBERGLASS

**Sub-Category Definition:** *Equipment shelters of molded fiberglass construction, specifically designed and constructed for extreme installation locations.*

**Example Product: Quantity one (1) — 40 ft.² equipment shelter equipped for helicopter transport.**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Shelters11.3-Fiberglass*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **GENERAL REQUIREMENTS** | | |
| 1.1. | Shelter area: ~40 ft.² (±10%) | **NO BID** | **NO BID** |
| 1.2. | Shelter height: >7 ft | | |
| 1.3. | Temperature range: -50°F to +150°F | | |
| 1.4. | Rated wind velocity: (2" radial ice): >150 mph | | |
| **2.** | **DESIGN AND CONSTRUCTION** | | |
| 2.1. | Shelter design and construction shall be impact resistant to flying debris at the rated wind velocity. | | |
| 2.2. | Adequate screened ventilation shall be provided to permit occupancy by persons in the event adverse weather prohibits travel. | | |
| 2.3. | The primary structure shall be a one-piece Fiber Reinforce Plastic (FRP) structural laminate with foam insulating core. | | |
| 2.4. | All metallic components shall be stainless steel. | | |
| 2.5. | All doors and access panels will be locked. | | |

| | | | |
|---|---|---|---|
| 2.6. | Shelter shall provide for lightning protection and grounding features that meet or exceed current industry applicable standards. | | |
| 2.7. | Vendor shall supply foundation design based on customer supplied soils report. | | |
| 2.8. | Vendor may offer integration of components from other manufacturers (HVAC, generators, UPS, equipment racks, cable trays, etc.) as an additional service so as to deliver a complete shelter. | | |
| **3.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **4.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |

| | |
|---|---|
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 11.4 EQUIPMENT SHELTER SUB-CATEGORY: FRAMED, LIGHT WEIGHT

**Sub-Category Definition:** *Equipment shelters of framed construction; with metal, cement board, or other composite exterior; specifically designed and constructed for extreme installation locations.*

**Example Product: Quantity one (1) — 40 ft.² equipment shelter**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Shelters11.4-Framed-LightWeight*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | Shelter area: ~40 ft.² (±10%) | **NO BID** | **NO BID** |
| **2.** | Shelter height: >7 ft. | | |
| **3.** | Temperature range: -50°F to +150°F | | |
| **4.** | Rated Wind Velocity (2" radial ice): >100 mph | | |
| **5.** | **DESIGN AND CONSTRUCTION** | | |
| 5.1. | Shelter design and construction shall be impact resistant to flying debris at the rated wind velocity. | | |
| 5.2. | Floor Load: >180 lbs-ft.² | | |
| 5.3. | Roof Load: > 80 lbs-ft.² | | |
| 5.4. | Roof Impact Resistance: 100 lbs-ft.² with no damage to exterior or interior of the roof or shelter. | | |
| 5.5. | Adequate screened ventilation shall be provided to permit occupancy by persons in the event adverse weather prohibits travel. | | |

| | | | |
|---|---|---|---|
| 5.6. | Insulation shall be installed between interior and exterior wall providing a value of >R13. | | |
| 5.7. | All exterior metallic components and fasteners shall be stainless steel or hot-dipped galvanized. | | |
| 5.8. | Roof and wall exteriors shall be constructed to provide full weather resistance and resistance to flying embers from adjacent fire; asphalt roofing and other combustible materials shall not be used. | | |
| 5.9. | All joints/seams shall be sealed and fully weather-tight. | | |
| 5.10. | Flooring: commercial grade floor tile | | |
| 5.11. | Doors: galvanized steel primed & painted, 16-gauge door with 14-gauge frame. | | |
| 5.12. | Cable entry panel: six each, 4-inch ports or equivalent grounded multiport entry panel. | | |
| 5.13. | Shelter shall provide for lightning protection and grounding features that meet or exceed current industry applicable standards. | | |
| 5.14. | Vendor shall supply foundation design based on customer supplied soils report. | | |
| 5.15. | Vendor shall note that compliance with state specific requirements for Factory Assembled Structures will be addressed in individual state Participating Agreements. | | |
| 5.16. | Vendor may offer integration of components from other manufacturers (HVAC, generators, UPS, equipment racks, cable trays, etc.) as an additional service so as to deliver a complete shelter. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |

| | | | |
|---|---|---|---|
| **7.** | **SHIPPING REQUIREMENTS –** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 11.5 EQUIPMENT SHELTER SUB-CATEGORY: OUTDOOR CABINET

**Sub-Category Definition:** *Equipment cabinets of single and multiple widths of EIA standard 19" and 23" rack, in various depths and heights; specifically designed and constructed for extreme installation locations; providing protection conforming to NEMA-3R, UL50, and UL50E standards, along with associated components and hardware.*

**Example Product: Quantity one (1) — Single width, 19" - 84 RU cabinet of 25 inch depth.**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Shelters11.5-OutdoorCabinet*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **CABINET DIMENSIONS** | | |
| 1.1. | Width: EIA standard 19" rack, single width, ~25 inches | **NO BID** | **NO BID** |
| 1.2. | Height: 42 Rack Units (RU), ~ 78 inches | | |
| 1.3. | Depth: ~25 inches | | |
| **2.** | **CONSTRUCTION** – resistant to impact and corrosion | | |
| 2.1. | Exterior: high strength aluminum | | |
| 2.2. | Hardware: stainless steel | | |
| 2.3. | Weather-tight: NEMA 3R standard | | |
| **3.** | **RACK RAILS**: 2 pair, individually depth adjustable | | |
| 3.1. | Two pair | | |
| 3.2. | Fully drilled and tapped | | |
| **4.** | **THERMAL PROTECTION** | | |

| | | | |
|---|---|---|---|
| 4.1. | Solar shield roof with air gap to dissipate radiant heat. | | |
| 4.2. | Solar shield vent and perimeter screened to prevent insect entry. | | |
| 4.3. | Insulation bonded to interior walls. | | |
| 4.4. | Exhaust fans: 12 VDC, with thermostat. | | |
| 4.5. | Cabinet shall provide for lightning protection and grounding features that meet or exceed current industry applicable standards. | | |
| **5.** | **DOORS** | | |
| 5.1. | Two (2) doors, front and back. | | |
| 5.2. | Continuous hinge. | | |
| 5.3. | Three point locking mechanism. | | |
| 5.4. | Internal lock or external padlock. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **7.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
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**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

## Exhibit B-1 Mandatory Technical Requirements

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

## Exhibit B-1 Mandatory Technical Requirements

### 12. CATEGORY: TOWERS

#### 12.1 TOWER OVERALL SPECIFICATIONS

**The following overall specification shall apply to all sub-categories of tower product, as referenced within each specification below. ALL components must be new. ALL components, fabrication and construction must adhere to most recent industry standards as shown below.**

**NOTE: Individual states may have additional or more restrictive requirements.**

| ITEM NO. | DESCRIPTION |
|---|---|
| **1.** | **CODES AND STANDARDS** |
| 1.1. | The International Building Code (IBC) 2018 |
| 1.2. | The Operational Safety & Health Administration (OSHA) |
| 1.3. | American Institute of Steel Construction (AISC) — Manual of Steel Construction 15th Edition |
| 1.4. | Telecommunications Industries Association (TIA) Standard TIA-222-H — Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures; and all Addenda |
| 1.5. | American Welding Society (AWS) D1.1 — Structural Welding Code |
| 1.6. | FAA Advisory Circular #AC 70/7460 — Obstruction Marking and Lighting |
| 1.7. | National Electric Code (NEC) — Tower Lighting Kits |
| 1.8. | American Institute of Steel Construction (AISC) — Specification for Structural Joints using ASTMA325 or A490 Bolts |
| 1.9. | Federal Communications Commission Rules and Regulations - Part 17 |
| 1.10. | American Concrete Institute ACI 318 — Building Code Requirements for Reinforced and Structural Concrete |
| 1.11. | American Concrete Institute ACI 347 Recommended Practice for Concrete Framework |
| 1.12. | Post-Tensioning Institute (PTI) Recommendations for Pre stressed Rock and Soil Anchors (at customer request) |
| 1.13. | American Society for Testing and Materials (ASTM) for: |
| 1.14. | A36, A441, A500, A572, A588 and A992 — Structural Steel |
| 1.14.1. | A-123 — Zinc (hot-dipped galvanized coatings on products fabricated from rolled, pressed, and forged steel shapes, plates, bars and strips) |
| 1.14.2. | A-153 — Zinc Coatings (hot-dip) on Iron and Steel Hardware |
| 1.14.3. | B-695 — Coatings of Zinc Mechanically Deposited on Iron and Steel (minimum thickness 0.0026") |
| 1.14.4. | A-385 — Zinc Coatings (hot-dip) on Assembled Steel Products |
| 1.14.5. | A-307 — Low-Carbon Steel Externally and Internally Threaded Standard Fasteners |
| 1.14.6. | A-325 — High Strength Steel Bolts |

| | |
|---|---|
| 1.14.7. | A-615 and A-706 — Reinforcing Bars |
| 1.10.8. | ASTM C-9— Ready-mixed Concrete |
| 1.15. | The customer will arrange for building permits and advise the tower manufacturer of local codes and regulations that affect this specification. |
| 1.16. | Where local ordinances specify higher standards than those represented in this specification, the local ordinances shall govern. Pertinent sections of those codes shall be provided by the customer to the tower manufacturer. |
| 1.17. | The customer will report the results of special air navigational studies for marking and lighting towers. If special navigational reports are not a part of the contract, the tower vendor will apply the standards rules of the FAA, FCC and NEC when specified by the customer. |
| 1.18. | Site work specifications on the roadway condition, access, concrete washout, leave no marking, no haz mat, no storage, staking, tower center point locate, no removal of any trees, erosion control. (At Customer Request) |
| **2.** | **ANALYSIS AND DESIGN** |
| 2.1. | Towers shall be designed by or under the direct supervision of a registered professional engineer, specifically experienced in the design of radio and microwave towers. |
| 2.2. | All design and analysis computations and installation drawings shall be certified and stamped by a licensed Professional Engineer. |
| 2.3. | The structure shall be designed to support all specified antennas, including future antennas, and to hold all antennas on path within the twist, sway and displacement limits of TIA-222-H. Where multiple frequencies are specified, the most critical twist, sway and displacement limits shall govern. |
| 2.4. | The tower, when fully loaded with antenna assemblies, waveguide, and other appurtenances, shall be designed for the minimum wind loads as specified by TIA-222-H, unless otherwise specified. |
| 2.5. | When specified by the customer, tower designs shall consider the concurrent accumulation of radial ice to all parts of the tower, antennas, and accessories. Loadings shall take into account both the resultant added wind load and dead load. |
| 2.6. | Under basic wind speeds up to 35 mph, all horizontal members shall be capable of supporting a 250 lb. vertical load at mid-span, in addition to all other design loads. A load factor of 1.5 shall be applied to this required load. |
| 2.7. | Tower deflection limits are to be held both vertically and horizontally. Deflection must be determined at each specific point on the tower where an antenna is attached. The twist and sway of the tower at all antenna mounting elevations shall be determined by analytical methods and shall be noted on the formal stress analysis. |
| 2.8. | The antenna loading (present and future) to be applied to the structure is as follows: (Customer to specify). |
| 2.9. | The allowable unit stresses and the actual member stresses resulting from the specified design loads shall not exceed those given in the AISC specifications. |
| 2.10. | All members of the structure shall be considered primary members for the purpose of establishing allowable compressive stresses per AISC, except those members whose sole function is to reduce the kl/r ratio of primary members. |
| 2.11. | For self-supporting and guyed tower footings, the resistance factors for uplift shall be as described in TIA-222-H, latest edition. |
| 2.12. | Foundations shall be designed with sufficient reserve capacity to match the least tower leg reserve capacity. |

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| 2.13. | Combined tower wind loads and antenna loads shall be applied in combination such that the maximum axial forces are produced in girts, diagonals, and legs. Multiple analyses may be necessary to ensure that worst case design conditions have been investigated. |
| 2.14. | Provide One (1) set of complete as-built drawings including foundation, grounding, tower, cable bridge, transmission, qualifications of independent inspection individuals |
| **3.** | **TOWER PRODUCTS** |
| 3.1. | *Fabrication* |
| 3.1.1. | All fabrication, erection and identification of structural steel shall conform to AISC specifications. |
| 3.1.2. | Under no circumstances shall "dissimilar metals" be used in contact with one another. All structural tower components shall be of steel construction. All steel components shall be fabricated in the United States of America from materials produced in the United States of America. |
| 3.1.3. | Hot-dipped galvanizing of tubular sections shall be inside and outside per ASTM A123 or A153 as appropriate with no less than two (2) ounces of zinc per square foot of surface area throughout, including nuts and bolts. |
| 3.1.4. | Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure." |
| 3.1.5. | Properly mark and match-mark materials for field assembly. Fabricate for a delivery sequence which will expedite erection and minimize field handling of materials. Or Design/Build entity shall supply all equipment necessary to transport and erect the tower per all applicable laws, codes and standards. |
| 3.1.6 | If a round or tubular tower is provided vendor must supply a moisture weep hole at the base of the tower to ensure any accumulated moisture can drain from the bottom of the tower leg. Weep holes shall be at least 0.25 inches in diameter and 0.375 inches in diameter for tubes greater than 2 inches in diameter. Weep holes that are cast into grout placed below the tower baseplate shall be at least 0.75 inches in diameter. |
| 3.1.7 | Mill certificates shall be submitted to the State for all tower components BEFORE materials are delivered on site for approval. Any materials delivered on site without prior approval by the State may be rejected and shall be replaced at the Design/Build Entity's expense. A complete set of mill certificates shall be submitted in one package that clearly indicates where each component is used on the structure. Incomplete submittals will be rejected without review. Certificates shall, at a minimum, be supplied for the tower:<br>3.7.1. Legs;<br>3.7.2. Bracing;<br>3.7.3. Flanges and Tab Plates;<br>3.7.4. Bolt Assemblies;<br>3.7.5. Anchor Bolts;<br>3.7.6. Step Bolts;<br>3.7.7. Mounts;<br>3.7.8. Climbing and Waveguide Ladders; and<br>3.7.9. Threaded Rods and Associated Components for Rock Anchors. |
| 3.2. | *Connections and Locking Devices* |

<table>
<tr><td>3.2.1.</td><td>No field welding shall be permitted unless specifically approved in writing.</td></tr>
<tr><td>3.2.2.</td><td>All members shall be connected with galvanized ASTM A325 Type 1 high-strength structural bolts unless otherwise approved.</td></tr>
<tr><td>3.2.3.</td><td>The vendor shall provide bolts, nuts and lock-washers in a quantity in excess of the actual bolt count, for each size required for each tower site.
<table>
<tr><th>Bolt Count</th><th>Percentage Excess</th><th>Minimum Excess</th></tr>
<tr><td>0-200</td><td>5%</td><td>1</td></tr>
<tr><td>200-500</td><td>4 %</td><td>10</td></tr>
<tr><td>500-1000</td><td>3%</td><td>20</td></tr>
<tr><td>1000 and over</td><td>2 %</td><td>30</td></tr>
</table></td></tr>
<tr><td>3.2.4</td><td>If the bolts provided by the tower manufacturer are not sufficient length to accommodate all necessary hardware the vendor shall replace the bolts with ones of sufficient length at no cost to the State. All bolted connections shall be installed with a nut locking device. ANCO® style nuts or any other nut that damages the galvanization on the bolt will not be accepted. All bolts shall be installed nut-end-up. All bolts, washers and nuts shall be supplied from one vendor as a fastener assembly, as defined by RCSC. All tower leg members shall be fabricated from pipes or solid rounds. Tower leg members constructed from a lattice design will not be accepted. All self-supporting tower bracing shall be fabricated from angle members. All guyed tower bracing shall be fabricated from solid round members.</td></tr>
<tr><td>3.2.5.</td><td>All towers will be provided with the correct size and length of anchor bolts necessary to carry the anticipated tower loads.</td></tr>
<tr><td>3.2.6.</td><td>All threaded fasteners shall extend not less than 1-1/2 threads beyond nuts and locking devices.</td></tr>
<tr><td>3.3.</td><td>Climbing Ladders</td></tr>
<tr><td>3.3.1</td><td>Lattice self-supporting towers shall be equipped with a 16” outside climbing ladder with 7” toe clearance (for self-supporting towers only) spanning from the ground to the top of the tower structure. The ladder shall meet the requirements of TIA-222-H Section 12<br>Monopoles - shall be equipped with step bolts starting at 10’ AGL to the top of the tower in conformance with TIA-222-H.<br>Guyed towers shall have integrated climbing ladders pre-welded into the tower face that is in conformance with TIA-222-H.</td></tr>
<tr><td>3.3.2</td><td>The climbing ladders or climbing pegs shall be supplied with “Tuf-Tug Step Bolt Anchor Bracket – Flat”. The safety-climb system shall be installed at the ladder location and allow a climber to remain connected to the safety-climb for the entire length of the ladder. The safety climb cable shall be a 3/8 (0.375) inch diameter cable constructed from stainless steel and shall comply with the stated requirements.</td></tr>
<tr><td>3.4.</td><td>Rest Platforms</td></tr>
<tr><td>3.4.1.</td><td>For towers greater than 50 feet in height, rest platforms shall be placed at intervals no greater than 50 feet.</td></tr>
<tr><td>3.4.2.</td><td>A rest platform will consist of a level platform of grating which allows room for one person to sit or stand.</td></tr>
<tr><td>3.5.</td><td>Work Platforms</td></tr>
<tr><td>3.5.1.</td><td>When work platforms are required they shall consist of level platforms of grating. They shall be either walkways with a minimum width of 24 inches or full coverage platforms and they shall provide reasonable access to appropriate work areas.</td></tr>
<tr><td>3.5.2.</td><td>Safety handrails shall be provided around the perimeter of the platforms with the upper railing at 42 inches above the deck and the intermediate rail approximately halfway between the top rail and the deck with a 4” toe board around the outer edge of the platform deck.</td></tr>
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| 3.5.3. | When platform access is via an inside climbing ladder, a hatch shall be provided to eliminate the hazard of an access opening in the work area. |
| 3.5.4. | Work platforms shall be designed to support two concentrated live loads of 250 lbs. each. Live loads imposed by persons on the platform shall be considered to concentrate at such points that will cause maximum stress in the structural members being considered. |
| 3.6. | *Finishes* |
| 3.6.1. | All steel members and fasteners shall be galvanized (zinc coated) per standards in Section 2.0 of this specification. |
| 3.6.2. | Under no circumstances shall any coating on any metal member or fastener be cathodic relative to the base material. |
| 3.6.3. | Use “Devcon", or equivalent, zinc rich paint, or approved equal, to touch up damaged galvanizing. Touch up may be done by either a spray or brush application. |
| 3.6.4. | When required, tower structures shall be painted per FAA specification AC70/7460. |
| 3.6.5. | All painting shall be performed in the shop using an acrylic latex paint specifically formulated for application to galvanized material. |
| 3.6.6. | Field painting shall be limited to touch-up of paint damaged during transportation and erection. Use the same paint as was used in the shop to touch up damaged paint and provide the same protection as original shop painting. |
| **4.** | **TOWER ACCESSORIES** |
| 4.1. | *Tower Lighting* |
| 4.1.1. | When required, an obstruction lighting system shall be supplied with the tower and installed as required by FAA. |
| 4.1.2. | All obstruction lighting equipment shall be FAA approved. |
| 4.1.3. | Lighting shall be activated and deactivated by photoelectric control for unattended stations, and the method of activation for attended stations is to be specified. |
| 4.1.4. | All wire shall be SO cable. All electrical installation shall conform to the National Electric Code requirements for outdoor installation. |
| 4.2. | *Lightning Protection* |
| 4.2.1. | All towers shall be supplied with a complete grounding system which conforms to the minimum requirements of EIA RS-222, Section 12, and “Protective Grounding”. |
| 4.2.2. | Each tower with a height greater than 30 feet must be equipped with a lightning rod fastened at the extreme top of the tower. |
| 4.2.3 | A galvanized steel lightning rod, with minimum dimensions of 5/8 inch diameter by 4 feet long, shall be attached so as to extend a minimum of 36 inches above the highest point of the tower, including all attachments. |
| 4.2.4. | Any and all equipment mounted on the tower shall be so fastened as to be effectively grounded. |
| 4.2.5. | Testing of grounding systems are the responsibility of the radio installer or others, not that of the tower vendor. |
| 4.3. | *Antenna Mounts* |
| 4.3.1. | Pipe mounts shall be plumb in each axis unless specified otherwise. |
| 4.3.2. | Pipe mounts shall be positioned to prevent the antenna feed horn assembly from being directly opposite a tower member. Pipe mount positioning should not prevent direct waveguide installation to any antenna. |

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| 4.3.3. | Mounts and stiff arm support locations shall meet or exceed the standards specified by the antenna manufacturer in their latest installation bulletin. |
| 4.3.4. | Waveguide support shall be engineered to provide supports at intervals not greater than 4 feet O.C. This support can be in the form of leg clamps, waveguide ladders or horizontal bridges. |
| 4.3.5. | Waveguide support capacity shall provide for one waveguide run for each present and future antenna, unless otherwise specified. |
| 4.3.6. | The waveguide bridge shall provide support and protection of waveguide runs between the tower and building structures. |
| 4.3.7. | Waveguide support structures shall be grounded in accordance with the tower grounding specification. |
| 4.3.8. | Wall entries must be specified by the customer in terms of sizes and number of openings required. They shall be designed and installed to be completely weatherproof and to accommodate all present and future waveguide runs. |
| **5.** | **FOUNDATION DESIGN** |
| 5.1. | The vendor will be required to develop foundation designs based on soil conditions reported by the customer. |
| 5.2. | Foundation recommendations contained within soils reports are general in nature and are made without benefit of tower reaction information. The ultimate authority and responsibility for the foundation design rests with the vendor. |
| 5.3. | In the absence of a customer furnished soils report, presumptive soil conditions as described in TIA Standard TIA-222-H will be assumed for the foundation design. |
| 5.4. | Foundation designs should utilize, as a minimum, 4500 psi concrete and grade 60 reinforcing steel. When specified, a concrete mix design shall be submitted to the tower engineer to ensure that materials are proportioned by weight to produce concrete with a minimum compressive strength at 28 days of 4500 psi. Maximum w/cm 0.45, Slump 3”-5” Air Entrainment Per ACI 318-14 Table 19.3.3.1 |
| 5.5. | Where a soil investigation indicates that adequate rock conditions exist, grouted anchors may be designed. Field tension testing shall be done when specified. |
| 5.6. | When abnormal soil conditions are encountered to the extent that additional charges may be incurred, the customer must verify said conditions. Soil tests shall be provided by the customer. |

### 12.2 TOWERS SUB-CATEGORY: ACCESSORIES & APPURTENANCES

**Sub-Category Definition:** *Radio tower accessories, antenna stand-offs, antenna array mounts, ice shields, cable bridges, grounding materials, cable entry-panels, non-penetrating and ballasted antenna mounts, anti-climb panels, and related products.*

**Example Product: Quantity one (1) — Non-penetrating/ballasted antenna mount.**

**For Bidding Purposes:** vendor shall assume that (1) customer will resolve all the building structural capacity issues, (2) manage all permits, (3) provide ballast material, and (4) contract for erection services.

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Towers12.2-Accessories*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **DESCRIPTION** | | |
| 1.1. | Non-penetrating mount that provides a single mast. | **NO BID** | **NO BID** |
| 1.2. | Load = One (1) panel antenna. | | |
| 1.3. | Antenna Height = 10 feet. | | |
| 1.4. | Roof Protection pads (1/2" rubber mat) are required. | | |
| **2.** | Conform to **"OVERALL SPECIFICATION"** requirements. | | |
| **3.** | **SITE INFORMATION** | | |
| 3.1. | Location = 44 56 30.73N 122 56 33.77W / Marion County / Salem, OR 97317 Wind and Ice 104 mph + 0" ice & 30 mph + 2" ice. | | |
| 3.2. | Building has a Flat roof 24' AGL. | | |
| **4.** | **ANTENNA DETAILS – PANEL ANTENNA** | | |
| 4.1. | Dimensions: W x H x T = 10' x 3" omni antenna with one (1) 7/8" coax. | | |

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| **5.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **6.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 12.3 TOWERS SUB-CATEGORY: DEPLOYABLE/TEMPORARY

**Sub-Category Definition:** *Deployable radio towers designed and constructed for temporary installation, fixed or transportable configurations, along with specially configured transport vehicles, accessories and appurtenances.*

**Example Product: Quantity one (1) — 40-foot extendable tower mounted on 16 foot enclosed cargo trailer for rapid deployment to tactical events.**

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Shelters12.3-Deployable-Temporary*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Vendors should submit descriptive literature for the product offered confirming its compliance with specifications.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **TOWER** | | |
| 1.1. | Structure type: extendable guy wire supported. | **NO BID** | **NO BID** |
| 1.2. | Maximum height: 40 feet. | | |
| 1.3. | Maximum payload: > 120 pounds. | | |
| 1.4. | Maximum antenna load: >15 ft.². | | |
| 1.5. | Rated wind speed: 70 mph. | | |
| 1.6. | Antenna mount: 2 inch diameter pipe, with > 72" extending above the tower. | | |
| **2.** | **TOWER MOUNTING / DEPLOYMENT** | | |
| 2.1. | When retracted the tower shall tilt to horizontal position for transport atop the trailer. | | |

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| 2.2. | A carried mechanism shall allow the tower to move from the stored position to a position where it can be tilted for deployment. | | |
| 2.3. | When in the vertical position, the tower sections shall be extended by means of a 12 V DC electric winch, with manual override. | | |
| 2.4. | All guy wire materials shall be supplied with the tower. | | |
| 2.5. | Guy wire anchors for normal soil conditions shall be supplied with the tower. (Other anchor configurations shall be available as options.) | | |
| **3.** | **TRAILER** | | |
| 3.1. | Gross vehicle weight rating (GCWR): > 6500 lbs. | | |
| 3.2. | Number of axles: 2 (tandem). | | |
| 3.3. | Overall width: < 102 inches. | | |
| 3.4. | Overall length, excluding coupler: <22 feet. | | |
| 3.5. | Coupler Size: Standard ball @ 2-5/16 inches. | | |
| 3.6. | Electrical connector: Standard 7-pin. | | |
| 3.7. | Electric brakes: all wheels. | | |
| 3.8. | All DOT required lighting (LED), safety change, and breakaway switch with battery shall be included. | | |
| 3.9. | The trailer interior shall be open space ready for customization. | | |
| 3.9.1. | Interior width: 96 inches. | | |
| 3.9.2. | Interior height: > 76 inches. | | |
| 3.9.3. | Interior length: > 200 inches. | | |
| 3.9.4. | Doors: rear = full width; right front equal 36 inch. | | |
| **4.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |

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| **5.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 12.4 TOWER SUB-CATEGORY: GUYED

**Sub-Category Definition:** *Guy wire supported type towers, tower engineering and design, foundation engineering and design, along with associated components and hardware.*

**Example Product: Quantity one (1) — 140-foot guy-wire-supported communications tower.**

**For Bidding Purposes:** Vendor shall assume that (1) customer will supply geotechnical report, (2) manage all permits, and (3) contract for foundation and tower erection services. Note: (4) antenna mounts, stand-offs, ice-shields, and waveguide bridges are be specified and priced under a separate sub-category.

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Towers12.4-Guyed*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **SUMMARY DESCRIPTION** | | |
| 1.1. | ANSI/TIA-222-H or current nationally approved standard, Risk Category III, Essential Communications. | **NO BID** | **NO BID** |
| 1.2. | Tower Type = Guy-Wire-Supported. | | |
| 1.3. | Overall height = 140 feet, excluding lightning rod. | | |
| **2.** | Conform to **"OVERALL SPECIFICATION"** requirements. | | |
| **3.** | Climb-Safety per "**OVERALL SPECIFICATIONS**". | | |
| **4.** | Foundation design per "**OVERALL SPECIFICATION**" and identified site conditions. | | |
| **5.** | PE stamped plans per "**OVERALL SPECIFICATIONS**". | | |
| **6.** | **SITE INFORMATION** | | |
| 6.1. | Location = Oregon, east side of Willamette Valley, Cascade foothills Wind and Ice 104 mph + 0" ice & 30 mph + 2" ice. | | |

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| 6.2. | Topographical Category 3, located at the top of a hill - Crest Height 2,063. | | |
| 6.3. | Exposure Classification C, open terrain without forest or significant structures. | | |
| 6.4. | Geotechnical = TIA 222 - Rev H "Presumptive Soil". | | |
| 6.5. | Site Access = gravel road. | | |
| 6.6. | FAA Clearance = lighting not required. | | |
| **7.** | **HEIGHT & LOAD INFORMATION**<br>– includes future capacity<br>– refer to antenna details (section 5) | | |
| 7.1. | @40-feet = Microwave antenna, with mounts and ice shield – orientation = 220° (per 5.1 below). | | |
| 7.2. | @40-feet = Microwave antenna, with mounts and ice shield – orientation = 130° (per 5.1 below). | | |
| 7.3. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 100° (per 5.4 below). | | |
| 7.4. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 180° (per 5.4 below). | | |
| 7.5. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 270° (per 5.4 below). | | |
| 7.6. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 0° (per 5.3 below). | | |
| 7.7. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 120° (per 5.3 below). | | |
| 7.8. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 240° (per 5.3 below). | | |
| 7.9. | @110-feet = Panel antenna, with mounts – orientation = 40° (per 5.2 below). | | |
| 7.10. | @110-feet = Panel antenna, with mounts – orientation = 160° (per 5.2 below). | | |
| 7.11. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 0° (per 5.3 below). | | |

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|---|---|---|---|
| 7.12. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 120° (per 5.3 below). | | |
| 7.13. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 240° (per 5.3 below). | | |
| 7.14. | @140-feet = Lightning Rod > 10-feet, to extend above topmost antenna. | | |
| **8.** | **ANTENNA DETAILS** | | |
| 8.1. | Microwave Antenna. | | |
| 8.2. | Antenna Diameter = 6' HP microwave dish @ 6Ghz with (1) EW63. | | |
| 8.3.1 | Mounting Pipe Diameter = 4.5 in. | | |
| 8.3.2 | Net Weight = 254 lbs. | | |
| 8.4. | Panel Antenna. | | |
| 8.4.1 | Mounting = Flush Mount. | | |
| 8.4.2 | Dimensions: W x H x T = 3'x18"x6" Panel Antenna with one (1) 7/8" coax. | | |
| 8.5. | Base Radio Antenna (Open Dipole). | | |
| 8.5.1 | Antenna Model # Decibel DB224 with one (1) 7/8" coax. | | |
| 8.5.2 | Mounted on one (1) 3' sidearm. | | |
| 8.6. | Enclosed Yagi Antenna. | | |
| 5.6.1 | Antenna Model # Scala RY-900B w/ Radome and one (1) 7/8" coax. | | |
| 5.6.2 | Mounted on Flush Mount. | | |
| **9.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |

| | | | |
|---|---|---|---|
| **10.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 12.5 TOWER SUB-CATEGORY: GUYED, LIGHT

**Sub-Category Definition:** *Light duty lattice type towers, tower engineering and design, foundation engineering and design, and associated components and hardware.*

**Example Product: Quantity one (1) — Light duty 60-foot self-supported communications tower.**

**For Bidding Purposes:** Vendor shall assume that (1) customer will supply geotechnical report, (2) manage all permits, and (3) contract for foundation and tower erection services. Note: (4) antenna mounts, stand-offs, ice-shields, and waveguide bridges are be specified and priced under a separate sub-category.

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Towers12.5Guyed-Light*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **SUMMARY DESCRIPTION** | | |
| 1.1. | ANSITIA-222-H or current nationally approved standard, Risk Category III, Essential Communications. | **NO BID** | **NO BID** |
| 1.2. | Tower Type = Self-Supported. | | |
| 1.3. | Overall height = 60 feet, excluding lightning rod. | | |
| **2.** | Conform to "**Overall Specification**" requirements. | | |
| **3.** | Climb-Safety per "**Overall Specifications**". | | |
| **4.** | Foundation design per "**Overall Specification**" and identified site conditions. | | |
| **5.** | PE stamped plans per "**Overall Specifications**". | | |
| **6.** | **LIGHT DUTY DEFINITION** | | |
| 6.1. | Decreased height and loading requirements. | | |
| 6.2. | Component transport in units of 10-feet or less. | | |

| | | | |
|---|---|---|---|
| 6.3. | Erection can be accomplished without the use of heavy equipment. | | |
| **7.** | **SITE INFORMATION** | | |
| 7.1. | Location = Oregon, east side of Willamette Valley, Cascade foothills Wind and Ice 104 mph + 0" ice & 30 mph + 2" ice. | | |
| 7.2. | Topographical Category 3, located at the top of a hill Crest Height 2,063. | | |
| 7.3. | Exposure Classification C, open terrain without forest or significant structures. | | |
| 7.4. | Geotechnical = TIA 222 - Rev H "Presumptive Soil". | | |
| 7.5. | Site Access = gravel road. | | |
| 7.6. | FAA Clearance = lighting not required. | | |
| **8.** | **HEIGHT & LOAD INFORMATION**<br>– includes future capacity<br>– refer to antenna details (refer to antenna details in section 6) | | |
| 8.1. | @40-feet = Enclosed Yagi antenna, with mounts – orientation = 100° (per 6.3 below). | | |
| 8.2. | @40-feet = Enclosed Yagi antenna, with mounts – orientation = 200° (per 6.3 below) | | |
| 8.3. | @40-feet = Panel antenna, with mounts – orientation = 40° (per 6.1 below). | | |
| 8.4. | @50-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 0° (per 6.2 below). | | |
| 8.5. | @50-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 180° (per 6.2 below). | | |
| 8.6. | @50-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 240° (per 6.2 below). | | |
| **9.** | **ANTENNA DETAILS** | | |
| 9.1. | Panel Antenna. | | |
| 9.1.1 | Mounting = Flush Mount. | | |
| 9.1.2. | Dimensions: W x H x T = 3'x18"x6" panel antenna with one (1) 7/8" coax. | | |

| | | | |
|---|---|---|---|
| 9.2. | Base Radio Antenna (Open Dipole). | | |
| 9.2.1. | Antenna Model # Decibel DB224 with one (1) 7/8" coax. | | |
| 9.2.2. | Mounted on one (1) 3' sidearm. | | |
| 9.3. | Enclosed Yagi Antenna. | | |
| 9.3.1. | Antenna Model # Scala RY-900B w/ Radome and one (1) 7/8" coax. | | |
| 9.3.2. | Mounted on Flush Mount. | | |
| **10.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **11.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |

| | |
|---|---|
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 12.6 TOWER SUB-CATEGORY: LATTICE

**Sub-Category Definition:** *Self-supporting type towers (3-leg and 4 leg), tower engineering and design, foundation engineering and design, and associated components and hardware.*

**Example Product: Quantity one (1) — 140-foot self-supporting communications tower.**

**For Bidding Purposes:** Vendor shall assume that (1) customer will supply geotechnical report, (2) manage all permits, and (3) contract for foundation and tower erection services. Note: (4) antenna mounts, stand-offs, ice-shields, and waveguide bridges are to be specified and priced under a separate sub-category.

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Towers12.6-Lattice*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **SUMMARY DESCRIPTION** | | |
| 1.1. | ANSITIA-222-H or current nationally approved standard, Risk Category III, Essential Communications. | **NO BID** | **NO BID** |
| 1.2. | Tower Type = Self-Supporting, 3-Leg. | | |
| 1.3. | Overall height = 140 feet, excluding lightning rod. | | |
| **2.** | Conform to **"Overall Specification"** requirements. | | |
| **3.** | Climb-Safety per "**Overall Specifications**". | | |
| **4.** | Foundation design per "**Overall Specification**" and identified site conditions. | | |
| **5.** | PE stamped plans per "**Overall Specifications**". | | |
| **6.** | **SITE INFORMATION** | | |
| 6.1. | Location = Oregon, east side of Willamette Valley, Cascade foothills Wind and Ice 104 mph + 0" ice & 30 mph + 2" ice. | | |
| 6.2. | Topographical Category 3, located at the top of a hill | | |

| | | | |
|---|---|---|---|
| | Crest Height 2,063'. | | |
| 6.3. | Exposure Classification C, open terrain without forest or significant structures. | | |
| 6.4. | Geotechnical = TIA 222 - Rev H "Presumptive Soil". | | |
| 6.5. | Site Access = gravel road. | | |
| 6.6. | FAA Clearance = lighting not required. | | |
| **7.** | **HEIGHT & LOAD INFORMATION**<br>– includes future capacity<br>– refer to antenna details (section 5) | | |
| 7.1. | @40-feet = Microwave antenna, with mounts and ice shield – orientation = 220° (per section 5.1 below). | | |
| 7.2. | @40-feet = Microwave antenna, with mounts and ice shield – orientation = 130° (per section 5.1 below). | | |
| 7.3. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 100° (per section 5.4 below). | | |
| 7.4. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 180° (per section 5.4 below). | | |
| 7.5. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 270° (per section 5.4 below). | | |
| 7.6. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 0° (per section 5.3 below). | | |
| 7.7. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 120° (per section 5.3 below). | | |
| 7.8. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 240° (per section 5.3 below). | | |
| 7.9. | @110-feet = Panel antenna, with mounts – orientation = 40° (per section 5.2 below). | | |
| 7.10. | @110-feet = Panel antenna, with mounts – orientation = 160° (per section 5.2 below). | | |
| 7.11. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 0° (per section 5.3 below). | | |

| | | | |
|---|---|---|---|
| 7.12. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 120° (per section 5.3 below). | | |
| 7.13. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 240° (per section 5.3 below) | | |
| **8.** | **ANTENNA DETAILS** | | |
| 8.1. | Microwave Antenna. | | |
| 8.1.1. | Antenna Diameter = 6' 6GHz HP microwave dish with one (1) EW63. | | |
| 8.1.2. | Mounting Pipe Diameter = 4.5 in. | | |
| 8.2. | Panel Antenna. | | |
| 8.2.1. | Mounting = Flush Mount. | | |
| 8.2.2. | Dimensions: W x H x T = 3'x18"x6" panel antenna with one (1) 7/8" coax. | | |
| 8.3. | Base Radio Antenna (Open Dipole). | | |
| 8.3.1. | Antenna Model Decibel DB224 with one (1) 7/8" coax. | | |
| 8.3.2. | Mounted on one (1) 3' sidearm. | | |
| 8.4. | Enclosed Yagi Antenna. | | |
| 8.4.1. | Antenna Model # Scala RY-900Y with one (1) 7/8" coax. | | |
| 8.4.2. | Mounted to Flush Mount. | | |
| **9.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **10.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |
| **ADDITIONAL PRODUCTS FOR CONSIDERATION** | | | |

| *(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |
| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 12.7 TOWER SUB-CATEGORY: LATTICE, LIGHT

**Sub-Category Definition:** *Light duty lattice type towers, tower engineering and design, foundation engineering and design, and associated components and hardware.*

**Example Product: Quantity one (1) — Light duty 60-foot self-supported communications tower.**

**For Bidding Purposes:** Vendor shall assume that (1) customer will supply geotechnical report, (2) manage all permits, and (3) contract for foundation and tower erection services. Note: (4) antenna mounts, stand-offs, ice-shields, and waveguide bridges are to be specified and priced under a separate sub-category.

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Towers12.7-Lattice-Light*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

Note: Symbols for less-than (<) or greater-than (>) shall be interpreted to include equal-to the specified value. The symbol for approximate (~) indicates an imprecise or nominal value where variations will be acceptable.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **SUMMARY DESCRIPTION** | | |
| 1.1. | ANSI/TIA-222-H or current nationally approved standard, Risk Category III, Essential Communications. | **NO BID** | **NO BID** |
| 1.2. | Tower Type = Self-Supported. | | |
| 1.3. | Overall height = 60 feet, excluding lightning rod. | | |
| **2.** | Conform to "**Overall Specification**" requirements. | | |
| **3.** | Climb-Safety per "**Overall Specifications**". | | |
| **4.** | Foundation design per "**Overall Specification**" and identified site conditions. | | |
| **5.** | PE stamped plans per "**Overall Specifications**". | | |
| **6.** | **LIGHT DUTY DEFINITION** | | |

| | | | |
|---|---|---|---|
| 6.1. | Decreased height and loading requirements. | | |
| 6.2. | Component transport in units of 10-feet or less. | | |
| 6.3. | Erection can be accomplished without the use of heavy equipment. | | |
| **7.** | **SITE INFORMATION** | | |
| 7.1. | Location = Oregon, east side of Willamette Valley, Cascade foothills Wind and Ice 104 mph + 0" ice & 30 mph + 2" ice. | | |
| 7.2. | Topographical Category 3, located at the top of a hill Crest Height 2,063'. | | |
| 7.3. | Exposure Classification C, open terrain without forest or significant structures. | | |
| 7.4. | Geotechnical = TIA 222 - Rev H "Presumptive Soil". | | |
| 7.5. | Site Access = gravel road. | | |
| 7.6. | FAA Clearance = lighting not required. | | |
| **8.** | **HEIGHT & LOAD INFORMATION**<br>– includes future capacity<br>– refer to antenna details (section 6) | | |
| 8.1. | @40-feet = Enclosed Yagi antenna, with mounts – orientation = 100° (per section 6.3 below). | | |
| 8.2. | @40-feet = Enclosed Yagi antenna, with mounts – orientation = 200° (per section 6.3 below). | | |
| 8.3. | @40-feet = Panel antenna, with mounts – orientation = 40° (per section 6.1 below). | | |
| 8.4. | @50-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 0° (per section 6.2 below). | | |
| 8.5. | @50-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 180° (per section 6.2 below). | | |
| 8.6. | @50-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 240° (per section 6.2 below). | | |
| 8.7. | @60-feet = Lightning Rod > 10-feet, to extend above topmost antenna. | | |
| **9.** | **ANTENNA DETAILS** | | |

| | | | |
|---|---|---|---|
| 9.1. | Panel Antenna. | | |
| 9.1.1. | Mounting = Flush Mount. | | |
| 9.1.2. | Dimensions: W x H x T = 3'x18"x6" panel antenna with one (1) 7/8" coax. | | |
| 9.2. | Base Radio Antenna (Open Dipole). | | |
| 9.2.1. | Antenna Model # Decibel DB224 with one (1) 7/8" coax. | | |
| 9.2.2. | Mounting = one (1) 3' sidearm. | | |
| 9.3. | Enclosed Yagi Antenna. | | |
| 9.3.1. | Antenna Model # Scala RY-900B with one (1) 7/8" coax. | | |
| 9.3.2. | Antenna Mount = Flush Mount. | | |
| **10.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser. | | |
| **11.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|

| | |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 12.8 TOWER SUB-CATEGORY: MONOPOLE

**Sub-Category Definition:** *Monopole type towers, tower engineering and design, foundation engineering and design, and associated components and hardware.*

**Example Product: Quantity one (1) — 140-foot monopole communications tower.**

**For Bidding Purposes:** Vendor shall assume that (1) customer will supply geotechnical report, (2) manage all permits, and (3) contract for foundation and tower erection services. Note: (4) antenna mounts, stand-offs, ice-shields, and waveguide bridges are be specified and priced under a separate sub-category.

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Towers12.8-Monopole*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **SUMMARY DESCRIPTION** | | |
| 1.1. | ANSI/TIA-222-H or current nationally approved standard, Risk Category III, Essential Communications. | **NO BID** | **NO BID** |
| 1.2. | Tower Type = Monopole. | | |
| 1.3. | Overall height = 140 feet, excluding lightning rod. | | |
| **2.** | Conform to **"Overall Specification"** requirements. | | |
| **3.** | Climb-Safety per "**Overall Specifications**". | | |
| **4.** | Foundation design per "**Overall Specification**" and identified site conditions. | | |
| **5.** | PE stamped plans per "**Overall Specifications**". | | |
| **6.** | **SITE INFORMATION** | | |
| 6.1 | Location = Oregon, east side of Willamette Valley, Cascade foothills Wind and Ice 104 mph + 0" ice & 30 mph + 2" ice. | | |
| 6.2. | Topographical Category 3, located at the top of a hill Crest Height 2,063'. | | |

| | | | |
|---|---|---|---|
| 6.3. | Exposure Classification C, open terrain without forest or significant structures. | | |
| 6.4. | Geotechnical = TIA 222 - Rev H "Presumptive Soil". | | |
| 6.5. | Site Access = gravel road. | | |
| 6.6. | FAA Clearance = lighting not required. | | |
| **7.** | **HEIGHT & LOAD INFORMATION**<br>– includes future capacity<br>– refer to antenna details (section 15) | | |
| 7.1. | @40-feet = Microwave antenna, with mounts and ice shield – orientation = 220° (per section 15.1 below). | | |
| 7.2. | @40-feet = Microwave antenna, with mounts and ice shield – orientation = 130° (per section 15.1 below). | | |
| 7.3. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 100° (per section 15.4 below). | | |
| 7.4. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 180° (per section 15.4 below). | | |
| 7.5. | @60-feet = Enclosed Yagi antenna, with mounts and ice shield – orientation = 270° (per section 15.4 below). | | |
| 7.6. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 0° (per section 15.3 below). | | |
| 7.7. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 120° (per section 15.3 below). | | |
| 7.8. | @80-feet = Base Radio antenna, with bottom and top mounts and 4-foot side arms – orientation = 240° (per section 15.3 below). | | |
| 7.9. | @110-feet = Panel antenna, with mounts – orientation = 40° (per section 15.2 below). | | |
| 7.10. | @110-feet = Panel antenna, with mounts – orientation = 160° (per section 15.2 below). | | |
| 7.11. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 0° (per section 15.3 below). | | |

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| 7.12. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 120° (per section 15.3 below). | | |
| 7.13. | @130-feet = Base Radio antenna, with bottom and center mounts and 4-foot side arms – orientation = 240° (per section 15.3 below). | | |
| **8.** | **ANTENNA DETAILS** | | |
| 8.1. | Microwave Antenna. | | |
| 8.1.1. | Antenna Diameter = 6’ 6GHz HP microwave dish with one (1) EW63. | | |
| 8.1.2. | Mounting = One (1) 4.5” OD Dish Mount with tri-collar. | | |
| 8.2 | Panel Antenna. | | |
| 8.2.1. | Mounting = Flush Mount with one (1) tri-collar. | | |
| 8.2.2. | Dimensions: W x H x T =3’x16”x6” panel antenna with one (1) 7/8” coax. | | |
| 8.3 | Base Radio Antenna (Open Dipole). | | |
| 8.3.1. | Antenna Model # Decibel DB224 each with one (1) 7/8” coax. | | |
| 8.3.2. | Mounting = 3’ sidearm with tri-collar. | | |
| 8.4. | Enclosed Yagi Antenna. | | |
| 8.4.1. | Antenna Model # Scala RY-900B with Radome each with one (1) 7/8” coax. | | |
| 8.4.2. | Mount = Flush Mount with tri-collar. | | |
| **9.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options. | | |
| **10.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the | | |

| | | | |
|---|---|---|---|
| | Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

| **ADDITIONAL PRODUCTS FOR CONSIDERATION**<br>*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)* | |
|---|---|
| **PRODUCT MODEL NAME/NUMBER** | **DESCRIPTION** |
| | |
| | |
| | |

| **WARRANTY OPTIONS**<br>*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)* | |
|---|---|
| **WARRANTY OPTION** | **DESCRIPTION** |
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |

### 12.9 TOWER SUB-CATEGORY: PASSIVE MICROWAVE REPEATER

**Sub-Category Definition:** *Passive microwave repeater (reflector) structures, structure engineering and design, foundation engineering and design, and associated components and hardware.*

**Example Product: One - 20 foot by 32-foot passive microwave repeater.**

**For Bidding Purposes:** Vendor shall assume that (1) customer will supply geotechnical report, (2) manage all permits, and (3) contract for foundation and tower erection services.

The following specifications and equipment configuration describes requirements for the EXAMPLE PRODUCT. It is the Bidder's responsibility to fully describe or explain how the product offered meets or exceeds each identified requirement. If more space is needed, Bidders may submit additional pages (up to a maximum equivalent of five single-sided pages – 12 point font labeled "*ExhibitB1-Towers12.9-MicrowaveRepeater*"). For evaluation purposes, only one product may be offered to meet or exceed these specifications on a pass/fail basis. Bidders are encouraged to submit descriptive literature for the product offered confirming its compliance with specifications. Additional products may be offered for consideration upon award as identified below.

**Manufacturer:** Click or tap here to enter text. **Product Model Name**: Click or tap here to enter text. **Product Number**: Click or tap here to enter text.

| ITEM NO. | PERFORMANCE REQUIREMENT | BIDDER COMPLIES Y/N | BIDDER CLARIFICATIONS AND COMMENTS |
|---|---|---|---|
| **1.** | **SUMMARY DESCRIPTION** | | |
| 1.1. | ANSI/TIA-222-H or current nationally approved standard, Risk Category III, Essential Communications. | **NO BID** | **NO BID** |
| 1.2. | Structure Type = Passive Microwave Repeater (Reflector). | | |
| 1.3. | Size = 20 feet by 32 feet. | | |
| **2.** | Conform to **"Overall Specification"** requirements. | | |
| **3.** | Foundation design per "**Overall Specification**" and identified site conditions. | | |
| **4.** | PE stamped plans per "**Overall Specifications**" | | |
| **5.** | **SITE INFORMATION** | | |
| 5.1. | Location = Oregon, east side of Willamette Valley, Cascade foothills Wind and Ice 104 mph + 0" ice & 30 mph + 2" ice. | | |
| 5.2. | Topographical Category 3, located at the top of a hill Crest Height 2,063'. | | |

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|---|---|---|---|
| 5.3. | Exposure Classification C, open terrain without forest or significant structures. | | |
| 5.4. | Geotechnical = TIA 222 - Rev H "Presumptive Soil". | | |
| 5.5. | Site Access = gravel road. | | |
| **6.** | **WARRANTY** – Minimum one (1) year (standard warranty that includes all firmware and software updates within warranty period). Parts and related software will be free from defects in material and workmanship for one year. If equipment fails because of a defect in workmanship or materials within one year from the date of shipment manufacturer shall repair or replace the equipment or part without charge to purchaser.<br>Provide additional warranty options. | | |
| **7.** | **SHIPPING REQUIREMENTS:** F.O. B. Destination. Shipping charges may be negotiated and mutually agreed between the Purchaser and the Contractor. All shipping charges will be added as a separate line item to the invoice. | | |

**ADDITIONAL PRODUCTS FOR CONSIDERATION**

*(For informational purposes ONLY. Listed items may be considered as additional option(s) upon award and included in Bidder's offering)*

| PRODUCT MODEL NAME/NUMBER | DESCRIPTION |
|---|---|
| | |
| | |
| | |

**WARRANTY OPTIONS**

*(Warranty options listed below and may be considered upon award and included in Bidder's offering. Costs for additional warranty options beyond the minimum one-year warranty will be captured in Exhibit C Bid Price.)*

| WARRANTY OPTION | DESCRIPTION |
|---|---|
| TWO-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryTwo-YearWarranty".* |
| THREE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryThree-YearWarranty".* |
| FOUR-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFour-YearWarranty".* |

| | |
|---|---|
| FIVE-YEAR ADDITIONAL OPTION | *Describe in the space provided or submit a separate document describing the two-year warranty option labeled, "Exhibit B-1Category/Sub-CategoryFive-YearWarranty".* |