

APPLICATION GUIDE FOR
MOBILE AND FIXED DIAL RADIOTELEPHONE SPECIFICATIONS
REA FORM 397e

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1. GENERAL

1.1 This section provides REA borrowers, consulting engineers, radiotelephone manufacturers and suppliers with information for use in completing Part III of REA Form 397e, "Mobile and Fixed Dial Radiotelephone Specifications." Revision of this section was necessary for it to conform to the revised REA Form 397e, dated May 1971.

1.2 The purpose of Part III of REA Form 397e is to provide the Purchaser and Seller with detailed information to ensure that the desired system is provided.

1.3 Items in Part III which may need clarifying are discussed in their order of appearance. Item numbers refer to paragraph numbers as they appear in Part III.

1.4 The example in Appendix A is a completed Part III for a hypothetical radiotelephone system. The information presented in this example is intended only as a guide for preparing Part III.

1.5 Part III is subdivided into III A and III B.

1.51 Part III A contains forms to be completed by the Purchaser or its engineer for providing equipment requirements and application data to Sellers of radiotelephone equipment.

1.52 Part III B contains forms to be used by the Seller to describe the proposed equipment.

2. EXPLANATION OF PART III A

2.01 Item 1.11 describes a map containing information which will give the Seller the size of the area to be covered by the radiotelephone system. The Purchaser should use its knowledge of the topography, accessibility, existing power lines and existing telephone lines when selecting a site for the base station radio equipment. The site chosen by the Purchaser should be a suggestion only. The Seller may choose a different site if it determines that a more suitable system can be provided. The Seller must obtain the Purchaser's concurrence if it proposes a site different from that of the Purchaser. Figure 1 in Appendix A shows an example of the information required in Item 1.11.

2.02 Item 1.12 describes a floor plan of each central office where equipment will be located. This item includes instructions to assure that the physical characteristics of the proposed equipment location are fully described for the Seller.

2.03 Item 2 provides a place for the Purchaser to show an address to which the equipment should be shipped. The desired receiving point is not always located at the telephone company's business address.

2.04 Item 3.01 or 3.02 shows the quantity of base station radio channels needed to serve the central office area named in Item 2.

2.05 Items 3.01 to 3.04 show the operating frequency band, quantity of operating channels and quantity of subscriber units initially required for the radiotelephone system associated with the central office named in Item 3. IMTS mobile units for the 150 MHz band can be equipped with as many as 11 channels and 450 MHz mobile units can be equipped with 12. Channels can be easily added by inserting frequency determining units. The Purchaser indicates in Items 3.03 and 3.04 the quantity of channels each mobile should have initially. In single-channel systems some mobiles may be equipped with one channel while others are equipped with several channels. The quantity of channels with which a particular mobile is equipped will depend on the roaming area of that mobile. The desired control head colors should be determined from the prospective subscribers to mobile telephone service. Available colors can be determined from information provided by the Seller.

2.06 Item 3.05 should show the type of standby power source available at the central office where the base station radio and/or control terminal equipment will be installed. The amount of power in excess of the requirements of the central office and other equipment that is available from the standby source should be indicated so that the Seller can determine if sufficient power will be available for the base station radio and/or control terminal equipment.

- 2.07 Items 3.052 and 3.053 allow the Purchaser an opportunity to ask the Seller to provide a standby power source for the base station.
- 2.08 Item 3.06 gives the Seller information about the central office equipment which will interface with the Seller's equipment.
- 2.09 Item 3.07 should indicate whether one-party or multiparty connections are to be made at the central office equipment. One-party office connections are recommended for systems having two or more base station radio channels. Either multiparty or one-party central office connections may be specified. One-party connections require more central office equipment than multiparty connections and do not provide significant advantages over multiparty connections in single-channel systems. However, one-party connections offer a definite improvement in traffic handling capability to multichannel systems.
- 2.10 Items 3.09 and 3.10 are needed by the Seller to permit it to make decisions concerning its equipment strapping options.
- 2.11 Item 3.09 refers to the provision which enables roaming mobiles to place a call with operator assistance. This service can be provided by either a nondedicated or a dedicated trunk. The dedicated trunk referred to in this paragraph is one that is assigned only for mobile service. It is connected between the radio control terminal and the mobile service operator (MSO) position at the toll switchboard and is accessible only by the mobile service operator at the switchboard or by a mobile through the office where the control terminal is located. A nondedicated trunk is a regular toll service trunk used for toll calls involving either a land subscriber or a mobile subscriber. If equipment employing a nondedicated trunk is used, it may be arranged to automatically dial a regular "0" toll trunk or a code such as "113" to access a special service trunk.
- 2.12 Item 3.10 refers to the provision which enables roaming mobiles to receive calls with operator assistance. This feature requires special applique equipment such as selector level access for use with a regular toll service trunk or it requires a dedicated trunk with the necessary interface equipment at the radio control terminal and the mobile service operator switchboard.
- 2.13 Item 3.11 concerns the connecting facility used to connect the radio control terminal and the operator switchboard when a dedicated trunk is required. A description of the facility should be provided indicating whether it is carrier derived, loaded cable, open wire, etc. The type of signaling should be described so that the Seller can provide the required interface equipment. The facility must meet all applicable REA specifications for toll connecting trunks.

2.14 Item 3.12 covers the extent of service to be offered roaming IMTS mobiles. The IMTS control terminal can be wired to accept dialed calls from roaming IMTS mobiles. If this feature is desired, the extent of service contemplated should be described. For example, mobiles from particular numbering plan areas (NPA) may be allowed to dial local exchange numbers, EAS numbers and special service codes.

2.15 Item 3.13 should provide information about the base station antenna supporting structure when it is provided by the Purchaser. This structure may be a water tower, building, existing antenna tower or other suitable structure. A description of the structure including location and height should be provided in Item 3.14. If antennas for existing systems are mounted on the structure, a description of their size and operating frequencies should be included.

2.16 Item 3.14 indicates if the Seller is to provide an antenna tower and the type of tower to be provided. Since self-supporting towers are much more expensive than guyed towers, the Purchaser should specify a guyed tower unless there is insufficient space for guying.

2.17 Item 3.15 permits the Purchaser to specify who will provide the supporting structure for a fixed subscriber station. Normally, the Purchaser will provide this structure. It can be a wood pole or other suitable structure. It is the responsibility of the Seller to determine the necessary height of the structure and to specify this height in Part III B, paragraph 2.43.

2.18 Item 3.16 allows the Purchaser to specify outdoor enclosures for the base or fixed station equipment. Fixed station enclosures must be large enough to house the battery and charger unless these items are housed in subscriber's premises. In any case, all enclosures or spaces must be designed to maintain the equipment environment within the equipment manufacturer's specified ranges of temperature and humidity.

2.19 Item 3.17 allows the Purchaser to list locations where the Seller is to provide grounding systems at the base and/or fixed subscriber locations. When new equipment is to be located at a site which has an existing station ground, item 3.17 may be used to specify that the Seller must connect to it.

2.20 Item 3.18 lists four kinds of documentations to be provided by the Seller prior to completion of the project. These are in addition to descriptive materials to be submitted with the Seller's proposal (paragraph 1.2 of Part III B).

3. EXPLANATION OF PART III B

- 3.1 The following information is to assist the Seller in completing its portion of REA Form 397e. Only those items which appear to need explanation are discussed.
- 3.2 Item 2.11c shows the quantity of radio channels proposed to serve the exchange area named in Item 2 of Part III B.
- 3.3 Item 2.2c should show the same quantity as Item 2.11c for initial installation.
- 3.4 Item 2.2d shows the quantity of radiotelephone subscribers that the control terminal will accommodate as home subscribers without the need for additional equipment.
- 3.5 Item 2.43 shows the required height of the antenna supporting structure for each fixed radiotelephone subscriber as determined by the Seller.
- 3.6 Item 3 covers the equipment required to give the degree of compatibility specified in Part III A, paragraphs 3.09 and 3.10. The Seller should provide a clear description of the service that may be rendered to roaming mobiles and also a description of the equipment required to interface with the control terminal and operator's switchboard via the trunk facility specified in Part III A, paragraph 3.11. Use additional sheet of paper where required.

PART III A

3.18 The Seller shall provide the following documentation prior to completion of the work:

3.181 (2) copies of the Control Terminal Instruction Manual.

3.182 (2) copies of the Base Station Instruction Manual.

3.183 (1) copy of the Subscriber Mobile Unit Instruction Manual for each (7) units, but in no event less than (2) copies covering the Subscriber Units.

3.184 (1) copy of a system sketch showing all stations, all transmit frequencies, wiring options used and other information which the Seller believes the Purchaser will need to maintain the system.

PART III

MOBILE AND FIXED DIAL RADIOTELEPHONE SPECIFICATIONS
DETAILED EQUIPMENT REQUIREMENTS AND TECHNICAL
DATA FOR APPLICATION ENGINEERING

1. GENERAL

- 1.1 The information in Part III A is supplied by the Purchaser to aid the Seller in quoting on a dial radiotelephone system as described herein. The Seller shall complete Part III B where applicable and submit any additional information necessary to fully describe the system proposed.
- 1.2 The system and the materials that comprise the system shall meet the requirements of Parts I, II and III of this specification.

PART III A

MOBILE AND FIXED DIAL RADIOTELEPHONE SPECIFICATIONS
TO BE PREPARED BY PURCHASER

1. The Canton Tel. Co. (Somestate500) requests the Radio Equipment Co. to
Name of Purchaser Name of Seller

submit its proposal to provide a Dial Radiotelephone System as described herein.

1.1 The following information is submitted, where checked, in addition to the detailed information spelled out in the spaces provided:

1.11 A map showing the desired service area, including:

a. The preferred location of each base station.

b. The location of the central office equipment building in which the control terminal will be installed.

c. The location of each fixed radiotelephone subscriber.

1.12 A floor plan of each central office building where equipment will be located.

a. This floor plan shows the dimensions and layout of all existing equipment and where the control terminal equipment will be installed.

b. The drawings also show where the base station radio equipment may be installed if it is to be located in the central office equipment building.

c. The floor plan indicates the rack height in the area where the base station equipment is to be located.

(NOTE: Item 1.12 is not included in this example, however, this information should be supplied under actual conditions.)

PART III. A

PREPARE THE FOLLOWING PARAGRAPHS FOR EACH LOCATION
WHERE EQUIPMENT IS KNOWN TO BE REQUIRED

2. Telephone Company

Name Canton Telephone Company

Mailing address Canton, Somestate

Address of shipping destination Same as above

3. Description of equipment to provide radiotelephone service out of
Canton

(Name of Central Office)

3.01 Quantity of 150 MHz radio channels required at this time: 1

3.02 Quantity of 450 MHz radio channels required at this time:

3.03 Quantity of mobile subscriber units required at this time: 15

3.031 Mobile units initially required are described as follows:

<u>Quantity of Mobiles</u>	<u>Quantity of Channels Equipped Initially</u>	<u>Color of Control Head</u>
<u>10</u>	<u>1</u>	<u>Beige</u>
<u>3</u>	<u>2</u>	<u>Blue</u>
<u>2</u>	<u>2</u>	<u>Black</u>

3.032 Mobile antennas shall be: Roof mount X Bumper mount

3.04 Quantity of fixed subscriber units required 1

3.041 Fixed subscriber units initially required are described as
follows:

<u>Quantity of Units</u>	<u>Quantity of Channels Equipped Initially</u>	<u>Color of Telephone Set</u>	<u>Quantity of Batteries and Chargers</u>
<u>1</u>	<u>1</u>	<u>Blue</u>	<u>1 each</u>

PART III A

3.042 Purchaser shall be responsible for providing battery charger(s)

Yes _____ No X

3.05 Primary power voltages available at central office: 48 VDC

115 + 5 VAC. 60 Hz

3.051 An existing standby power source is available.

Yes X No _____

If yes, list its KVA rating and the KVA load which is transferred to it during a commercial power failure: 25 kVA, 120 V, 3 phase generator.
Approximately 10 kVA existing load. Therefore, approximately 15 kVA is available for other uses.

3.052 A standby power source shall be provided by Seller.

Yes _____ No X

3.053 A new standby power source shall be furnished by the Purchaser.

Yes _____ No X

3.06 Description of central office equipment to which the control terminal will connect.

3.061 Manufacturer Telephone Switches, Inc.

3.062 Type Designation NTX

3.063 Type of ringing Decimonic

3.064 Terminal per line _____ Terminal per station X

3.07 Subscriber mobile and fixed unit appearances in the control terminal shall be connected to the central office equipment

in the following manner: (Check where applicable.)

PART III A

3.071 One-Party (subscriber per line) X.

3.072 Multiparty _____.

3.08 Type of billing planned initially is:

Flat rate X Message unit _____

3.09 The control terminal shall permit the following roaming mobiles

equipped with proper channels to place calls with operator assistance: (✓)

a. 150 MHz IMTS X.

b. 450 MHz IMTS _____.

c. 150 MHz manual or non-IMTS dial X.

3.091 This service is to be provided with a;

a. Non-dedicated trunk using automatic dial _____
equipment. (For example, "0" or "113" may be desired.)

b. Dedicated trunk X.

3.10 The control terminal shall permit the following roaming mobiles

equipped with proper channels to receive calls with operator assistance: (✓)

a. 150 MHz IMTS X.

b. 450 MHz IMTS _____.

c. 150 MHz manual X.

3.101 This service is to be provided with a:

a. Regular toll service trunk _____.

b. Dedicated trunk X.

3.11 The operator attended office is located remote from the central office

where the control terminal will be installed. The existing connecting

facility which is available for use as a dedicated trunk is described as follows:

PART III A

4 wire VF _____, carrier channel X, type of signaling Outband, trunk relay circuit number and manufacturer for each end of trunk Seller to provide both ends.

3.12 The control terminal shall be set up to permit roaming IMTS mobiles to make local calls on a dial basis. Yes X No _____

If yes, the details are as follows: IMTS roamers from the home NPA will be given dial tone and provided the same service as local subscribers except that attempted DDD calls shall be completed by the operator.

3.13 Base station antenna supporting structure will be supplied by the Purchaser. If it is an existing structure, note existing antennas, if any. (Seller must concur that its location and height will provide the specified coverage.) Yes _____ No X. Description of structure:

3.14 Base station antenna supporting structure shall be a tower supplied by Seller. Yes X No _____. Antenna supporting structure shall be: Guyed Tower X Self-Supporting _____ Other _____
Explain: _____

3.15 Fixed subscriber antenna supporting structure(s) will be supplied by Purchaser. Yes X No _____. Seller shall determine and specify height in Part III B.

3.16 Enclosures shall be provided for equipment as follows: (1) Pole mounted enclosure for fixed subscriber equipment described in item 3.041.

3.17 A station grounded system in accordance with Appendix I attached to REA Form 397e shall be provided by the Seller at _____.
(locations)

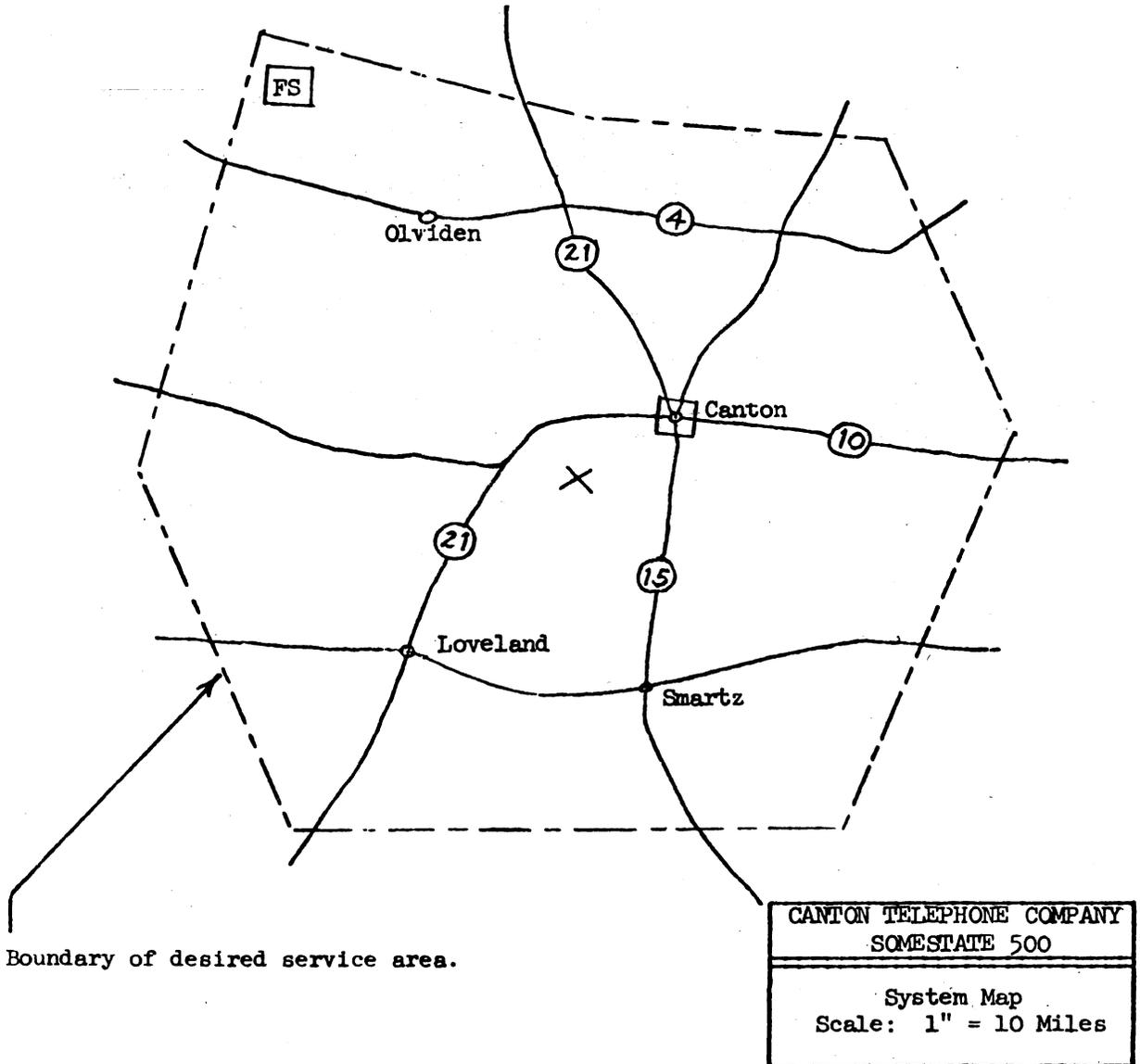
APPENDIX A

EXAMPLE SHOWING COMPLETED PARTS III A AND III B
FOR A HYPOTHETICAL RADIO TELEPHONE SYSTEM

1. Figure 1 of Part III A shows information provided by the Purchaser which shows the desired service area, the preferred location of the base station, the location of the central office where the control terminal will be installed and the location of a fixed radiotelephone subscriber.
2. Figure 1 of Part III B shows the location of the base station and the service area as determined by the Seller. (Note: In this example the Seller concurs with the Purchaser.)
3. A floor plan was not included in this example because of the self-explanatory nature of that requirement.

PART III A

Figure 1
Service Area Map
Prepared by Customer



Boundary of desired service area.

CANTON TELEPHONE COMPANY
SOMESTATE 500
System Map
Scale: 1" = 10 Miles

LEGEND

- X Purchaser's preferred location of base station
- [] Central office where control terminal will be located
- [FS] Fixed radio subscriber
- △ Seller's recommended location of base station.

NOTE: Seller shall show coverage to be provided by enclosing service area with an appropriate line determined by topographical features that may affect transmission to mobiles. (Seller may use a copy of this map.)

PART III B

MOBILE AND FIXED DIAL RADIOTELEPHONE SPECIFICATION
TO BE PREPARED BY SELLER

1. The Radio Equipment Company submits, for the Purchaser's consideration,
Name of Seller

a proposal for a dial radiotelephone system which will serve the area and number of subscribers stated in Part III A. The equipment and material are guaranteed to perform in strict accordance with Part I of these specifications unless deviations or exceptions are set forth in an addendum attached hereto.

- 1.1 The cost of preparing this proposal, including all studies and surveys, is included in the base proposal price.

- 1.2 Attachments to this proposal are as follows (Seller show compliance by checking (✓) each):

1.21 A map showing the service area coverage to be provided by each system offered in this proposal. The locations of the base stations, towers and fixed subscriber stations are shown on the map.

1.22 The manufacturer's specifications covering the base station, control terminal, subscriber radiotelephone units, tower and antenna specifications are also included where applicable.

1.23 A narrative description of the proposed system. It includes a general description of the system plus additional information which the Seller believes will help the Purchaser understand the proposal.

PART III B

PREPARE THE FOLLOWING PARAGRAPHS FOR EACH EXCHANGE AREA
WHERE EQUIPMENT IS TO BE INSTALLED

2. List of equipment that will be located in Canton .
(Exchange area)

2.1 Base Station Equipment

2.11 RF Equipment

- a. Manufacturer Radio Equipment Company .
- b. Unit Model Number A-44-CX .
- c. Quantity of Channels Provided 1 .
- d. RF Power Output to Transmission line 50 Watts .
- e. Total Power Consumption Required 600 Watts at 117 Volts .

2.12 Antenna Supporting Structure, if Supplied by Seller, Including
Erection and Complete Installation.

- a. Manufacturer Radio Equipment Company .
- b. Unit Model Number 40CA .
- c. Height of Tower 150 feet .
- d. Wind Loading 30 lbs. per sq. ft. .
- e. Guyed Yes .
- f. Self-supporting _____ .
- g. Painting and Lighting is Likely to be Required by FCC No .

2.13 Antenna and Transmission Line

- a. Description of Antenna REC-821 .
- b. Antenna Gain Over Half-wave Dipole 6 dB .
- c. Description of Transmission Line 7/8" foam ins. coax. .

PART III B

d. Length of transmission line 160 feet.
attenuation 0.6 dB/100 feet at base station frequency.

2.14 A standby power source is to be provided by Seller.

Yes _____ No X

If yes, describe _____
_____.

2.2 Control Terminal Equipment

- a. Manufacturer Radio Equipment Company.
- b. Unit Model TES-9.
- c. Quantity of radio channels for which terminal is equipped 1.
- d. Quantity of subscribers for which terminal is equipped 30.
- e. Description of radio link, where applicable, connecting base station and control terminal. N.A.

2.3 Mobile Subscriber Units

2.31 RF Equipment

- a. Manufacturer Radio Equipment Company.
- b. Unit Model Number MBS-42.
- c. RF Power Output to Transmission Line 20 Watts.
- d. Standby Current Drain 2 Amperes at 13.6 VDC.
- e. Transmit Current Drain 10 Amperes at 13.6 VDC.

2.32 Check type of antenna supplied: Roof Mount X Bumper Mount _____.

2.33 Mobile units are described as follows:

<u>Quantity of Units</u>	<u>Quantity of Channels Equipped</u>	<u>Control Head Color</u>
<u>10</u>	<u>1</u>	<u>Beige</u>
<u>3</u>	<u>2</u>	<u>Blue</u>
<u>2</u>	<u>2</u>	<u>Black</u>

PART III B

2.4 Fixed Subscriber Stations

2.41 RF Equipment

- a. Manufacturer Radio Equipment Company.
- b. Unit Model Number MBS-42.
- c. RF Power Output to Transmission Line 20 Watts.
- d. Standby Current Drain 2 Amperes at 13.6 VDC.
- e. Transmit Current Drain 10 Amperes at 13.6 VDC.

2.42 Antenna and Transmission Line

- a. Description of Antenna REC-820.
- b. Antenna Gain Over Half-wave Dipole 9 dB.
- c. Description of Transmission Line 1/2" coaxial type 76.
- d. Length of Transmission Line 60 Feet;
Attenuation 1.0 dB/100 Feet.

2.43 Antenna Supporting Structure Height 50 Feet.

2.44 Fixed subscriber units are described as follows:

Quantity of Units	Quantity of Channels Per Unit	Telephone Set Color	Quantity of Battery Chargers
<u>1</u>	<u>1</u>	<u>Blue</u>	<u>1</u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>

2.441 Description of Battery Charger and Battery

- a. Manufacturer Exodus.
- b. Unit Model Number RT-47B Charger 12V, 20 A.H. Batt.

PART III B

3. Operator Service for Foreign Mobile Units as Specified in Part III A.

(Check where applicable.)

3.1 Uses a Non-Dedicated Trunk No .

3.11 Automatic Dial "0" No .

3.12 Automatic Dial No .

(Fill in code
from III A)

3.2 Requires a Dedicated Trunk Yes .

3.21 Describe Requirements: Mobiles equipped with an IMTS or a manual (600/1500 cps) decoder may be dialed by a mobile service operator. Mobiles that can access the radio channel but do not have dial equipment or are restricted from dialing will be routed to the mobile service operator. These services will be performed via a dedicated trunk. The facility described in Part III A, item 3.11 will require a model 9W/EM.

PART III B

4. Spare Parts and Test Equipment

4.1 Listed below, for the Purchaser's consideration, are the spare parts and maintenance tools including price of each which we recommend for the radiotelephone equipment in this proposal. The cost of these items has not been included in the base proposal price. The Purchaser may accept any or all items as an alternate to the base proposal price: (1) IMP-65 Mobile Supervisory Unit \$350

(1) Box of 10 Primary Fuses \$7.10

4.2 We recommend the following test equipment. The price has not been included in the base proposal price. The Purchaser may accept any or all items as an alternate to the base proposal price:

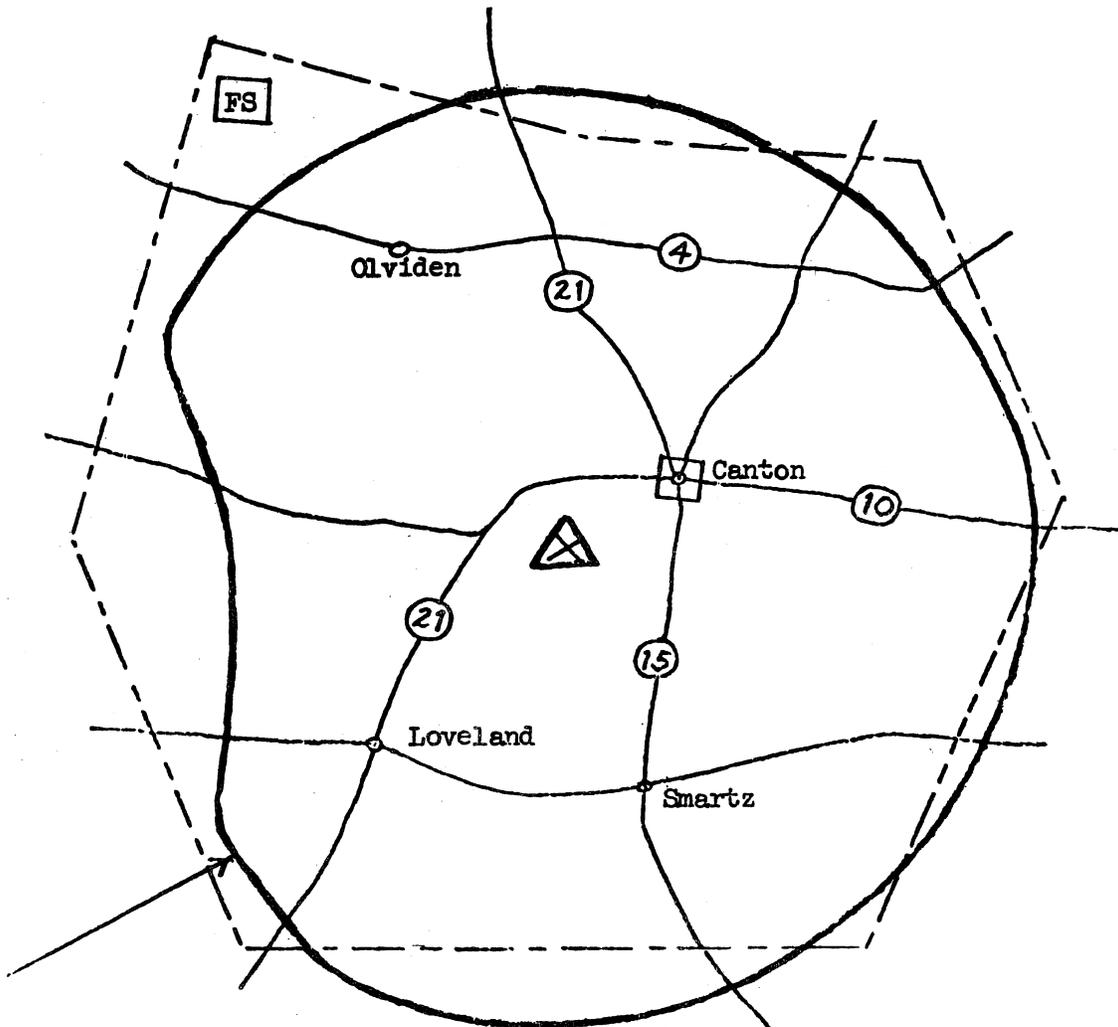
A separate maintenance contract is proposed for this system. Customer owned test equipment is not required.

5. Training

5.1 Recommended training courses available at Manufacturers location are: Course B4-7 requires 2 weeks attendance at factory. Training classes are scheduled for May and September each year. Travel and living expenses to be paid by purchaser. There is no tuition charge.

PART III B

Figure 1
 Service Area Map
 Completed by Seller



Boundary of reliable mobile service as determined by base station antenna elevation and topography of area.

CANTON TELEPHONE COMPANY SOMESTATE 500
System Map Scale: 1" = 10 Miles

LEGEND

- X Purchaser's preferred location of base station
- Central office where control terminal will be located
- Fixed radio subscriber
- △ Seller's recommended location of base station