3. COMMUNICATION EQUIPMENT SELECTION FACTORS

This section provides a discussion of 14 selection factors that are recommended for consideration by the emergency first responder community when selecting and purchasing communications equipment that can be used in conjunction with chemical and biological protective clothing and respiratory equipment. These factors were compiled by a panel of scientists and engineers who have multiple years of experience in communication equipment, domestic preparedness, emergency and public service communications, and identification of emergency first responder needs. The factors have also been shared with the emergency first responder community in order to get their thoughts and comments.

It is anticipated that, as additional input is received from the emergency first responder community, additional factors may be added or existing factors may be modified. These factors were developed so that communications equipment could be compared and contrasted in order to assist with the selection and purchase of the most appropriate equipment. *It is important to note that the evaluation conducted using the 14 selection factors was based solely upon vendor-supplied data and no independent evaluation of equipment was conducted in the development of this guide.* The vendor-supplied data can be found in its entirety in Volume II.

Prior to discussing each of the selection factors, it is important to note that although weight was considered an important selection factor for several of the other guides, weight was not included as a selection factor for communication equipment. By definition, a portable radio is light (< 2 lb), a mobile radio is attached to a vehicle (therefore weight is not critical), and repeaters are generally operated at a fixed location.

The results of the evaluation of the communication equipment against the 14 selection factors are provided in section 4. The remainder of this section defines each of the selection factors.

3.1 Maximum Transmitter Output Power

The transmitter output power refers to the maximum output power of the transmitter. For portable radios, too high an output power leads to a shortened battery use cycle (the time between battery recharging or replacing), or too low output can put the life of the responder operating the radio in jeopardy as the signal may not be able to be picked up by a repeater or another receiver.

The above limitations do not apply to mobile radios or repeaters since they have a higher output and an external power source.

3.2 Secure Communications Compatibility

Secure communications is the ability to encrypt and decrypt communications signals. Once properly encrypted, the communication equipment can transmit any signal.

3.3 Programmability

This selection factor defines how restrictive the radio programming is for the communications equipment. Programming communications equipment focuses primarily on the ability to add or delete channels. Depending on the equipment, the ability to program or reprogram a radio may be limited to authorized personnel and/or vendors. The equipment may be able to be programmed by the end user as well.

3.4 User Capability

User capability refers to the ability of the communication system to simultaneously support different types of users (e.g., fire, EMS, Command, and law enforcement). An "unlimited capability" refers to the ability of the equipment and/or system to support all users without any restrictions whatsoever. A "fixed capability" refers to a system that allows communications only within each group, with Command Officers, and with other groups via a "shared mutual aid" channel. "Restrictive capability" refers to a system that allows users to communicate only with others within their own user group and to Command Officers. A Command Officer can communicate with other Command Officers as well as all the user groups in the chain of command.

3.5 Line of Sight

Line of sight refers to the distance that transmissions can occur in a clear area (no obstructions such as skyscrapers, forests, etc.) without a repeater.

3.6 Power Requirements

Power requirements indicate whether specific equipment can operate on a battery and/or ac electrical power. Since power requirements are inherently different for portable and mobile/repeater equipment items, separate selection factors for these equipment items are presented.

3.7 Battery Life

Battery life is the ability of the portable radio equipped with an approved battery to operate at maximum transmitter power for an 8 h duty shift when used in a 5/5/90 operating mode (5 % of the time transmitting, 5 % of the time receiving with the squelch being broken, 90 % of the time receiving with the squelch not being broken—"standby"). To squelch is the ability to silence the radio in the absence of a desired incoming radio signal. This selection factor is only relevant for portable radios.

3.8 Battery Locking Ability

Battery locking ability considers how securely the battery is attached to the radio. This selection factor is only relevant for portable radios.

3.9 Vehicular Adapter (Portable Radios)

Vehicular adapter refers to whether the portable radio has an optional vehicular adapter accessory. The vehicular adapter accessory allows the portable radio to act like a mobile radio.

3.10 Digital Communications Compatibility

Digital communications compatibility refers to whether the radio is capable of digital communication with or without an adapter (a manufacturer or third party supplied module installed in the radio that permits operation on a digital communication system).

3.11 Durability

The durability of a piece of equipment describes the ruggedness of the equipment (i.e., can the equipment be dropped from several feet or submersed in water and still operate).

3.12 Unit Cost

Unit cost is the cost of the radio equipment, including the cost of all support equipment and consumables. This factor, in conjunction with other selection factors, can help the user decide if a radio will be deemed suitable for disposal after use, suitable for special uses only, or suitable for all uses.

3.13 Operator Skill Requirements

Operator skill level refers to the skill level and training required for the operation of the equipment.

3.14 Training Requirements

Training requirements are the amount of instruction time required for the operator to become proficient in the operation of the instrument. For example, higher-end equipment such as a repeater requires more in-depth training than a portable radio; therefore, this selection factor has different criteria for portable and mobile/repeater equipment items.

Details on the manner in which the selection factors were used to assess the equipment are presented in table 3–1.

Table 3-1. Selection factor key for communication equipment

February 2001

	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements (Portable)	Power Requirements (Mobile and Repeater)	Battery Life (Portable)	Battery Locking Ability (Portable)	Vehicular Adapter (Portable)	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements (Portable)	Training Requirements (Mobile and Repeater)
●	Power output of 3 W to 6 W	Capable of secure transmissions without an accessory	Can be programmed/ reprogrammed by authorized personnel	Unlimited capability	Transmission can travel 10 miles or more	Operates off battery pack, external dc, or ac adapter	Uses 12 V dc to 15 V dc	Equal to or greater than 8 h	Battery securely locked into place on the radio and cannot be dislodged by bumping or dropping	Has vehicle adapter (with built-in amplifier) that connects to vehicle's electrical system and external antenna	Capable of digital transmissions without an adaptor	Designed for rugged use and is submersible in water	Less than or equal to $500 per unit	No special skills or training required	No special training required	No special training required
◔						Operates off battery pack or external dc adapter										
◑	Power output of more than 1.5 W but less than 3 W	Capable of secure transmissions with an accessory	Can be programmed/ reprogrammed by vendor only	Fixed capability	Transmission can travel 5 miles to 10 miles	Operates off battery pack or ac adapter	Uses 120/220 V ac	Greater than 4 h but less than 8 h			Capable of digital transmissions with an adaptor	Designed for rugged use but is not submersible in water	Greater than $500 but less than $1000 per unit	No special skills but some training required	Less than 60 min training required	Less than 8 h training required
○	Power output of less than 1.5 W	Not capable of secure transmissions	Can be programmed/ reprogrammed by the end user	Restrictive capability	Transmission can travel less than 5 miles	Operates off battery pack only	Uses voltage other than standard 12 V dc to 15 V dc or 110/220 V ac	Less than 4 h	Battery not locked into place	Does not have optional vehicle adapter	Not capable of digital transmissions	Designed for standard use only	Greater than $1000 per unit	Technical background required to operate equipment	More than 60 min training required	More than 8 h training required

The gray cells designate that the symbol is not applicable for the selection factor.
A duplicate of this table is provided for quick reference (as Table 4-12).

4. COMMUNICATION EQUIPMENT EVALUATION

An extensive market survey was conducted to identify commercially available communication equipment. The market survey, which included the identification of new equipment and interaction with numerous equipment vendors, identified 181 different communication equipment items. Section 4, of this volume, documents the results of evaluating each equipment item versus the 14 selection factors identified in sec. 3. Section 4.1 defines the equipment usage categories and sec. 4.2 discusses the evaluation results. Volume II of this guide provides details of the market survey, as well as data on each piece of equipment.

4.1 Equipment Categories

To display the evaluation results in a meaningful format, the communication equipment was grouped into four categories primarily based on physical size and power requirements of the equipment. The following types of communication equipment in this guide are portable, mobile, base, and repeater.

- Portable equipment is small and self-contained transceivers (transmitter and receiver) that are easily carried by personnel.

- Mobile equipment is a transceiver that operates from the electrical supply of a vehicle and is typically connected to an external antenna.

- A base is a transceiver that typically operates from the electrical system of a building and is connected to an external antenna.

- A repeater is a radio that receives and retransmits signals from portable, mobile, and base radios to extend the range of all of the radios.

4.2 Evaluation Results

The evaluation results for the communication equipment are presented in tabular format for the 181 items of communication equipment that were identified at the time this guide was written. A table is presented for each equipment category (see sec. 4.1); the portable and mobile radios are further divided by their trunking capability. The rating of each item is indicated by a symbol: the open symbol indicates that the item does not meet the conditions of a specific selection factor, the partially filled circles indicate that the equipment partially meets the conditions of a selection factor, and the full circle indicates that the piece of equipment totally meets the conditions of a selection factor. The acronym “TBD” (to be determined) is displayed in the appropriate cell if data were not available to characterize a specific selection factor. The acronym “NA” is displayed in the appropriate cell if the data were not applicable for a piece of equipment. Table 4–1 provides the table number and associated table pages for each of the nine usage categories and the selection factor table.

Table 4–1. Evaluation results reference table

Table Name	Table Number	Page(s)
Portable (Conventional and Trunked)	4–3	20–25
Portable (Conventional)	4–4	26–30
Portable (Trunked)	4–5	31
Mobile (Conventional and Trunked)	4–6	32–35
Mobile (Conventional)	4–7	36–37
Mobile (Trunked)	4–8	38
Repeater	4–9	39–40
Base	4–10	41
Base Station and/or Repeater	4–11	42
Selection Factor Key for Communication Equipment	4–12	43

4.2.1 Portable

The results of categorizing the communication equipment are detailed in table 4–2. Radio equipment was further divided by the communication technology (see sec. 2.1) of each communication item.

There were 100 portable detectors identified in the development of this guide. These 100 portable radios were further divided into three subcategories identifying their trunking capability. There were 55 portable radios using the conventional technology (see sec. 2.1.1.1) that were also capable of trunking (with or without an accessory). There were 44 portable radios using the conventional technology only. There was one portable radio identified as using only the trunking technology (see sec. 2.1.1.2). Tables 4–3, 4–4, and 4–5 detail the evaluation results for all three of these subcategories, respectively.

4.2.2 Mobile

There were 54 mobile radios identified in the development of this guide. These 54 mobile radios were further divided into three subcategories identifying their trunking capability. There were 33 mobile radios using the conventional technology that were also capable of trunking (with or without an accessory). There were 19 mobile radios using the conventional technology only. There were two mobile radios identified as using only the trunking technology. Tables 4–6, 4–7, and 4–8 detail the evaluation results for all three of these subcategories, respectively.

4.2.3 Base Station/Repeaters

There were 27 base or repeater systems identified in the development of this guide. These 27 base or repeater systems were further divided into three subcategories (repeater, base station, or base station/repeater). There were 17 repeater systems, four base systems, and six base station/repeater systems.

4.2.3.1 Repeater

There were 17 repeater systems identified in the development of this guide. These 17 repeater systems were further divided into three subcategories identifying their trunking capability. There were four repeater systems using conventional technology that were also capable of trunking (with or without an accessory). There were 12 repeater systems using conventional technology. There was one repeater system identified as using only trunking technology. Table 4–9 details the evaluation results for the repeater communications equipment.

4.2.3.2 Base Station

There were four base stations identified in the development of this guide. All four of these systems used conventional technology. Table 4–10 details the evaluation results for the base stations.

4.2.3.3 Base Station/Repeater

There were six base/repeater systems identified in the development of this guide. These six repeater systems were further divided into three subcategories identifying their trunking capability. There were five systems using conventional technology that were also capable of trunking (with or without an accessory). There was one system using only conventional technology, and no systems using only trunking technology. Table 4–11 details the evaluation results for the repeater/base station equipment.

Table 4–2. Communication equipment technology format

Radio Type	Communication Format			
	Both	**Conventional**	**Trunked**	**Total**
Portable	55	44	1	100
Mobile	33	19	2	54
Repeater	4*	12*	1*	17
Base	0*	4*	0*	4
Base Station and/or Repeater	5*	1*	0*	6
Total	**97**	**80**	**4**	**181**

*Separate base, repeaters, and base/repeater tables were not created for conventional and trunked technologies.

Table 4-3. Portable communication equipment (conventional and trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
5	EDACS™ LPE-200™ Portable 800 MHz, 900 MHz	●	◑	●	●	●	○	●	●	●	◑	●	○	◑	◑
9	ProVoice™ Jaguar™ 700P, 800 MHz	●	●	●	●	●	○	●	●	●	●	●	○	◑	◑
10	ComNet Ericsson Jaguar Transceiver, Portable; Jaguar 700P, 800 MHz	●	●	●	●	●	○	●	●	TBD	◑	◑	○	◑	◑
11	ComNet Ericsson M-RK™ Analog Portable, M-RK I	●	◑	●	●	●	○	●	●	●	◑	◑	◑	◑	◑
12	ComNet Ericsson M-RK™ Analog Portable, M-RK II	●	◑	●	●	●	○	●	●	●	●	◑	○	◑	◑
13	ComNet Ericsson M-RK™ Analog Portable, M-RK II Scan	●	●	●	●	●	○	●	●	●	◑	◑	○	◑	◑
23	ProVoice™ LPE-200™ Portable 800 MHz	●	●	●	●	●	○	●	●	●	●	●	○	◑	◑
32	EFJohnson Transceiver, Portable; 77xx-800 MHz	◑	○	●	●	TBD	●	●	●	○	○	○	◑	◑	◑
33	EFJohnson Transceiver, Portable; 98xx-800 MHz	●	○	●	●	●	●	NA	NA	NA	○	◑	◑	◑	◑
34	EFJohnson Transceiver, Portable; 501x VHF	●	●	●	●	TBD	●	●	●	○	●	◑	○	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-3. Portable communication equipment (conventional and trunked)
February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
35	EFJohnson Transceiver, Portable; 504x UHF	●	●	●	●	TBD	●	●	●	○	●	◑	○	◑	◑
36	EFJohnson Transceiver, Portable; 508x-800 MHz	◑	●	●	●	TBD	●	●	●	○	●	◑	○	◑	◑
39	Icom VHF Transceiver, Portable; IC-F3	●	●	●	●	●	○	●	●	○	○	◑	●	●	●
40	Icom VHF Transceiver, Portable; IC-F3S	●	○	●	●	●	○	●	●	○	○	◑	●	●	●
41	Icom VHF Transceiver, Portable; IC-F3GT/ IC-F3GTS	●	◑	●	●	●	○	●	●	○	○	◑	●	●	●
42	Icom UHF Transceiver, Portable; IC-F4	●	◑	●	●	○	○	●	●	○	○	◑	●	●	●
43	Icom UHF Transceiver, Portable; IC-F4S	●	○	●	●	○	○	●	●	○	○	◑	●	●	●
44	Icom UHF Transceiver, Portable; IC-F4GT/ IC-F4GTS	●	◑	●	●	●	○	●	●	○	○	◑	●	●	●
49	Icom VHF Transceiver, Portable; IC-F30GS/ IC-F30GT	●	●	●	●	●	○	●	●	○	○	◑	◑	◑	◑
50	Icom VHF Transceiver, Portable; IC-F30LT Land Use; IC-F30LT Marine Version	●	◑	●	●	●	○	●	●	○	○	●	◑	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-3. Portable communication equipment (conventional and trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
51	Icom UHF Transceiver, Portable; IC-F40GS/ IC-F40GT	●	●	●	●	●	○	●	●	○	○	◑	◑	●	●
52	Icom UHF Transceiver, Portable; IC-F40LT Land Use; IC-F40M/IC-F40LT Marine Version	●	◑	●	●	●	○	●	●	○	○	●	●	●	●
55	Kenwood Synthesized FM Portable Radio; TK-260/G	●	○	●	●	○	○	●	●	●	◑	◑	●	◑	◑
56	Kenwood Synthesized FM Portable Radio; TK-270/G	●	○	●	●	○	○	●	●	●	◑	◑	●	◑	◑
57	Kenwood Synthesized FM Portable Radio; TK-360/G	●	○	●	●	○	○	●	●	●	○	◑	●	◑	◑
58	Kenwood Synthesized FM Portable Radio; TK-370/G	●	○	●	●	○	○	●	●	●	○	◑	◑	◑	◑
80	Kenwood Synthesized FM Portable Radio/Trunked System; TK-280	●	◑	●	●	○	○	●	●	●	◑	◑	◑	◑	◑
81	Kenwood Synthesized FM Portable Radio/Trunked System; TK-380	●	◑	●	◑	○	○	●	●	●	◑	◑	◑	◑	◑
82	Kenwood 800/900 MHz FM Transceiver; TK-480 and TK-480 NPSPAC	◑	◑	●	●	○	○	●	●	●	◑	◑	◑	◑	◑
84	Kenwood Trunked Portable Radios; TK-930HDK2 NSPAC	●	◑	●	●	◑	●	NA	NA	NA	◑	◑	◑	◑	◑

'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-3. Portable communication equipment (conventional and trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
90	Motorola Astro Transceiver, Portable; Saber 1	●	◑	●	◑	TBD	◕	TBD	TBD	●	●	○	○	◑	◑
91	Motorola Astro Transceiver, Portable; Saber 2	●	◑	●	◑	TBD	◕	TBD	TBD	●	◑	○	○	◑	◑
92	Motorola Astro Transceiver, Portable; Saber 3	●	◑	●	◑	TBD	◕	TBD	TBD	●	◑	○	○	◑	◑
93	Motorola Astro Transceiver, Portable; XTS 3000 Model 1	●	◑	●	◑	TBD	○	TBD	TBD	●	◑	◑	○	◑	◑
94	Motorola Astro Transceiver, Portable; XTS 3000 Model 2	●	◑	●	◑	TBD	○	TBD	TBD	●	◑	◑	○	◑	◑
95	Motorola Astro Transceiver, Portable; XTS 3000 Model 3	●	◑	●	◑	TBD	○	TBD	TBD	●	◑	◑	○	◑	◑
96	Motorola Astro Transceiver, Portable; XTS 3000R Series Models 1, 2, & 3	●	◑	●	◑	TBD	◑	TBD	TBD	●	◑	●	○	◑	◑
108	Motorola Transceiver, Portable; MT 2000 VHF	●	○	●	◑	TBD	◑	●	TBD	●	TBD	◑	○	◑	◑
109	Motorola Transceiver, Portable; MTS 2000 Model I	●	◑	●	◑	TBD	◑	●	TBD	○	TBD	◑	○	◑	◑
110	Motorola Transceiver, Portable; MTS 2000 Model II	●	◑	●	◑	TBD	◑	●	TBD	○	TBD	◑	○	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-3. Portable communication equipment (conventional and trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
111	Motorola Transceiver, Portable; MTS 2000 Model III	●	◑	●	◑	TBD	◑	●	TBD	○	TBD	◑	○	◑	◑
112	Motorola Trunked Portable Radio; MTX 8000 Model B3	●	◑	●	◑	TBD	◑	TBD	TBD	●	TBD	○	◑	◑	◑
113	Motorola Trunked Portable Radio; MTX 8000 Model B5	●	◑	●	◑	TBD	◑	TBD	TBD	●	TBD	○	○	◑	◑
114	Motorola Trunked Portable Radio; MTX 8000/9000 Model B7	●	◑	●	◑	TBD	◑	TBD	TBD	●	TBD	○	○	◑	◑
145	Maxon UHF Transceiver, Portable; SP-150U	●	○	●	●	◑	○	●	●	○	○	◑	◑	◑	◑
162	Vertex HX Series; HX482UT UHF Portable	●	○	●	●	TBD	○	◑	TBD	○	TBD	○	◑	◑	◑
163	Vertex HX Series; HX580 Dual Protocol Hand Held	◑	○	●	●	TBD	◕	TBD	TBD	○	TBD	○	◑	◑	◑
164	Vertex VX Series; VX-210V (VHF Model)	●	◑	●	●	○	○	●	TBD	TBD	TBD	◑	●	●	●
165	Vertex VX Series; VX-210U (UHF Model)	●	◑	●	●	○	○	◑	TBD	TBD	TBD	◑	●	●	●
166	Vertex VX Series; VX-400V (VHF Model)	●	◑	●	●	○	○	●	TBD	TBD	TBD	◑	◑	●	●

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-3. Portable communication equipment (conventional and trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
167	Vertex VX Series; VX-400U (UHF Model)	●	◑	●	●	○	○	◑	**TBD**	**TBD**	**TBD**	◑	◑	●	●
168	Vertex VX Series; VX-500	●	◑	●	●	◑	○	◑	**TBD**	**TBD**	**TBD**	◑	**TBD**	●	●
169	Vertex VX Series; VX-510LX (Low Band VHF)	●	◑	●	●	◑	○	●	**TBD**	**TBD**	**TBD**	◑	◑	●	●
170	Vertex VX Series; VX-510V (VHF Model)	●	◑	●	●	○	○	●	**TBD**	**TBD**	**TBD**	◑	◑	●	●
171	Vertex VX Series; VX-510U (UHF Model)	●	◑	●	●	○	○	●	**TBD**	**TBD**	**TBD**	◑	◑	●	●

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-4. Portable communication equipment (conventional)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
1	Communications-Applied Technology; AWIS Portable Radio	○	●	●	○	○	○	●	●	○	●	◑	○	●	●
3	Communications-Applied Technology; QB Series: QB-3S, QB-3S/IS/ QB-3R Portable Radios	○	○	○	NA	○	○	●	●	○	○	◑	○	●	●
6	EDACS™ M-RK™ Aegis™ Portable VHF, UHF, 800 MHz, M-RK I	●	●	●	●	●	○	●	●	●	●	●	○	◑	◑
7	EDACS™ M-RK™ Aegis™ Portable VHF, UHF, 800 MHz, M-RK II	●	●	●	●	●	○	●	●	●	●	●	○	◑	◑
8	EDACS™ M-RK™ Aegis™ Portable VHF, UHF, 800 MHz, M-RK II SCAN	●	●	●	●	●	○	●	●	●	●	●	○	◑	◑
19	ComNet Ericsson Panther Transceiver, Portable; Panther 400P	●	○	●	●	●	○	●	●	●	○	◑	●	◑	◑
20	ComNet Ericsson Panther Transceiver, Portable; Panther 500P	●	○	●	●	●	○	●	●	●	○	○	◑	●	●
21	ComNet Ericsson Panther Transceiver, Portable; Panther 600P	●	○	●	●	TBD	○	●	●	●	◑	◑	●	◑	◑
22	ComNet Ericsson Panther Transceiver, Portable; Panther 625P	●	○	●	●	TBD	○	●	●	●	◑	◑	◑	◑	◑
74	Kenwood Transceiver, Portable; TK-2100	◑	○	●	●	○	○	●	●	○	○	◑	●	●	●

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-4. Portable communication equipment (conventional)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
75	Kenwood Transceiver, Portable; TK-3100	◑	○	●	●	○	○	●	●	○	○	◑	●	●	●
76	Kenwood Transceiver, Portable; TK-3101	◑	○	●	●	○	○	●	●	○	○	◑	●	●	●
77	Kenwood VHF FM Transceivers; TK-290	●	◑	●	●	○	○	●	●	●	◑	◑	◑	◑	◑
78	Kenwood UHF FM Transceivers; TK-390	●	◑	●	●	○	○	●	●	●	◑	◑	◑	◑	◑
105	Motorola Transceiver, Portable; VISAR	●	○	●	●	TBD	◕	◑	TBD	○	TBD	◑	○	◑	◑
106	Motorola Transceiver, Portable; HT 1000	●	○	●	●	TBD	◑	●	TBD	TBD	TBD	◑	○	◑	◑
107	Motorola Transceiver, Portable; JT 1000	●	○	●	●	TBD	◑	TBD	TBD	●	TBD	○	○	◑	◑
118	Racal Transceiver, Portable; MBITR (Multiband Inter/Intra Team Radio)	●	●	●	●	●	◕	●	●	●	●	●	○	◑	◑
119	Racal Transceiver, Portable; MSHR (Miniature Secure Handheld Radio)	●	●	●	●	●	◕	◑	●	●	●	●	○	◑	◑
120	Racal Transceiver, Portable; 20 Meter MSHR	●	●	●	●	●	◕	◑	●	●	●	●	○	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-4. Portable communication equipment (conventional)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
121	Racal Transceiver, Portable; Racal 25	●	●	●	●	●	◕	●	●	TBD	●	●	○	◑	◑
125	BK Synthesized FM E Series DES EPH 599, EPU 499 and EPV 499 Models	●	●	●	●	TBD	○	TBD	TBD	○	TBD	◑	○	◑	◑
126	BK Synthesized FM Portable Radio; E Series, EPH 51 and 52 Models	●	○	●	●	TBD	○	TBD	TBD	○	TBD	◑	○	◑	◑
127	BK Synthesized FM Portable Radio; E Series, EPI 510 Models	●	○	●	●	TBD	○	TBD	TBD	○	TBD	◑	○	◑	◑
128	BK Synthesized FM Portable Radio; E Series, EPU & EPV 414 and 499 Models	●	○	●	●	TBD	○	TBD	TBD	○	TBD	◑	○	◑	◑
130	BK Radio FM Transceiver, Portable; G Series, GPH Models	●	○	●	●	TBD	○	●	TBD	TBD	TBD	○	○	◑	◑
133	Relm Portable Radios; MPU08 (UHF)	●	○	●	●	TBD	○	TBD	TBD	○	TBD	○	●	●	●
134	Relm Portable Radios; MPU32 (UHF)	●	○	●	●	TBD	○	TBD	TBD	○	TBD	○	●	◑	◑
135	Relm Portable Radios; MPV32 (VHF)	●	○	●	●	TBD	○	TBD	TBD	○	TBD	○	●	◑	◑
141	Maxon VHF/UHF Transceiver, Portable; SP-120	◑	◑	●	●	○	○	●	●	○	○	◑	●	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-4. Portable communication equipment (conventional)
February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
142	Maxon VHF/UHF Transceiver, Portable; SP-130/SP-140	●	◑	●	●	◑	○	●	●	○	○	◑	●	◑	◑
143	Maxon VHF/UHF Transceiver, Portable; SP-200	●	◑	●	●	◑	○	●	●	○	○	◑	◑	◑	◑
144	Maxon VHF/UHF Transceiver, Portable; SP-300	●	◑	●	●	◑	○	●	●	○	○	◑	●	◑	◑
146	Vertex Dual Band (VHF & UHF) Transceiver, Portable; FTH-2070	●	◑	●	●	○	○	●	TBD	○	TBD	◑	○	●	●
152	Vertex VX Series; VX-10V (VHF Model)	●	◑	●	●	○	○	●	TBD	○	TBD	TBD	◑	●	●
153	Vertex VX Series; VX-10U (UHF Model)	●	◑	●	●	○	○	◑	TBD	○	TBD	TBD	◑	●	●
154	Vertex VX Series; VX-300	●	○	●	●	◑	◕	●	TBD	○	◑	◑	●	●	●
155	Vertex HX Series; HX120 UHF Portable	◑	○	●	●	TBD	○	●	TBD	TBD	TBD	TBD	●	●	●
156	Vertex HX Series; HX120 VHF Portable	◑	○	●	●	TBD	○	●	TBD	TBD	TBD	TBD	●	●	●
157	Vertex HX Series; HX140 VHF Portable	●	◑	●	●	TBD	○	TBD	TBD	TBD	TBD	◑	●	●	●

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-4. Portable communication equipment (conventional)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
158	Vertex HX Series; HX381 VHF Portable	●	◑	●	●	TBD	◕	TBD	TBD	TBD	TBD	◑	◑	●	●
159	Vertex HX Series; HX381 UHF Portable	●	◑	●	●	TBD	◕	TBD	TBD	TBD	TBD	◑	◑	●	●
160	Vertex HX Series; HX240 VHF Portable	●	○	●	●	TBD	◕	●	TBD	○	TBD	◑	●	◑	◑
161	Vertex HX Series; HX240 UHF Portable	●	○	●	●	TBD	◕	●	TBD	○	TBD	◑	●	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-5. Portable communication equipment (trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
83	Kenwood 800/900 MHz FM Transceiver; TK-481	◑	◑	●	●	○	○	●	●	●	◑	◑	◑	◑	◑

‘TBD (to be determined) - there is currently no data available to support that selection factor.
‘NA’ - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-6. Mobile communication equipment (conventional and trunked)
February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
15	ComNet Ericsson Orion Mobile Radio	●	●	●	●	●	●	NA	NA	NA	◑	◑	○	◑	◑
25	ProVoice™ Orion™ Mobile 800 MHz	●	●	●	◑	●	●	NA	NA	NA	●	●	○	◑	◑
37	EFJohnson Transceiver; 531x VHF	●	●	●	◑	●	●	NA	NA	NA	TBD	TBD	TBD	◑	◑
38	EFJohnson Transceiver; 538x-800 MHz	●	●	●	◑	●	●	NA	NA	NA	TBD	TBD	TBD	◑	◑
45	Icom VHF Mobile Transceiver; IC-F1020	●	○	●	●	●	●	NA	NA	NA	○	◑	◑	●	●
46	Icom UHF Mobile Transceiver; IC-F2020	●	○	●	●	●	●	NA	NA	NA	○	◑	◑	●	●
47	Icom VHF Mobile Transceiver; IC-F320/ IC-F420	●	○	●	●	●	●	NA	NA	NA	○	◑	●	●	●
48	Icom UHF Mobile Transceiver; IC-F320S/ IC-F420S	●	◑	●	●	●	●	NA	NA	NA	○	◑	●	●	●
59	Kenwood Compact Synthesized FM Mobile Radio; TK-760G	●	◑	●	●	●	●	NA	NA	NA	◑	◑	●	◑	◑
60	Kenwood Compact Synthesized FM Mobile Radio; TK-860G	●	◑	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-6. Mobile communication equipment (conventional and trunked)
February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
61	Kenwood Compact Synthesized FM Mobile Radio; TK-762G	●	◑	●	●	●	●	NA	NA	NA	◑	◑	●	◑	◑
62	Kenwood Compact Synthesized FM Mobile Radio; TK-862G	●	◑	●	●	●	●	NA	NA	NA	◑	◑	●	◑	◑
72	Kenwood VHF/UHF Mobile Radio; TK-780	●	◑	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑
73	Kenwood VHF/UHF Mobile Radio; TK-880	●	◑	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑
85	Kenwood Trunked Compact Mobile Radio; TK-980	●	◑	●	●	◑	●	NA	NA	NA	◑	◑	◑	◑	◑
86	Kenwood Trunked Compact Mobile Radio; TK-81	●	◑	●	●	◑	●	NA	NA	NA	◑	◑	◑	◑	◑
97	Motorola Dual Mode Mobile; MCS 2000 Mobile Model II	●	◑	●	◑	●	●	NA	NA	NA	○	○	○	◑	◑
98	Motorola Dual Mode Mobile; MCS 2000 Mobile Model II	●	◑	●	◑	●	●	NA	NA	NA	TBD	○	◑	◑	◑
99	Motorola Dual Mode Mobile; MCS 2000 Mobile Model III	●	◑	●	◑	●	●	NA	NA	NA	TBD	○	○	◑	◑
100	Motorola Transceiver; Astro Digital Spectra W3	●	◑	●	◑	●	●	NA	NA	NA	◑	○	○	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-6. Mobile communication equipment (conventional and trunked)
February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
101	Motorola Transceiver; Astro Spectra W4	●	◑	●	◑	●	●	NA	NA	NA	TBD	○	○	◑	◑
102	Motorola Transceiver; Astro Spectra W5	●	◑	●	◑	●	●	NA	NA	NA	◑	○	○	◑	◑
103	Motorola Transceiver; Astro Spectra W7	●	◑	●	◑	●	●	NA	NA	NA	◑	○	○	◑	◑
104	Motorola Transceiver; Astro Spectra W9	●	◑	●	◑	●	●	NA	NA	NA	◑	○	○	◑	◑
147	Vertex FTL Series; FTL-1011 (VHF LowBand)	●	◑	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑
148	Vertex FTL Series; FTL-1011H (VHF LowBand HiPower)	●	◑	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑
149	Vertex FTL Series; FTL-2011 (VHF Highband)	●	◑	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑
150	Vertex FTL Series; FTL-7011 (UHF)	●	◑	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑
172	Vertex VX Series; VX-2000V Mobile Radio (VHF)	●	◑	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑
173	Vertex VX Series; VX-2000U Mobile Radio (UHF)	●	◑	●	◑	●	●	NA	NA	NA	○	◑	TBD	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-6. Mobile communication equipment (conventional and trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
174	Vertex VX Series; VX-3000L (VHF Lowband)	●	○	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑
175	Vertex VX Series; VX-3000V (VHF)	●	○	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑
176	Vertex VX Series; VX-3000U (UHF)	●	○	●	◑	●	●	NA	NA	NA	◑	◑	TBD	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-7. Mobile communication equipment (conventional)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
17	ComNet Ericsson Panther Transceiver, Mobile Panther 400M	●	◑	●	●	●	●	NA	NA	NA	○	◑	●	◑	◑
18	ComNet Ericsson Panther Transceiver, Mobile Panther 600M	●	◑	●	●	●	●	NA	NA	NA	○	◑	◑	◑	◑
63	Kenwood Compact Synthesized FM Mobile Radio; TK-760H	●	●	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑
64	Kenwood Compact Synthesized FM Mobile Radio; TK-860H	●	●	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑
65	Kenwood Compact Synthesized FM Mobile Radio; TK-762H	●	●	●	●	●	●	NA	NA	NA	◑	◑	●	◑	◑
66	Kenwood Compact Synthesized FM Mobile Radio; TK-862H	●	●	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑
67	Kenwood Public Safety Mobile FM Radios; TK-690H	●	◑	●	●	●	●	NA	NA	NA	◑	◑	○	◑	◑
68	Kenwood Public Safety Mobile FM Radios; TK-790	●	◑	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑
69	Kenwood Public Safety Mobile FM Radios; TK-790H	●	◑	●	●	●	●	NA	NA	NA	◑	◑	○	◑	◑
70	Kenwood Public Safety Mobile FM Radios; TK-890	●	◑	●	●	●	●	NA	NA	NA	◑	◑	◑	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-7. Mobile communication equipment (conventional)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
71	Kenwood Public Safety Mobile FM Radios; TK-890H	●	◑	●	●	●	●	NA	NA	NA	◑	◑	○	◑	◑
123	BK Radio FM Transceiver; EMH 599 2X	●	○	●	●	●	●	NA	NA	NA	TBD	◑	○	◑	◑
124	BK Synthesized FM Mobile Radio; EMV	●	TBD	●	●	●	●	NA	NA	NA	TBD	◑	○	◑	◑
131	BK Radio Airborne Transceiver; KFM 985	●	○	●	●	●	●	NA	NA	NA	TBD	◑	TBD	◑	◑
132	Relm Mobile Radio; 256NB	●	○	●	●	●	●	NA	NA	NA	TBD	TBD	TBD	◑	◑
136	Relm Mobile Radios; SMV2516	●	○	●	●	●	●	NA	NA	NA	TBD	◑	◑	◑	◑
137	Relm Mobile Radios; SMV4016	●	○	●	●	●	●	NA	NA	NA	TBD	◑	◑	◑	◑
139	Maxon Scanning Transceiver; SM-2000 Series	●	◑	●	●	●	●	NA	NA	NA	○	◑	●	◑	◑
140	Maxon Scanning Transceiver; SM-4000 Series	●	○	●	●	●	●	NA	NA	NA	○	◑	◑	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-8. Mobile communication equipment (trunked)

February 2001

ID #	Equipment Name	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Battery Life	Battery Locking Ability	Vehicular Adapter	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
79	Kenwood Trunked Mobile Radio; TK-980 NSPAC	●	◑	●	●	◑	●	**NA**	**NA**	**NA**	◑	◑	◑	◑	◑
151	Vertex GX4800UT Mobile Transceiver	●	○	●	◑	●	●	**NA**	**NA**	**NA**	**TBD**	◑	**TBD**	◑	◑

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-9. Repeaters communication equipment

February 2001

ID #	Equipment Name		Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
2	Communications-Applied Technology; DWIS Portable Repeater System	Conventional or Trunking, Digital DSSS TOMA	○	●	●	○	○	◑	●	◑	○	●	●
4	Communications-Applied Technology; QB Series Repeater: Portable Repeater Systems	Conventional	○	○	○	NA	○	◑	○	◑	○	●	◑
14	ComNet Ericsson Repeater; MASTR III	Conventional or Trunking	NA	●	●	●	NA	●	●	●	○	◑	◑
16	ComNet Ericsson Repeater; Orion Transportable Repeater	Conventional or Trunking	NA	◑	●	●	NA	●	●	●	○	◑	◑
27	EFJohnson Auris Repeater; RS-5601 VHF; Single Channel	Conventional Digital	NA	●	●	●	NA	●	●	○	○	◑	◑
28	EFJohnson Auris Digital Repeater; RS-5611 VHF; Dual Channel	Conventional Digital	NA	●	●	●	NA	●	●	○	○	◑	◑
31	EFJohnson Auris Repeater; RS-5604 (Single Channel)/5614 (Dual Channel) UHF	Conventional	NA	●	●	●	NA	●	●	○	○	◑	◑
53	Modular Interconnect System, ACU-1000	Conventional Modular Interconnect Communications Interoperability System	NA	●	●	◑	NA	●	◑	◑	TBD	TBD	TBD
54	Transportable Radio Interconnect System, TRP-1000	Trunking/ Conventional Transportable Interconnect/ Communications Interoperability System	NA	●	●	◑	NA	●	◑	◑	TBD	TBD	TBD

‘TBD (to be determined) - there is currently no data available to support that selection factor.
‘NA’ - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-9. Repeaters communication equipment
February 2001

ID #	Equipment Name		Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
88	Kenwood VHF/UHF Repeater; TKR-720	Conventional Desktop Repeater	**NA**	◑	●	●	**NA**	◑	○	○	○	◑	◑
89	Kenwood UHF Repeater; TKR-820	Conventional Desktop Repeater	**NA**	◑	●	●	**NA**	◑	○	○	○	◑	◑
117	Motorola Portable Repeater; Portable Repeater 2	Conventional	**NA**	●	●	●	**NA**	●	**TBD**	○	○	◑	◑
129	BK Repeater; ERU Series	Conventional	**NA**	○	●	●	**NA**	●	○	◑	**TBD**	○	○
138	Maxon VHF/UHF RF Link Module; SD-125	Link Conventional RF Link (Repeater) Module	**NA**	◑	●	**NA**	**NA**	●	◑	○	●	●	◑
177	Vertex Repeaters; VXR-1000 (VHF)	Conventional Mobile Repeaters	**NA**	●	●	●	**NA**	●	**TBD**	◑	◑	○	○
178	Vertex Repeaters; VXR-1000 (UHF)	Conventional Mobile Repeater	**NA**	●	●	●	**NA**	●	**TBD**	◑	◑	○	○
179	Vertex Repeaters; VXR-5000 (VHF)	Trunking Mobile Repeater	**NA**	○	●	●	**NA**	◑	**TBD**	◑	**TBD**	○	○

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-10. Base station communication equipment

February 2001

ID #	Equipment Name		Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
26	EFJohnson Auris Digital Base Station; RS-5601 VHF; Single Channel	Conventional Digital Base Station	NA	○	●	●	NA	●	●	○	○	◑	◑
29	EFJohnson Auris Digital Base Station; RS-5611 VHF; Dual Channel	Conventional Digital Base Station	NA	○	●	●	NA	●	●	○	○	◑	◑
87	Kenwood VHF Base Tranceiver; TKB-720	Conventional Base Radio	NA	◑	●	●	◑	◑	○	○	○	◑	◑
122	BK Base Station; EBU Series	Conventional Base Station	NA	○	●	●	NA	●	TBD	◑	TBD	○	○

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-11. Base station and/or repeater communication equipment
February 2001

ID #	Equipment Name		Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements
24	ProVoice™ MASTR™ III Base Station 800 MHz	Mobile Base Station or Repeater (Trunking is the primary operating mode)	**NA**	●	●	●	**NA**	●	●	●	○	◑	◑
30	EFJohnson Auris Digital Repeater/Basestation; RS-5604 (Single Channel)/5614 (Dual Channel) UHF	Digital Base Station (Conventional)	**NA**	●	●	●	**NA**	●	●	○	○	◑	◑
115	Motorola Station/Repeater; QUANTAR	Functions as a Base Station or Repeater (Conventional or Trunking)	**NA**	●	●	●	**NA**	●	◑	○	○	◑	◑
116	Motorola Station/Repeater; QUANTRO	Base Station/Repeater (Conventional/Trunking)	**NA**	●	●	●	**NA**	●	◑	○	○	◑	◑
180	Vertex Repeaters or Base Station; VXR-5000 (UHF)	Mobile Base Station or Repeater (Conventional; Trunking Capable with Optional Accessory Board)	**NA**	●	●	●	**NA**	●	**TBD**	**NA**	**TBD**	○	○
181	Vertex Repeater or Base Station; VXR-7000 (VHF)	Mobile Base Station or Repeater (Conventional; Optional VX-Trunk Operation)	**NA**	●	●	●	**NA**	●	**TBD**	**NA**	**TBD**	○	○

'TBD (to be determined) - there is currently no data available to support that selection factor.
'NA' - data field is not applicable for this piece of equipment.
See Table 4-12 for selection factor definitions.

Table 4-12. Selection factor key for communication equipment

February 2001

	Maximum Transmitter Power Output	Secure Communications Compatibility	Programmability	User Capability	Line of Sight	Power Requirements (Portable)	Power Requirements (Mobile and Repeater)	Battery Life (Portable)	Battery Locking Ability (Portable)	Vehicular Adapter (Portable)	Digital Communications Compatibility	Durability	Unit Cost	Operator Skill Level	Training Requirements (Portable)	Training Requirements (Mobile and Repeater)
●	Power output of 3 W to 6 W	Capable of secure transmissions without an accessory	Can be programmed/ reprogrammed by authorized personnel	Unlimited capability	Transmission can travel 10 miles or more	Operates off battery pack, external dc, or ac adapter	Uses 12 V dc to 15 V dc	Equal to or greater than 8 h	Battery securely locked into place on the radio and cannot be dislodged by bumping or dropping	Has vehicle adapter (with built-in amplifier) that connects to vehicle's electrical system and external antenna	Capable of digital transmissions without an adaptor	Designed for rugged use and is submersible in water	Less than or equal to $500 per unit	No special skills or training required	No special training required	No special training required
◕						Operates off battery pack or external dc adapter										
◑	Power output of more than 1.5 W but less than 3 W	Capable of secure transmissions with an accessory	Can be programmed/ reprogrammed by vendor only	Fixed capability	Transmission can travel 5 miles to 10 miles	Operates off battery pack or ac adapter	Uses 120/220 V ac	Greater than 4 h but less than 8 h			Capable of digital transmissions with an adaptor	Designed for rugged use but is not submersible in water	Greater than $500 but less than $1000 per unit	No special skills but some training required	Less than 60 min training required	Less than 8 h training required
○	Power output of less than 1.5 W	Not capable of secure transmissions	Can be programmed/ reprogrammed by the end user	Restrictive capability	Transmission can travel less than 5 miles	Operates off battery pack only	Uses voltage other than standard 12 V dc to 15 V dc or 110/220 V ac	Less than 4 h	Battery not locked into place	Does not have optional vehicle adapter	Not capable of digital transmissions	Designed for standard use only	Greater than $1000 per unit	Technical background required to operate equipment	More than 60 min training required	More than 8 h training required

The gray cells designate that the symbol is not applicable for the selection factor.

APPENDIX A—RECOMMENDED QUESTIONS ON COMMUNICATION EQUIPMENT

APPENDIX A—RECOMMENDED QUESTIONS ON COMMUNICATION EQUIPMENT[5]

Buying detection, protection, decontamination, and communication equipment to respond to the threatened terrorist use of chemical or biological warfare agents may be new for public safety agencies. To help procurement officials obtain the best value for their domestic preparedness dollar, a series of questions was excerpted from a report titled: "Domestic Preparedness Program in Defense of Weapons of Mass Destruction Report on Communication Equipment" (see detailed reference in appendix B). These questions should assist officials in selecting products from the large number in the present day marketplace. Requesting vendors to provide written responses to specific questions may also be helpful in the decision process.

Note: The included question lists are meant as starting points only. The consumer should add any questions pertinent to a particular application.

Portable Radio Accessories

1. Can I use the accessory with or without a facemask?
2. Can I use the accessory with an encapsulated suit?
3. What radios are compatible with the unit?
4. How does the equipment function in high noise (a lot of electrical or environmental interference) surroundings?
5. Does the equipment require batteries? How many? What type? Battery life?
6. Is the equipment waterproof?
7. Is the equipment spark proof, intrinsically safe, or explosion proof?
8. Is the product voice activated? Push-to-talk (PTT)? Both? How big is the PTT switch?
9. Can the PTT be activated through a suit? How tactile is the switch?
10. What receiver options are available?
11. Can the unit be decontaminated?
12. Does other protective equipment affect the clarity of communication?
13. Will communication capability be affected by the removal or addition of any personal protective equipment (PPE)?
14. Is the product ruggedly constructed? What is the warranty period?
15. Who uses the product now? Where? For what application?
16. How much does a complete unit with radio interface cable cost?
17. What is the cost of ownership over time? (i.e., batteries, additional components, etc.)

Portable Radio Capabilities

1. Is voice communication continuous?
2. What is the level of intrinsic safety?
3. What materials are used in the construction of the equipment?
4. Is the equipment waterproof? Immersion proof?
5. What is the power source? Batteries (type)? Other?

[5]The information in Appendix A was provided by the National Domestic Preparedness Office (NDPO) in coordination with the National Institute of Justice and Technical Support Working Group.

6. What is the battery life? Is there a low battery warning?
7. Can it be used while wearing breathing apparatus?
8. What kind of accessories are available for the equipment?
9. Are system components and accessories interchangeable?
10. How quickly can the equipment be deployed?
11. Is the equipment shielded against RF or electromagnetic interference?
12. How easy is it to use? How much training is required?
13. How many people can be on the communication system at once?
14. What type of warranty does it come with?
15. Is the equipment built to a quality standard? What standard?

APPENDIX B—REFERENCES

APPENDIX B—REFERENCES

1. Andy Ibbetson, *Domestic Preparedness Program in Defense of Weapons of Mass Destruction Report on Communication Equipment*, CON-SPACE Communication Inc., October 26, 1999.

APPENDIX C—EQUIPMENT SAFETY

APPENDIX C—EQUIPMENT SAFETY[6]

Types of Electrical Equipment

Some examples of commonly used electrical equipment by rescuers in hazardous locations are two-way radios, hard-line and sound powered communication systems, gas detectors PASS devices, pagers, and ventilation equipment. However, electrical equipment, as defined by Factory Mutual Research in their Approval Standard 3600, is "All items applied as a whole or in part for the utilization of electrical energy. These include, among others, items for the generation, transmission, storage, measurement, regulation, conversion, and consumption of electrical energy and items for telecommunications."

Equipment Safety

When selecting electrically powered communication equipment for use in a hazardous or potentially hazardous environment, it is important to choose equipment that has been designed and approved to be spark proof, explosion proof, or intrinsically safe. The classifications for hazardous locations are in the National Electrical Code (NFPA 70).

The following is an abbreviated list of the different classifications and what they mean. If there is any doubt about the approval rating on a particular piece of equipment, check the label. In North America, all intrinsically safe or explosion proof equipment has to carry a label that lists the hazardous location or hazardous locations for which it has been tested and approved. If the hazardous location information is not on the label, it is not approved for that location and, if there is no label, the equipment is not approved. If the physical size of the equipment prohibits a listing of approved locations, as a minimum requirement, the equipment will have the mark of the Nationally Recognized Test Laboratory (NTRL) that did the testing. If there is any question about the approval status for a piece of electrical equipment, request a copy of the certification record or approval agreement from the equipment manufacturer or distributor and keep it on file for future reference.

[6] Appendix C has been copied in its entirety from "Report on Communication Equipment, (Domestic Preparedness Program in Defense of Weapons of Mass Destruction)." This is a circulated document prepared by Andy Ibbetson, CON-SPACE Communication Inc., October 26, 1999.

National Electrical Code (NEC) Classifications for Hazardous Locations

Class I	Locations where there is a danger of explosion due to flammable gases or vapors present in quantities sufficient to produce explosive or ignitable mixtures.
Class II	Locations where there is a danger of explosion due to the presence of combustible or electrically conductive dust.
Class III	Locations where there is a danger of explosion or flash fire due to the presence of easily ignitable fibers or flyings.
Classes are separated into Divisions 1 and 2	
Division 1	Locations where the gases, vapors, conductive dust, combustible dust, flyings and/or fibers are present in the air in potentially flammable concentrations continuously, frequently, or intermittently under normal operating conditions.
Division 2	Locations where the gases, vapors, conductive dust, combustible dust, flyings and/or fibers might become hazardous in the event of mechanical breakdown, accident, failure, or the abnormal operation of equipment.
Classes are further divided into Groups	
Class I	
Group A	Acetylene.
Group B	Butadiene, Hydrogen, Ethylene Oxide, Propylene Oxide, and Acrolien.
Group C	Acetaldehyde, Ethylene, and Ether Vapors.
Group D	Acetone, Ammonia, Benzene, Butane, Cyclopropane, Gasoline, Hexane, Methane, Methanol, Natural Gas, Naptha, and Propane.
Class II	
Group E	Combustible metal dust including aluminium, magnesium and their commercial alloys.
Group F	Combustible carbonaceous dusts including Carbon Black, coal, and charcoal.
Group G	Combustible dusts not listed in groups E or F including flour, grain, wood, and plastic.
Class III	No Groups.

Zones

The 1996 version of the National Electrical Code (NEC) included Article 505 – Class I, Zone 0, 1, and 2 Locations. Article 505 specifies an alternative hazardous location identification scheme for Class I environments. The Zone system does not replace the aforementioned classification system, but since Zones are common classifications elsewhere in the world, its inclusion in the NEC should be considered a step toward standardization of I.S. approval standards with other countries.

Special Note: NEC Article 500–3 states that if Article 505 is used, area classification, wiring, and equipment selection must be done under the supervision of a qualified Registered Professional Engineer.

Class 1 – Zones*

Zone 0	Location in which ignitable concentrations of flammable gases and vapors are present either continuously or for long periods of time.
Zone 1	Location in which ignitable concentrations of flammable gases or vapors that are likely to exist under normal operating conditions or may exist frequently because of repair maintenance, leakage, or breakdown. Or the location is adjacent to a Class I, Zone 0 from which ignitable concentrations could be communicated, unless prevented by adequate positive pressure ventilation and safeguards are in place to prevent ventilation failure.
Zone 2	Location in which ignitable concentrations of flammable gases or vapors that are not likely to occur in normal operation and if they do occur will exist only for a short period of time. An area where liquids gases or vapors are normally confined in closed containers or systems that could escape due to an accidental rupture, breakdown, or abnormal operation of equipment. Or where the ignitable concentrations are normally prevented by positive mechanical ventilation but could become hazardous due to the failure or abnormal operation of the ventilation equipment. Or the location is adjacent to a Class I, Zone 1 from which ignitable concentrations could be communicated, unless prevented by adequate positive pressure ventilation and safeguards are in place to prevent ventilation failure.

Group Equivalents

Zone System	=	Current System
Class I, Group IIc	=	Class I, Groups A & B
Class I, Group IIb	=	Class I, Group C
Class I, Group IIa	=	Class I, Group D

*The above is an abbreviated version of the Zone/Group system and is for information purposes only. Refer to the NEC Article 505 for complete descriptions of Class I, Zones and Groups.

Examples of Classifications and Corresponding Rescue Sites

Note: Refer to the National Electrical Code Articles 500, 501, 502, 503, 505 for a complete description of Hazardous Area Classifications and Group descriptions including an alternative hazardous location identification scheme (Zone Classification System).

Class I, Divisions 1 & 2

Petroleum refineries, dry cleaning plants, petrochemical plants, hospitals, utilities, aircraft hangers, paint manufacturers, dip tanks containing flammable or combustible liquids, and spray finishing areas.

Class II, Divisions 1 & 2

Grain elevators, flour and feed mills, confectionery plants, fireworks manufacturing and storage, grain ships, areas for packaging and handling of pulverized sugar and cocoa, manufacturing and storage of magnesium or aluminium, spice grinding mills, and some coal handling plants.

Class III, Divisions 1 & 2

Wood working plants, textile mills, cotton gins, cottonseed mills, flax producing plants, knitting mills, and weaving mills.

NOTE: The above is an example only. Individual group classifications also apply to the above and were omitted for brevity. To determine Classifications for specific locations, consult with your safety officer.