MODTECH CORP.
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Proposal Number ***Example***
Prepared for Public Safety
October 1, 2009

Example Proposal for In-Building Communications Hybrid System Approach

Summary / Overview:

Equipment, material, and select labor to treat four (4) building premises for 800 MHz SMR public safety radio in-building communications are proposed.

The approach is of a hybrid type wherein each building installs certain fixed equipment and the fire department utilizes certain portable equipment to more economically achieve the desired result.

First, **the fire or other public safety department** carries a portable, lithium-ion battery powered, bi-directional amplifier (BDA) system. The portable system enables in-building communications to be established at any building, whether a building has been pre-treated or not.

Second, **each building** installs:

1. Outdoor antenna system
2. Indoor antenna system
3. Standard, in-building communications interface (IBC I/F)

This is a low cost addition to the building and makes coverage inside complex buildings more convenient for the first responders.

Exemplary cost would be approximately **$5,500** for each of five participants.

When called to a building, fire department personnel connect their portable BDA system to the building's standardized, IBC interface box and enable the BDA. The connection / setup time is estimated at under 1 minute. Portable outdoor antenna and indoor antenna systems are included with the fire department's portable system and serve as backups in the event of building equipment failure.

This approach allows for the easy addition of fixed BDA (electronics) systems to any building in the future. In case of such future addition, the FD portable kit continues to provide valuable backup coverage in the event of building or radio tower equipment faults. There are many other advantages to a hybrid approach. For further information, please visit **http://www.modtech-corp.com/bda**.

A detailed breakdown of costs and installation requirements follows. Overall cost to treat **four (4) buildings** including installed building equipment, portable FD equipment, and miscellaneous materials is estimated at $27,545. Labor required to install building equipment may be provided by building maintenance personnel or can be quoted upon request by Modtech. No labor is required for the FD portable equipment. Training and manuals are provided by Modtech.

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Building Specific Equipment (see note 1 below):

Outdoor Antenna System Including: Non-penetrating roof antenna stand 11 dBd directional antenna Up to 100' low loss fire retardant RG8/U coaxial cable Cable grounding kit / lightning / surge protection Weatherproofing for cable and connections	$575.00
Indoor Antenna System including: Omni-directional ¼ wave antenna Up to 100' low loss fire retardant RG8/U coaxial cable	$375.00
In-Building Communications Interface Box including: NEMA 4X enclosure for exterior wall mounting High pass filter protector / lightning / surge protection Heavy-duty 7/16 DIN connector sub-panel Passive antenna system jumper cable Grounding kit / lightning / surge protection Outdoor padlock and key	$875.00

Each Building Equipment Subtotal: **$1,825.00**

Optional items / equipment:

Installation labor (quotation upon request) see installation overview below	
Additional low loss RG8/U coaxial cable (per ft.)	$2.50
Additional indoor antennas (if required) including: Directional coupler Omni-directional ¼ wave antenna Up to 100' low loss fire retardant RG8/U coaxial cable	$575.00

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Portable Fire Department Equipment (see note 2 below):

SIPS-BDA-800E System including:	$19,995.00

Outdoor Antenna Kit at 38 lbs. complete
- Yagi directional outdoor antenna (11 dBd)
- Quick connect with elevation-polarization adjustment
- 10' heavy-duty wide base antenna stand
- 100' flexible low-loss coaxial cable
- Heavy duty duffle bag

Indoor Antenna Kit at 45 lbs. complete
- Omni-directional indoor antenna (0 dBi)
- 800 MHz, 25 dBm BDA with AGC and auto-shutdown
- 12-hour battery run time
- High performance non-toxic lithium-ion batteries
- Watertight molded enclosure

Operation Manual

Standard building interface cable kit including:	$250.00

- 12’ flexible RG8/U low loss coaxial uplink cable
- 12’ flexible RG8/U low loss coaxial downlink cable

Portable Fire Department Equipment Subtotal:	**$20,245.00**

Overall System Rollup:

Equipment for four (4) buildings ($1,825 each):	$7,300.00
Fire Department Portable Equipment:	$20,245.00
Total:	$27,545.00

Cost to each of five (5) equal participants:	**$5,509.00**

Notes:

1. Building costs are estimated based upon typical installations pending site evaluations to determine any specific building requirements. Cable run lengths, grounding scheme, and indoor antenna requirements may impact materials required.
2. Medium power portable BDA equipment is specified based upon observed application geography pending site evaluations to determine any specific RF requirements. Lower and higher power portable BDA equipment is available if needed.

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Building Equipment Installation Overview:

Each building to install:

1. Outdoor antenna system
2. Indoor antenna system
3. Standardized, in-building communications (IBC) interface box at exterior of building

Referring to figure 1, the outdoor antenna system is mounted on the building rooftop preferably using a non-penetrating mounting system. Concrete block or sand bag ballast is to be employed. Alternatively, an existing building mast or other attachment point may be utilized. The outdoor antenna is of a Yagi, directional variety and will be aimed at a preferred tower (XYZ-NEARBY Tower ID 5555555 for example). Coaxial cable shield is to be grounded via 6 AWG cable to low inductance low resistance building ground. All connections are to be weatherproofed appropriately. *Generally, roof penetration will not be required*. The responsibility for roof penetration if any is required to admit coaxial cable or for any purpose shall reside with the building owner. Coaxial cable from the roof top antenna system shall be routed, over building interior or exterior surfaces, to the location of the In-Building Communication (IBC) interface box to be terminated thereto. When the route is over exterior surfaces, appropriately protective conduit material shall be utilized.

Still referring to figure 1, the indoor antenna will typically be positioned at ceiling height near the center of each interior segment or floor of the building. The small, lightweight antenna may be connected via magnetic base to suitable steel structural or drop ceiling strut or may be attached otherwise. Low loss coaxial cable is run from the indoor antenna to the interior wall side of the location of the In-Building Communication (IBC) interface box to be terminated thereto.

The IBC Interface Box is pre-assembled and ready for mounting to the exterior face of the building at a ground level location easily accessible to fire and other public safety personnel. The IBC Interface Box provides four flange ears for fastener mounting to the building surface. Overall size is 12” wide by 15” tall by 7” deep. Two cable connection ports (one each for the outdoor and indoor antenna cables) are optionally positioned for wall side interface (1” diameter access holes through wall required for each cable). Alternatively, conduit entry at box top, bottom, or side surfaces may be provided. A ¼-20 ground stud is provided along with ground stake and 6 AWG cable for earth grounding near the box location. Figure 2a and 2b show the IBC Interface Box in the closed and open condition.

The IBC Interface Box shall also contain clear information pertaining to the location of in-building antennas, cable runs, and available radio tower locations in the region.

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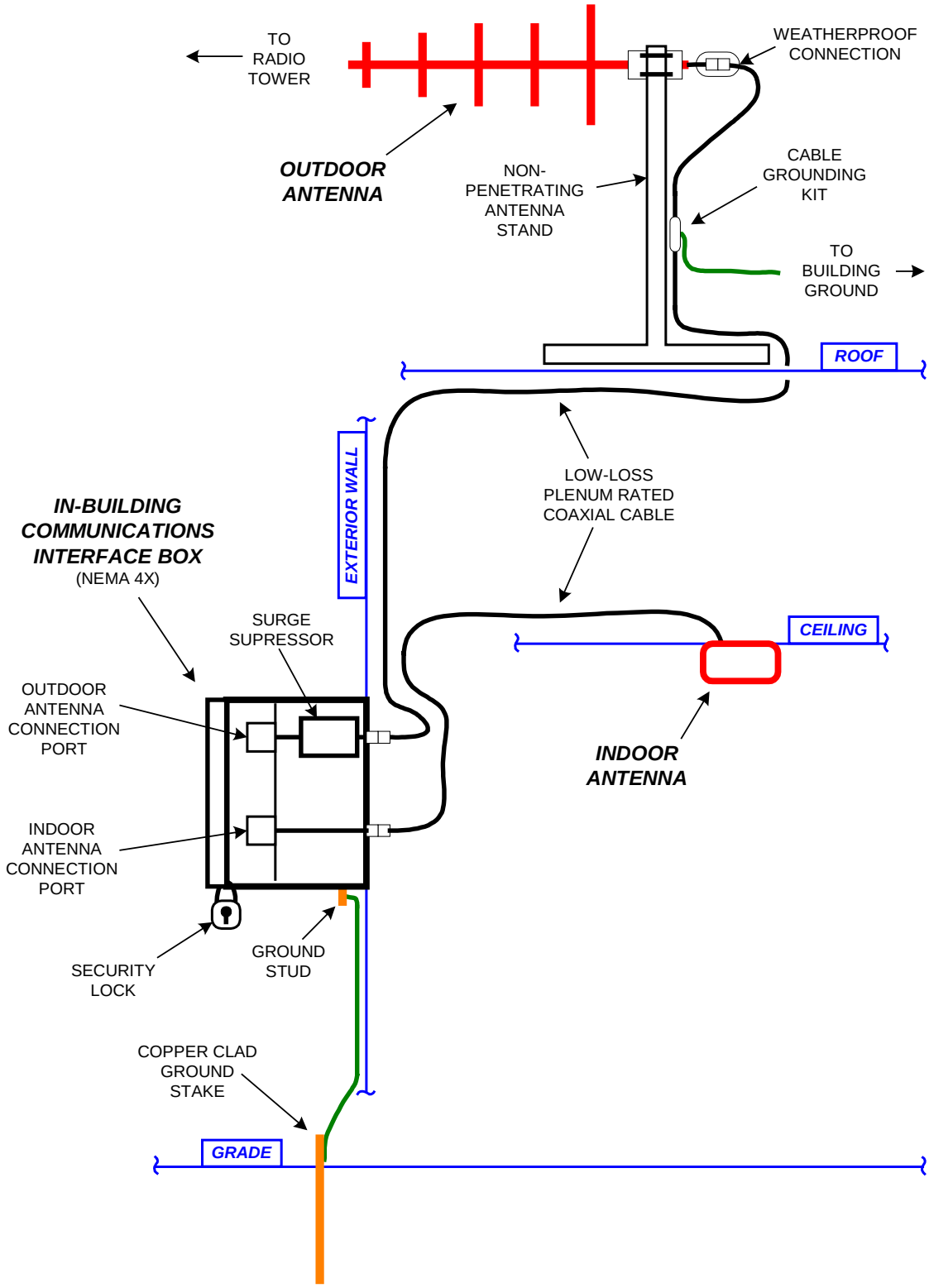

Figure 1 – Building equipment installation diagram

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Figure 2a – In-Building Communications (IBC) Interface Box (closed)

Figure 2b – In-Building Communications (IBC) Interface Box (cables attached)

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Portable Fire Department Equipment Overview:

The portable in-building communications system carried by the fire department consists of an outdoor antenna kit (backup in case of building antenna failure) and indoor antenna kit. The indoor antenna kit contains the battery-powered portable amplifier and a backup indoor antenna which may be deployed in the event of a building indoor antenna fault or failure. Detailed specifications for the system and its components are attached to this proposal as an addendum.

Figure 3 shows the outdoor antenna kit. The indoor antenna kit may be seen in figure 4. When called to an event at a participating building, the amplifier section of the indoor antenna kit is connected to the IBC Interface Box as shown in figure 5. Making this connection is fast and foolproof (connectors are polarized).

Figure 3 – Portable outdoor antenna kit

Figure 4 – Portable Indoor antenna and amplifier

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Figure 5 – Portable amplifier connected to IBC Interface Box using two heavy-duty coaxial cables. (B amplifier kit shown. Current proposal is to supply C amplifier as depicted in figure 4. A, B, D, or E amplifier kits may be substituted if possible / necessary).

As stated earlier, an important advantage of the hybrid approach (using fixed building antenna system in conjunction with portable, rapidly deployable, radio electronics) is the backup function provided by the portable kits. In the event of any problem, destruction, or malfunction of either building or radio tower equipment, the portable antenna system may be quickly deployed and aimed at any operating radio tower. Thus the FD maintains a building / tower independent approach to in-building communications. The fully deployed, portable configuration is shown in figure 6.

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Figure 6 – Full, portable system deployment, independent of building equipment, can be aimed at any operating radio tower.

General Terms and Conditions:

Warranty on equipment and workmanship shall be one (1) year. Delivery shall be F.O.B. Modtech Corp., Willoughby, OH. Modtech reserves the right to pass through shipping surcharges proportional to any such surcharges charged by its carriers. A down payment of 50% will be required to process an order. Orders are non-cancelable. Additional terms and conditions may apply, and if so, will be finalized at time of order. This proposal is valid for 30 days.

Disclaimer: The foregoing is a hypothetical proposal offered for the purposes of example only. It does not represent an offer for sale. A proposal for a specific, real application may be provided upon request. All specifications and descriptions are subject to change without notice.

