FCC Part 15 Subpart C
Transmitter Certification

Frequency Hopping Spread Spectrum Transmitter

FCC ID: R7PTOP04

FCC Rule Part: 15.247

ACS Report Number: 05-0327-15C

Manufacturer: Cellnet Technology, Inc.
Model: Take Out Point (TOP)

Installation Guide

Revision History

ECO/ECN	Rev	Date	Author	Page	Description
XXXXX	01		G. Farmer	ALL	INITIAL RELEASE

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Compliance With FCC Regulations

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this device not expressly approved by Cellnet could void the user's authority to operate the equipment.

RF Exposure

In accordance with FCC requirements of human exposure to radiofrequency fields, the radiating element shall be installed such that a minimum separation distance of 20cm is maintained between it and the user or general population.

Industry Canada

All Equipment:

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

Contents

Figures

Acronyms

MCC	MicroCell Controller
LAN RADIO	Local Radio Network
WAN	Wide Area Network
860 CPU	Central Processing Unit
ESD	Electrostatic Discharge

Related Documents

Document Title	Part Number	Revision	Date
Take Out Point programming guide			

1. Cellnet Network

The CellNet Automated Meter Reading network is used to transfer information from a number of endpoints usually distributed over a large geographical area. The most common endpoints are from electrical, gas and water meters. Additional potential endpoints include parking meters, vending machines and copiers. The network includes a Radio Frequency (RF) Wide Area Network (WAN) and an RF Local Area Network (LAN). The WAN consists of either CellMasters (CM), or Take Out Points (TOP) communicating with MicroCell Controllers (MCC) Or Infinet Concentrators (IC). The LAN is the RF link between the MCC or IC and meters or other end points with CellNet meter modules installed. The endpoint data is transmitted via a radio frequency (RF) link to the MCC/TOP where it is stored and processed. The MCC or IC then transmits this information to the Network Operations Center via a RF link to the CellMaster or TOP base station. This SOP deals with the installation of TOP's.

2. TOP enclosure/mounting

The TOP is a NEMA-4 enclosure with a power supply, lead-acid battery, system CPU board and four radios. It weighs approximately 42 pounds and typically mounts on wooden utility poles using two 5/8" diameter through bolts or on street lights with two stainless steel bands. It can also be mounted on a unistrut member sunk into the ground next to a transformer.

3. TOP programming

Programming of the TOP is required prior to installation. The TOP programming process consists of entering GPS and other data such as color into the radio. This task is best done in batch mode where the TOP's are stored prior to field deployment for installation. For the purposes of this SOP, it is assumed that the programming has already been completed and the information provided with work order/installation sheet. The TOP will typically be labeled with the IPC address visible from the outside.

4. Required Tools & Materials

The following is a list of tools and materials for installing the TOP,s for utility pole and streetlight mounting. For building and pad-mount installations, the same tools will apply with some additional materials required. Check under the type of installation for materials and tools needed to perform the installation. In the pad-mount and building installation sections there will be a tool or two not included in the spreadsheet.

Material Provided by Cellnet	Wood Utility Pole	Steel Street Light Pole	Pad-mount XFMR
Takeout Point	X	X	X
LAN omni whip antennas	X	X	X
WAN omni whip antenna	X	X	X
Streetlight head adapter		X	
RF coaxial cables**	X	X	X
AC power quick disconnect connector with 8 ft. or 18 ft. wire attached	X	X	X
Female N – bulkhead connectors	X	X	
MCC strap mounting brackets		X	

** These come in different lengths, 5, 10, 15, 20, and 25, are most commonly used

4.1. Contractor-provided tools

The following table contains specific tools required for the installation of TOP's on the three primary installation types. The contractor shall also provide typical tools required for mechanical and electrical installations such as normal lineman tools, wire cutters, hammer, assorted screw drivers, socket set, wrenches, voltmeter, compass, tape measure, etc.

Tools Provided by Contractor	Wood Utility Pole	Steel Street Light Pole	Pad-mount XFMR
steel banding tool		X	
drill (battery, gas or electric powered)	X		X
drill bits for lag and D/A bolt	X		X
Laptop computer with serial port*	X	X	X

* May not be required. Refer to statement of work or work project request.

4.2. Contractor-provided material

The following table contains specific material required for the installation of MCCs on the four primary installation types. Note: additional material such as screws, nuts, bolts may be required to complete installations. The contractor shall provide this material for each installation.

MATERIAL PROVIDED BY CONTRACTOR	Wood Utility Pole	Steel Street Light Pole	Pad-mount XFMR
TBD			

5. Customer Notification/Authorization

5.1. Appointment for building access

The Below statement is a placeholder until statement can be reviewed.

Cellnet shall provide a point of contact for each building that needs access by the contractor. It shall be the contractor's responsibility to schedule the required appointments and to make notifications to the appropriate building owners, managers or tenants before performing the TOP installation.

5.2. Utility or municipal authorization for pole attachment

The Below statement is a placeholder until statement can be reviewed.

When the TOP is to be located on utility or municipal property such as utility poles and streetlight poles, Cellnet will have a general agreement in place to install on these poles. There may be a requirement for the utility or municipal to approve individual sites. This approval will be noted on the TOP installation sheet or provided in another format approved by Cellnet. It is the contractor's responsibility to ensure that approval has been given for each installation.

6. Site location and verification

6.1. Site verification

The Below statement is a placeholder until statement can be reviewed.

The contractor shall be responsible for installing the TOP on the correct pole or building. The contractor should make every effort to confirm that they have the correct location.

6.2. Bucket trucks

The Below statement is a placeholder until statement can be reviewed.

The contractor shall provide a bucket truck for installations requiring them. A bucket truck is used for most wood and streetlight pole installations. The contractor shall comply with all local traffic ordinances while performing the TOP installations.

7. Installation

7.1. General

- For every TOP that is to be installed, a TOP Installation Sheet will be provided.
- The sheet has the street address, type of mounting (wood pole, streetlight pole, building, etc.), access (bucket truck or climbed manually).
- The TOP uses a quick-disconnect connector that must be wired to a single phase 120 VAC or 240 VAC circuit.

7.2. Power Requirements

The Takeout Point (TOP) requires the following voltage: 120 VAC +/- 20% (96-144 VAC), 60 Hz +/- 1 Hz or 240 VAC +/- 20% (192-288 VAC), 60 Hz +/- 1 Hz The Takeout Point (TOP) has the following current requirements:

1 Amp max at 120VAC (Approx.)
.5 Amp typical at 240 VAC (Approx.)

7.3. Power connections

7.3.1. VERIFY THAT THE POWER SOURCE IS EITHER 120 VAC OR 240 VAC SINGLE PHASE.

7.3.2. VERIFY THAT THE POWER SUPPLY JUMPER IS CONNECTED FOR THE APPROPRIATE SOURCE VOLTAGE.

7.3.3. RUN QUICK-DISCONNECT WIRE THROUGH LIQUID TIGHT CONDUIT WITH APPROPRIATE CONNECTORS. ADDITIONAL DETAIL WILL BE PROVIDED IN FOLLOWING PROCEDURES FOR THE DIFFERENT TOP INSTALLATION TYPES.

7.4. TOP mechanical mounting

7.4.1. STREET LIGHT POLE (OTHER THAN WOOD)

The final guidelines provided by the utility or municipality determine where the TOP can be installed. *It is the contractor's responsibility to know and follow the utility or municipality guidelines before installing the TOP and antenna***.**

7.4.2. TOP INSTALLATION PROCEDURE

1. Verify the TOP and antenna can be mounted on the pole as indicated on the TOP Installation Sheet. If the TOP and/or antenna cannot be mounted as indicated, contact a Cellnet Inc. representative and proceed to the next installation site.
2. Verify that the streetlights have AC power during daylight hours. Even if a photocell is installed on the streetlight head, it doesn't guarantee it is not on a controller. When in doubt, pull the photocell and measure for 120 or 240 volts AC.
3. Verify that the TOP power supply voltage jumper is in the correct position.
4. Attach the streetlight pole adapter to the pole using the 3/4 banding material in the orientation described on the TOP Installation Sheet. The flat side of the adapter bracket faces outward from the pole and the banding goes through the slots on the bracket.
5. Attach the MCC to the adapter bracket with the supplied hardware.

7.4.3. WOOD UTILITY POLE

7.4.3.1. Wood utility pole

The final guidelines provided by the utility determine where the TOP can be installed. Some utilities allow the TOP to be mounted above the secondary wires, while others require the TOP to be below the secondary wires. In most cases, the remote antenna can be mounted above the secondary and typically it is mounted below the primary. *It is the contractor's responsibility to know and follow the utility guidelines before installing the TOP and antenna***.**

7.4.3.2. TOP Installation procedure

1. Verify the TOP and antenna can be mounted on the pole as indicated on the installation sheet. If the MCC and/or antenna cannot be mounted as indicated, contact a Cellnet Inc representative and proceed to the next installation site.
2. Drill two 3/4" diameter holes through the wooden pole at 12 1/2 inches center to center. The holes should be positioned to ensure the TOP would be located at the height and direction described in the TOP Installation Sheet.
3. Mount the TOP mounting bracket on two galvanized 5/8 through bolts (D/A bolts). The bolts must be securely tightened to ensure the TOP will not move. Note: ½ through bolts may be used if this is the standard size used by the local utility.

7.5.Power cable preparation

1. Cut the liquid tight conduit to length.
2. Feed the quick disconnect wires through, then attach the conduit connectors LTFM-50 and UF-50 connectors. This end of the conduit will be attached to the secondary.
3. Attach the end with the quick disconnect to the TOP. Take the conduit and streamline it using the .U. nails along the pole to the secondary. Provide tension relief and a service loop on the conduit at the base of the TOP.
4. Drill a small hole at the bottom of the relief loop to drain moisture.
5. On the end of the piece of conduit with the LT connectors, bend the conduit downward to help prevent water from entering.
6. Seal the connector with RTV where the wires exit the conduit.
7. Cables part numbers are 105704-000 for a ten-foot cable, 105704-001 for a thirty-foot cable, and 105704-002 for a four-foot cable.
8. Depending on the utility requirements, physically connecting to the secondary may have additional requirements that have to be met. It is possible that the utility will do this. Take the naked wires from the end of the liquid tight conduit and securely clamp it to the secondary. This is a compression type fitting. Sometimes a run of secondary is needed from an adjacent pole to provide the power for this TOP.

7.6.Ethernet Connections

There is an Ethernet Port on the TOP that has a weather tight connection. This port should be connected to a internet connection by no more than 30 meters of shielded CAT 5E cable.