SmartMeter™ System

SSI OPENWAY 1X SmartMeter User Guide

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Document Revisions

The SSI OPENWAY 1X SmartMeter User Guide can be referred to by its document number: SMR45-4601A. Each revision of this document is designated with a letter, beginning with "A". SmartSynch, Inc. reserves the right to revise this publication and to make any modifications to its content, at any time, without obligation to notify any party, person, or entity of such revisions or changes. Occasionally, changes or variations exist in the products that are not reflected in the documentation. Generally, if such changes or variations are known to exist and affect the product significantly, release notes will accompany the documentation.

The information in this guide should not be considered as all-inclusive or covering all cases for events that may occur. If further information is required, consult your technical support representative.

See the License Agreement contained in the product for complete license information.

Contact your technical support representative for more information on any of our products.

Table of Contents

1 Introduction

1.1 About This Guide

This document is a manual designed to help guide you through the testing, installation and activation of your SSI OPENWAY 1X SmartMeter. This manual provides general instructions on the support of your SmartMeter and references to supporting manufacturer documentation for detailed guidelines and instructions on features and operating characteristics of the SmartMeter for installation, programming, communication, and troubleshooting.

1.2 Reference Materials

The following reference software and documentation are pertinent to the successful installation and use of the SSI OPENWAY 1X SmartMeter.

Itron/Schlumberger
- OPENWAY CENTRON Device Manual
- PC-PRO+Advanced Software
- PC-PRO+Advanced Installation Guide
- PC-PRO+Advanced User Guide

SmartSynch
For more information on the CENTRON SmartMeter, see the product brochure and spec sheet, available online at http://smartsynch.com/support/documents/CENTRON_SmartMeter_e.pdf.

1.3 Contacting SmartSynch

1.3.1 Technical Support

SmartSynch's technical support staff is ready to answer your technical questions. Your technical support representative can provide information about the latest SmartSynch products, upgrade options, and more. Contact your technical support representative directly, through the Online Customer Support Center at http://smartsynch.com/support/login.html, or by email at cs@smartsynch.com.

Note: You must be a registered user to access SmartSynch's online support services.

Help us help you

When contacting technical support please provide the following information for the fastest possible service:
- Your name, company name, and contact number
- SmartMeter make and model (meter manufacturer, SSI version number)
- Complete description of the issue, including the steps to reproduce it
- Wording of any message(s) displayed when the issue was encountered
- Action taken to resolve the problem

1.3.2 Documentation Feedback

SmartSynch, Inc. strives to produce quality documentation for our products and welcomes your feedback. If you have comments or recommendations about our online help or printed guides, you can email us. Please send email messages to cs@smartsynch.com. This email address is only for documentation feedback. If you have a technical question, please contact your technical support representative.

1.3.3 SmartSynch Headquarters

SmartSynch, an energy technology company based in Jackson, Mississippi, is the leading provider of advanced metering solutions to the energy and utility industry. Its core product, the SmartMeter System, enables energy and utility companies to communicate with commercial and industrial electricity meters using wireless communications and the Internet. The SmartMeter System manages the delivery of critical information to any application system, workstation, computer, or browser-enabled personal communication device.

Mailing Address:	SmartSynch, Inc. P.O. Box 12250 Jackson, MS 39236-2250	Telephone:	601-362-1780
		Fax:	601-362-1787
Street Address:	4400 Old Canton Road Suite 300 Jackson, MS 39211	World Wide Web:	www.smartsynch.com
		Office Hours:	8:00 a.m. to 5:00 p.m. Central Time

2 Getting Started

Please review the reference documentation before you begin the installation and use of the supporting software.

2.1 Operations

The SSI OPENWAY 1X SmartMeter is an Itron OPENWAY CENTRON electronic electricity meter integrated with a SmartSynch Interface (SSI) Module, which fully supports ANSI standards for electricity metering and is intended for use by commercial and industrial utility customers.

The SSI OPENWAY 1X SmartMeter offers you secure over-the-air transfer of data between the SmartMeter and the TMS (Transaction Management System).

2.2 Safety Precautions

The SSI OPENWAY 1X SmartMeter contains a Motorola C24 CDMA Cellular Engine for wireless communication purposes. The following safety precautions pertain to the hazards related to this device's radio frequency (RF) functionality and must be observed during all phases of installation, operation, service, and repair. Failure to comply with these precautions violates safety standards of design, manufacture, and intended use of the product.

<div style="border:2px solid black; padding:10px;">

WARNING!
Use authorized utility procedures for installing, maintaining, and removing a SmartMeter. Equipment damage, personal injury, or death can result if devices are not properly installed and operated.

</div>

2.2.1 Interference with Medical Equipment

Before installing the SSI OPENWAY 1X SmartMeter on the premises of a hospital or other health care facility, observe the restrictions on the use of mobile communication devices in sensitive areas. Some medical equipment may be sensitive to radio frequency (RF) energy, possibly requiring the meter to be properly shielded or placed in an alternate location.

The operation of cardiac pacemakers, hearing aids, and other implanted medical equipment can be affected by interference from cellular devices placed too closely. Pacemaker patients are advised to observe the same precautions recommended for handheld mobile phones while installing or operating the SSI OPENWAY 1X SmartMeter.

2.2.2 Fire or Explosion Hazards

Do not install or operate the SSI OPENWAY 1X SmartMeter in the presence of flammable gases or fumes. This includes gasoline stations, fuel depots, chemical plants, or sites where blasting operations are in progress. Operation of any electrical equipment in potentially explosive atmospheres can constitute a safety hazard.

2.2.3 Interference with Other Devices

The communication module embedded in the SSI OPENWAY 1X SmartMeter receives and transmits radio frequency (RF) energy while in operation. Interference can occur if it is placed too close to televisions, radios, computers, or inadequately sheltered equipment. Follow any applicable regulations if you suspect that this device may cause interference or danger.

2.3 Prerequisites

To perform the installation of your SmartMeter, you must have access to the following supporting software and should have reviewed relevant documentation:

Itron/Schlumberger (Meter Configuration and Analysis Tool) software, for programming the SSI CDMA 1.5 OPENWAY CENTRON meter. PC-PRO+98 is a Microsoft Windows-based tool that communicates with the CENTRON meter for program development, meter programming, meter reading, meter testing, and report generation. PC-PRO+ system requirements and installation instructions may be obtained in the:

- **PC-PRO+Advanced Installation Guide**
- **PC-PRO+Advanced User Guide**

3 Installing the SSI OPENWAY 1X SmartMeter

3.1 Preliminary Inspections

The SSI OPENWAY 1X SmartMeter is calibrated and tested at the factory and is ready for installation. Before installing and applying power to the SmartMeter, a quick inspection of the SmartMeter is recommended to ensure there is no damage to the SmartMeter, which could possibly occur during shipping. Physical damage to the SmartMeter indicates potential damage to the inside of the SmartMeter. Do not connect power to a SmartMeter that is suspected of having internal damage. Contact your SmartSynch technical support representative if you suspect your SmartMeter is damaged.

3.2 Installation Process

The customer will receive meters in a "Preconfigured" state. This means that meters have been integrated with an SSI SmartMeter Module loaded with the SSI embedded software, an **inactive (unless shipped active per customer request)** cellular network Subscriber Identity Module (SIM) card, and has passed several quality control stages. In addition, a *Ship* file containing device specific information has been generated by SmartSynch for the customer. This file is imported into a configuration server by SSI personnel and a copy is provided to the customer. Upon SIM card activation, upon shipment, or later upon customer request, an *Activation* file containing cellular network-specific information is generated. This file is also imported into the configuration server and a copy is provided to the customer.

Typically, a customer can deploy the meter using one of two methods, depending on business needs:

3.2.1 Option 1: Direct Field Installation

This option is used when the customer prefers immediate deployment of the meters "from the box to the base." This option is desirable in a deployment situation where a large number of meters need to be deployed in a relatively short period of time. The customer-specific information is automatically Over-the-Air downloaded to the SSI module upon energizing the meter and no addition action is needed on-site. Follow the meter installation instructions in Section 3.2.3.

3.2.2 Option 2: Meter Shop Test and Field Installation

There is no need for the Meter Shop to reprogram and test the SmartMeter when it arrives. Upon shipment, the meter will have undergone significant functional and RF testing at the factory. Internal quality control checks will ensure the SSI module is able to communicate with the meter successfully as well as communicate with all other internal components before it is shipped. The device will also arrive in a generic "Preconfigured" state with no customer-specific data stored in internal memory. There is no need for the Meter Shop to perform any programming steps on the meter.

3.2.3 Meter Installation

1. The installer verifies network coverage with a SmartSynch Coverage Validation Unit (CVU).
   Note: If the option board display codes are enabled in the meter program, the Received Signal Strength Indicator (RSSI) display values can be used to verify coverage without the CVU. Refer to section 5 for additional information.
2. The meter is placed in the socket and energized. The meter is now in the Pre-Configured state.

3. Once in the Pre-Configured state, the SSI embedded software transmits an Auto-Configuration message to the configuration server.
4. Upon receiving the meter's Auto-Configuration message, the configuration server will set all of the customer specific parameters into the SSI module's non-volatile memory.
5. When the SSI module inside the meter is fully configured with the customer specific information it will immediately send an Auto-Registration message to the customer's TMS server.
6. If the meter successfully communicates with TMS the Registration message is processed and the meter sends a confirmation message back to the configuration server.
7. The meter is added/updated in the "Registration Group" under the Master List in TMS.
8. The meter is now in the "Placed" state.
9. The meter is ready to receive the Provisioning commands from TMS.
10. Once the meter is provisioned, meter data can be collected from the meter.

3.3 Provisioning the SmartMeter

The provisioning process must be completed to ensure the resulting transaction communication between the TMS and the device is correctly interpreted. If the provisioning process does not run to completion within 30 minutes, the TMS Operator should confirm that coverage validation procedures were properly followed and then review the PIN settings in the Device properties setup.

Next, the operator should check the events in Monitoring Home>Event Search that have occurred within the time following the provision request.

There should be a response within a short time period from the specified device showing the version of the SSI Module, since the **Get Version** transaction is the initial start of the provisioning process. Once the Get Version response is returned to the TMS for the TMS to determine certain attributes of the Device, the TMS sends a number of other transactions to the device to complete the provisioning process.

If the **Get Version** does not complete successfully, check your Device PIN configuration.

If there is no response of the initial provisioning transaction, follow the troubleshooting processes outlined in Section 4. If unsuccessful, check the status of your local Internet connection, and then contact SmartSynch Customer Support for assistance.

4 Troubleshooting

4.1 Troubleshooting Process Flow

The troubleshooting support directives may involve a number of participants to resolve the issue, depending on the type of issue involved. Resolution may include TMS Administrators, TMS Operators, Field Meter Support personnel, or any user who may be required to support the TMS, its clients, or related data.

Section 4.2 describes the required corrective action that corresponds with each step in the flowcharts. The first chart describes the process for Onsite (Field) troubleshooting, and the next describes the process from the TMS Operator's perspective

Onsite Troubleshooting Flowchart
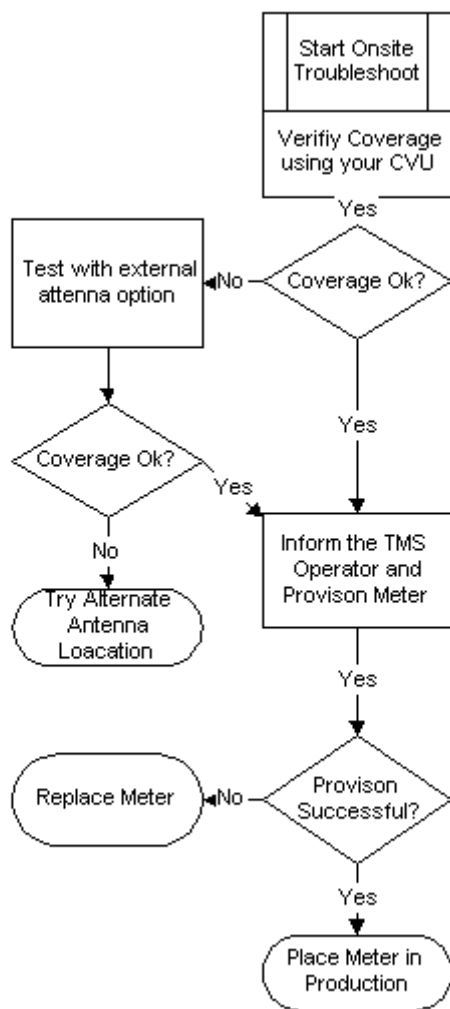
With either process, be sure to perform these initial steps:
1. Confirm that the meter is actually installed in the field.
2. Verify that the PIN for that meter is correct.
3. Verify that the site exceeds the acceptable minimums using the Coverage Validation Unit.

TMS Troubleshooting Flowchart (for meters that have been previously provisioned successfully)
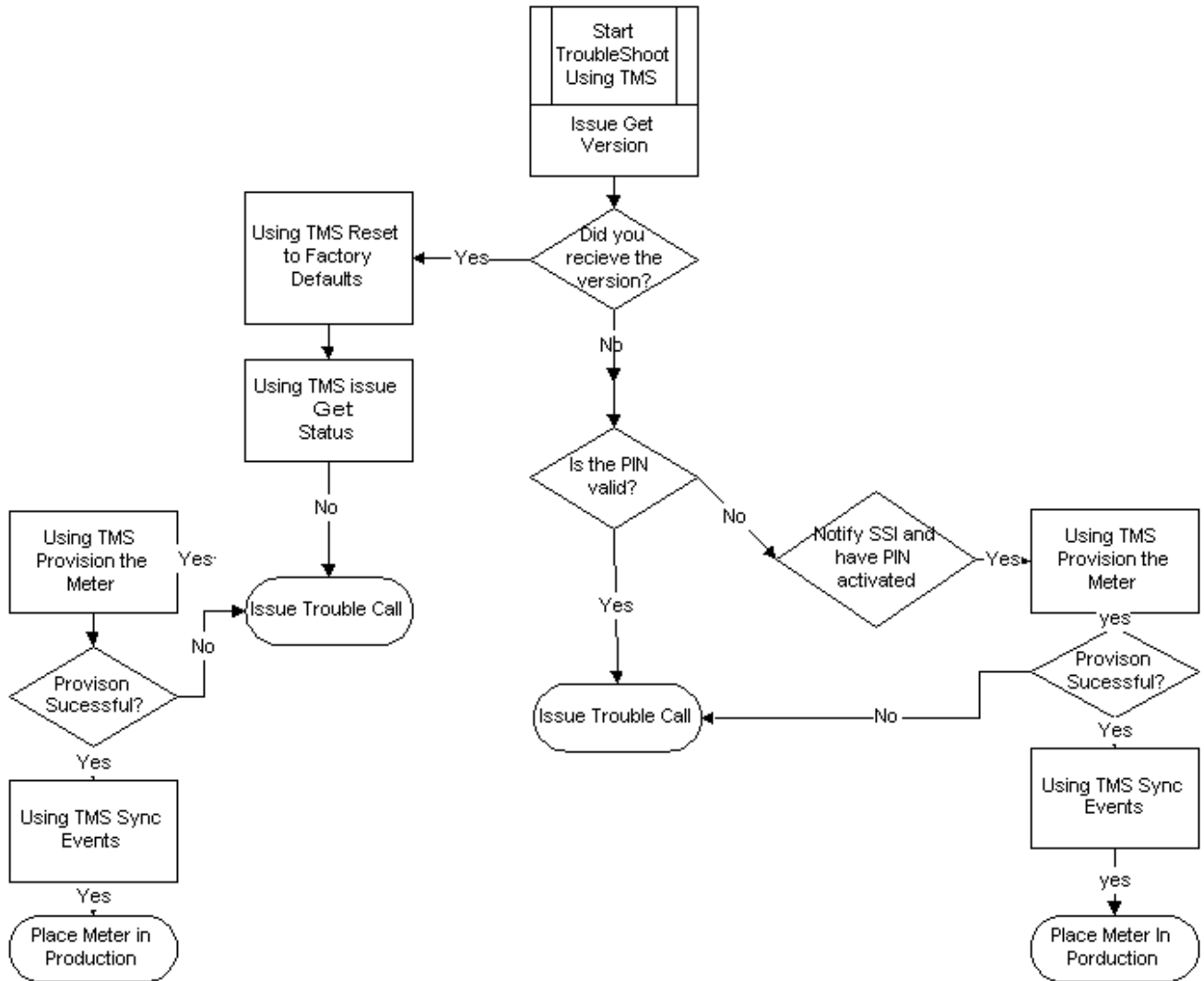
4.2 Troubleshooting Process Description

Process Steps	Description	Action
1	Is Meter Installed in field?	Check work orders, inventory management, or verify with Field Personnel that meter is installed and energized at a valid Customer location.
2	Install Meter	Refer to the Installation section of this document

Process Steps	Description	Action
3	Is Pin # Correct?	Validate that the pin number in the TMS system is indeed the pin number that is matched with the correct meter. Checking the manufacturer's spreadsheet sent with the meters and/or visually inspecting the label on the meter can accomplish this task.
4	Did site pass CVU tests?	Check Meter Test Person's site validation notes and verify that test were properly run and meet the minimum requirements.
5	Get Version?	Perform Get Version ANSI action on device. (See TMS User Guide)
6	Restore Meter to Factory Defaults?	Perform Restore Meter to Factory Defaults ANSI (see TMS User Guide)
7	Get Status?	Perform Get Status ANSI action on device. (See TMS User Guide)
8	Get Status Successful?	Check the results of the Get Status ANSI using Event Search and View Details. (See TMS User Guide)
9	Execute the following Task: Provision	Execute Provision on the meter. (See TMS User Guide)
10	Did the meter provision?	Check the results of the Provision ANSI using Event Search and View Details. (See TMS User Guide)
11	Sync System to Device	If meter is already in a Functional Group, user will need to execute task Sync System to device. (See TMS User Guide)
12	Put meter into production system	Do the necessary paperwork to put meter on production system and notify appropriate stakeholders.
13	Ping the Module Using the Internet/Web Browser	Go to the Network web page. Send a message tab. Enter in the pin number of the device and a miscellaneous message in the message field. Click Send. (See Section 4.2.1)
14	Is Pin Active?	After using the internet/web browser, does the screen say message submitted (yes) or invalid pin (no)? (See Section 4.2.1)
15	Activate Pin Through SmartSynch	Log on to the OCS and create a new case for the invalid pin. SmartSynch Personnel will take care of the issue and notify the user when the PIN is active.
16	Field Site Visit - Call into TMS Operator	Dispatch a meter tech to perform the Onsite troubleshooting procedure and have them call into the TMS operator at the time of completion.
17	Bring Meter in for evaluation	Replace meter with another SmartMeter and bring into Meter Shop for further evaluation.

5 SSI OPENWAY 1X Display Feature
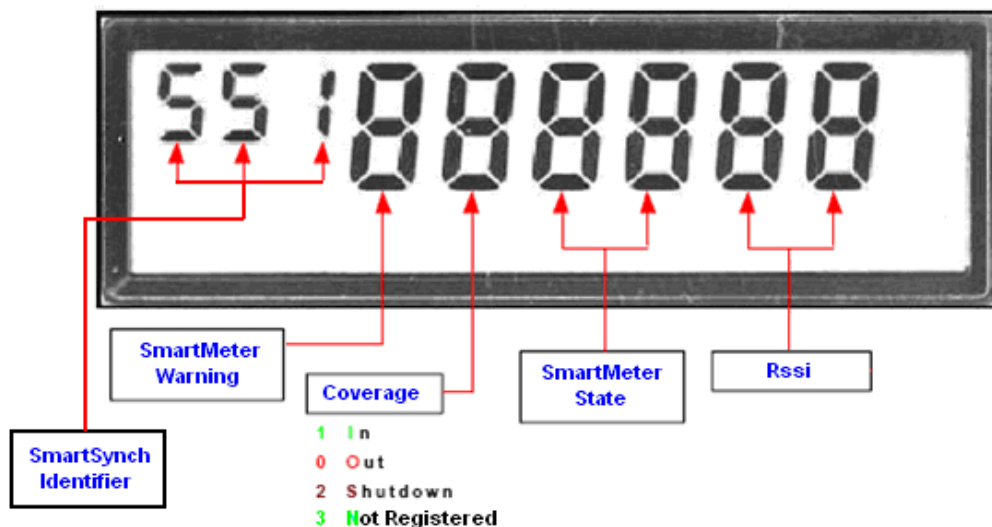
Note: **These display codes are only visible when the SmartSynch Option Board type is selected in the meter program and the option board fields are enabled.**

1. **SmartSynch Identifier**: In general, the meter program controls the number of displays, associated fields, and display time. This 3-letter field identifies SmartSynch display among available displays.
Note: This is a user defined field and can be changed by the customer.

Values	Description
SSI	SmartSynch, Inc.

2. **SmartMeter Warning**: displays error codes generated by SmartSynch embedded software.

–	●	Normal operations – no errors
1	●	SmartMeter module's NVRAM error
2	●	Read/write failure in the Common Configuration area - NVRAM
3	●	Read/write failure in the App. Specific Configuration area - NVRAM
4	●	Actual firmware binary image is corrupted
5	●	Firmware image decompression error
6	●	Meter clock deviation is greater than the maximum correction limit
7	●	Software watchdog triggered – processor is reset

● Good. ● Warning. ● Error

3. **Wireless Coverage Status**: coverage status detected by the CDMA modem.

Values	Description
1	In coverage: modem can hear the network
0	Out of coverage: modem can't hear the network

2	Shut-down: modem power is off when temperature is outside [-20C, +70C] range
3	Not Registered: modem is **not** currently registered to any networks, but **is** trying to manually register on its own

4. **SmartMeter State**: provides a high-level state of SmartSynch firmware.

00	●	Initial state – SmartMeter not Quality Controlled yet
01	●	SmartMeter passed the Meter Integrator QC
02	●	SmartMeter passed Utility QC & is ready for deployment
03	●	SmartMeter is attempting to auto-configure with configuration server
04	●	SmartMeter is configured & is attempting to register with TMS
30	●	SmartMeter failed to automatically download configuration
05	●	SmartMeter has automatically registered with TMS
31	●	SmartMeter failed to automatically register with TMS
06	●	TMS has successfully provisioned the SmartMeter
80	●	SmartMeter failed to transmit messages in up to 24 hours
81	●	SmartMeter failed to transmit in at least 24 hours (# messages < 10)
82	●	SmartMeter failed to transmit in at least 24 hours (# messages >= 10)

● Not ready.　● Good.　● Warning.　● Error

States: 00 – 29; Errors: 30 – 59; Warnings: 80-99

5. **Received Signal Strength Indicator (RSSI)**: signal strength as reported by the modem

Displayed RSSI Value	Equivalent Power Value (dBm)
0	-113 or less
1	-111
2	-109
3	-107
5	-103
7	-99
9	-95
11	-91
13	-87
15	-83
17	-79
19	-75
21	-71
23	-67
25	-63
27	-59
29	-55
31	-51
99	not known or not detectable

Weaker Signal

Stronger Signal

6 Requirements and Compliance

The SSI OPENWAY 1X SmartMeter is compliant with all applicable Federal Communications Commission (FCC) and Industry Canada requirements. The FCC and IC identification numbers for the SSI OPENWAY 1X SmartMeter are listed as follows:

      FCC identifier: QHC-OPENWAY1X
      IC Identifier: 4393B-OPENWAY1X

This certification is granted to SmartSynch Inc.

6.1 FCC Grant Statement

The antennas used for this transmitter must be installed to provide a minimum separation distance of 20 cm from all persons, and must not be co-located or operate in conjunction with any other antenna or transmitter.

6.2 Compliance Statement (Part 15.19)

The SSI OPENWAY 1X SmartMeter complies with Part 15 of the FCC Rules. 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.

6.3 Warning (Part 15.21)

Changes or modifications not expressly approved by Itron and SmartSynch Inc. could void the user's authority to operate the equipment.

6.4 RF Radiation Safety Guidelines per Part 2 of FCC Rules and Regulations

The meter should be installed in a location where there will be a separation greater than 20 cm (8 inches) from locations occupied by humans.

6.5 User Information (Part 15.105)

The SSI OPENWAY 1X SmartMeter 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, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Move the receiving equipment farther away from the meter.
• Consult the dealer or an experienced radio/TV technician for help.

6.6 Acceptable External Antenna Configurations

The only acceptable GSM/CDMA external antenna configurations are as follows:

1. SSI-SAC-ANKEG-ODG-010 Monopole CDMA Antenna Kit (External Mount).
2. SSI Internal "Under Glass" mono-pole.

When using the externally mounted monopole, a ground plate must be used with the antenna to provide a ground plane for proper operation of the antenna.