Excellence in Compliance Testing

Certification Exhibit

FCC ID: TEB-HUNTSU825

FCC Rule Part: 15.247

ACS Project Number: 12-0333

Manufacturer: Landis+Gyr Technologies, LLC
Model: 0825

Manual

Draft 5.8.13

Gridstream RF S4e Endpoint with ZigBee Data Sheet

Publication: 98-9103 Rev AA

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Gridstream RF S4e Endpoint with ZigBee Data Sheet

General

The Gridstream RF S4e endpoint is designed to accommodate Landis+Gyr S4e poly-phase meters for use in commercial and light industrial services. The S4e Advanced Function meter is an Active Energy kWh/kW/TOU Meter. The meter features Digital Multiplication Measurement Technique, meets ANSI standards for performance and utilizes ANSI C12.19 protocol (between meter and AMR device). Can be deployed with or without ZigBee.

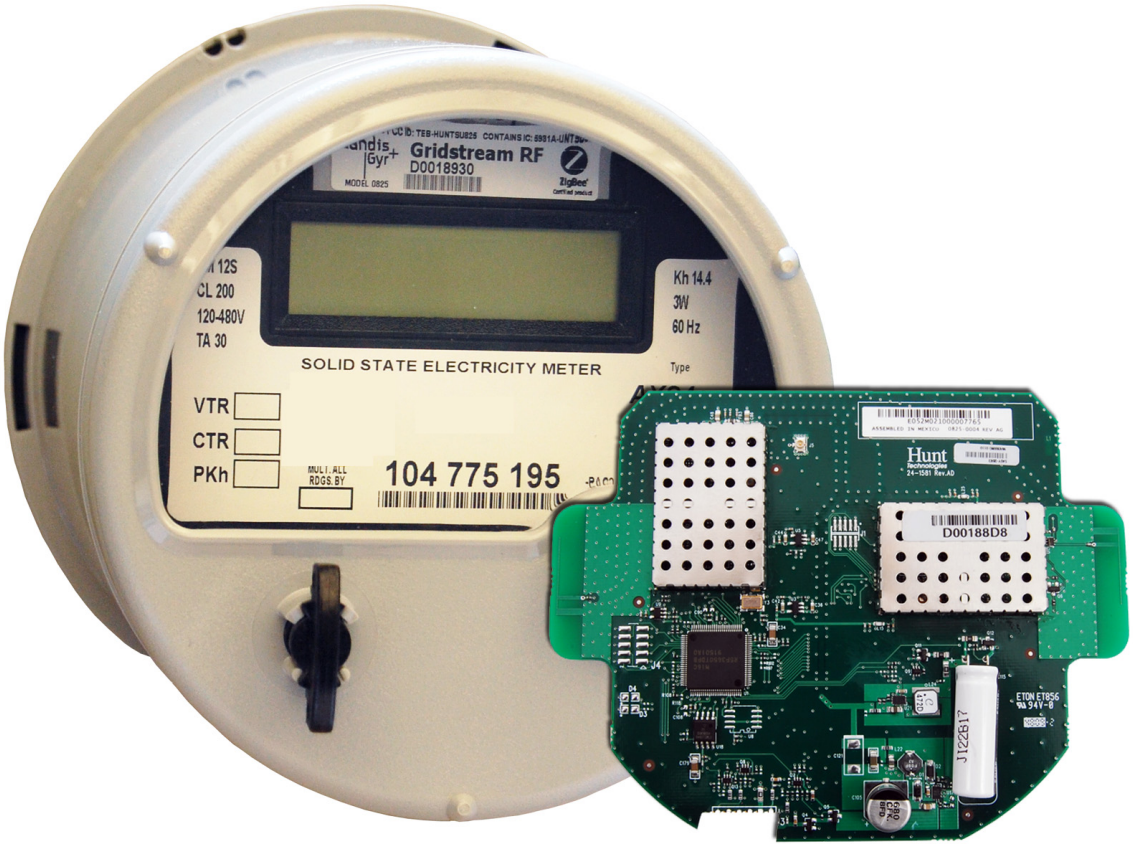

Figure 1. The Gridstream RF S4e Endpoint Module and the Landis+Gyr S4e Meter

FCC Compliance Information

Models: 0825, 26-1554, 26-1557
FCC ID: TEB-HUNTSU825
IC: 5931A-HUNTSU825

Compliance Statement (Part 15.19)

This device 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.

CAUTION: Changes or modifications not expressly approved by Landis+Gyr could void the user's authority to operate the equipment.

Endpoint Location

To comply with FCC's RF exposure limits for general population/uncontrolled exposure, the antenna(e) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

Industry Canada

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter (5931A-HUNTSU825) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Approved Antenna: Omni-directional antenna, 5.5 dBi gain, 902-928 MHz, antenna impedance is 50 ohms.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio (5931A-HUNTSU825) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Endpoint Usage

The Gridstream RF S4e endpoint will be used:

- for commercial and light industrial metering applications.
- at homes and businesses.

The Gridstream RF S4e endpoint requires professional installation by qualified personnel.

RF Interference

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 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 meter off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult Landis+Gyr or an experienced radio/TC technician for help.

Required Software

To work with the endpoint, you need one of the following software tools:

- Command Center host ver. 4.1 SP2 or greater
- RadioShop
- Landis+Gyr 1132Prog application
- Endpoint Testing Manager

Communication Module Specifications

Table -1. Gridstream RF S4e Communications Module Specifications

Category	Specification	Value or Range			
Compatible Meters	Landis+Gyr S4e Supported Meter Forms	Form	Class	Form	Class
		3S	20	16SE	320
		5S/45S	20	16/15K	480
		6S/36S	20		
		9S/8S	20		
		2S	200		
		12S	200		
		16S/15S	200		
		25S	200		
		12SE	320		
Electrical	Voltage	10.5-13.5V (from the meter's power supply)			
	Power	Max: 2.5W Typical: 0.5W			
RF 900 MHz	Output Power	+26 dBm +/-1 dBm			
	Adjacent Channel Power	39 dBc Nominal (9600 bps)			
	Transmit Frequency	902 to 928 MHz ISM unlicensed (FCC Part 15)			
	Communication Protocol	Gridstream Protocol for Command Center			
	Receive Sensitivity	-108 dBm minimum			
RF ZigBee	Output Power	+20 dBm +/-1			
	Adjacent Channel Power	40 dBc Minimum			
	Transmit Frequency	2405-2480 MHz			
	Communication Protocol	ZigBee Protocol			
	Receive Sensitivity	-104 dBm minimum			
Standards Compliance	FCC Title 47 CFR Part 15	Radiated and Conducted Emissions (incl. intentional radiators)			
	IEC 61000 4-2,3,4,5,11,12	Electromagnetic Compatibility			
	ANSI C12.19	Compatible with Utility Industry End Device Tables			
	ANSI C12.20	National Standard for Electricity Meters - 0.2 and 0.5 Accuracy Classes			
	ANSI C12.1	Code for Electricity Metering			
	ANSI C37.90.1 (1989)	Standard Surge Withstand Capability (SWC) Tests			
	ANSI C12.22	Transport of ANSI C12.19 Over Network Transmissions			

Table -1. Gridstream RF S4e Communications Module Specifications (Continued)

Category	Specification	Value or Range
Environmental	General Environmental	Outdoor, rain-protected, sunlight-exposed
	Operating Temperature Range	-40 to +85 C (under meter cover)
	Humidity	0 to 95% relative humidity, non-condensing

Gridstream
RF Electric Endpoint
Fix-up Antenna
Installation Guide

Publication: 98-1245 Rev AA

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Gridstream RF Electric Endpoint Fix-up Antenna Installation Guide

Overview

This publication outlines the procedure for remote passive antenna installation on Gridstream RF Electric Endpoints.

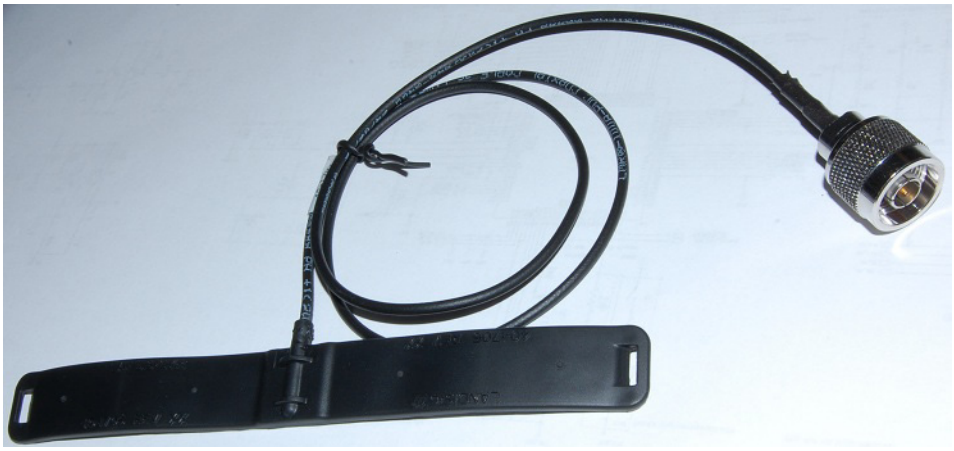


Figure 1. Remote Passive Antenna

This antenna couples radio frequency energy from a Landis+Gyr Gridstream RF Electric Endpoint's 902-928 MHz antenna into a coax cable connected to a remote antenna located at an optimal location for better connection to the Gridstream RF network. Coupling loss (including the 2.5 ft. cable) ranges from 5 to 9 dB, with 5 being a typical value. Environmental performance is rated for: 0 to 95% relative humidity, -40 to +85° C.

Coupler Part Numbers

The same coupler is used for all remote antenna installations. The part number and description is as follows:

- 40-1705 flex loop, 2.5 ft. antenna cable, cable tie, adhesive

In the case where the length above is insufficient, Landis+Gyr recommends the extension cable listed below, terminated with a female “N” connector on one end and a male “N” connector on the other:

- 19-1742, extension cable, 20 ft.

Required Materials

The following materials are required to complete a remote antenna installation.

- Alcohol wipes
- RTV - Part Number 30-0109, Dow Corning #839
- Cold flow sealing tape
- Hardware, appropriate to installation
- 45-1221, Kit, Antenna (consisting of items listed below)
  - 106119-000 Remote Antenna, 5dBi Whip
  - 28-1012, Antenna Ground Plane
  - 16-0214: Barrel Connector N-Female to N-Female, “Bulkhead”

List of Terms

The following is a list of terms used to identify remote antennas and related equipment.

Coupling Antenna

This is the flexible circuit that is at the end of the antenna assembly. It is referred to interchangeably as the flex circuit, flex dipole, patch antenna, coupler, and so on.

Remote Antenna

Refers to the omni whip antenna which will be “remoted” from the coupling antenna. The remote antenna is ideally mounted “line of sight” to the Gridstream RF Mesh network.

Optional Materials

The following items may be required, depending on the installation.

- 22-1542: Grommet, 1.25” OD, 1.0” ID with 0.25” center hole
- Mounting brackets, Landis+Gyr part numbers:
  - 28-1800: Bracket, antenna, meter box, right
  - 28-1801: Bracket, antenna, meter box, left
  - 28-1802: Bracket, antenna, ceiling mount
  - 28-1804: Bracket, antenna, wall, flat

Tools

The following tools may be required, depending on the installation.

- Flat head screwdriver
- Utility knife
- Battery-operated drill with 5/8- and 1-inch high speed metal bits
- Phillips head screwdriver
- Wire cutters
- Tape measure

Performance

Table 1. Performance

Parameter	Minimum	Typical	Maximum	Units	Condition
Frequency	902		928	MHz	
Coupling Loss		5	9	dB	
Polarization		Linear			
VSWR		1.78:1			Final antenna assembly on FOCUS AX: modular
Impedance		50		ohm	
Input RL		11		dB	Final antenna assembly on FOCUS AX: modular

General Installation Guidelines

Determine the optimum location for remote antenna installation. This will vary depending on the location of the meter. In general, the antenna should be:

- Installed as close to line of sight with a Gridstream RF network equipment as is possible.
- Mounted so that it is at least four inches from the nearest structure.
- Mounted so that a meter box cover, if the endpoint is enclosed in one, can be removed without interference from the remoted antenna.
- For inside-premise installations, remoted antennas may be mounted in the proximity of an available window, or may need to be routed to the outside if the signal strength is insufficient.
- Mounted so that the antenna connector is OUTSIDE the meter box. A 1-inch hole should be drilled in the meter box so that the connector can be fed through the box. Use the appropriate mounting bracket to mount the antenna external to the meter box.
- Mounted so that any length of additional cable is minimized. The best practice for maximum cable length is to not exceed line loss (refer to cable manufactures line loss chart) vs. gain of antenna, the RF link loss by use of passive antenna can be excluded from the line loss calculation.

It is the responsibility of local installation organizations to ensure that local wiring codes and requirements are met, including the application of a safety ground, when required.

NOTE: This device and the supplied installation components are UV-resistant.

Gridstream RF Enhanced FOCUS AX/AX-SD Mounting Procedure

NOTE: The passive antenna should be mounted within 5 mm (0.25") of the indicated location to achieve specified performance.

1. Clean the meter cover where the flex antenna will be installed. Wipe the cover mounting area with an alcohol wipe and let the area dry for one minute before proceeding with the installation.
2. Peel the paper backing off of the adhesive tape (bottom of coupling antenna).
3. ***Firmly press the center of the antenna to the bottom (6 o'clock position) of the meter while aligning the lower/left of center edge of the antenna with the lower edge of the window on the inner meter housing.***
4. Wrap the cable tie through and over antenna guides, and around the meter. Thread the cable tie into the mating end of itself.

Figure 2. Antenna Guides

5. Ensure that the cable tie is evenly placed over the antenna and cinch tight.
6. Install the remote antenna at the location indicated by the link assessment performed. If a link assessment tool is not available, select a location that provides the best line of sight to the nearest collector.
7. Once installed to the antenna, wrap the connector using cold flow tape. Tape should be wrapped tightly and in a continuous manner. The tape should cover the cable one inch past the end of the connector.
8. Secure the cable to the side of the structure using appropriate hardware for the building construction.

Cable Tie

Align the lower edge of the antenna with the lower edge of the bottom window on the inner meter housing, with the antenna center point as shown.

Figure 3. Installation On FOCUS AX/AX-SD Meters

Gridstream RF Enhanced S4e Mounting Procedure

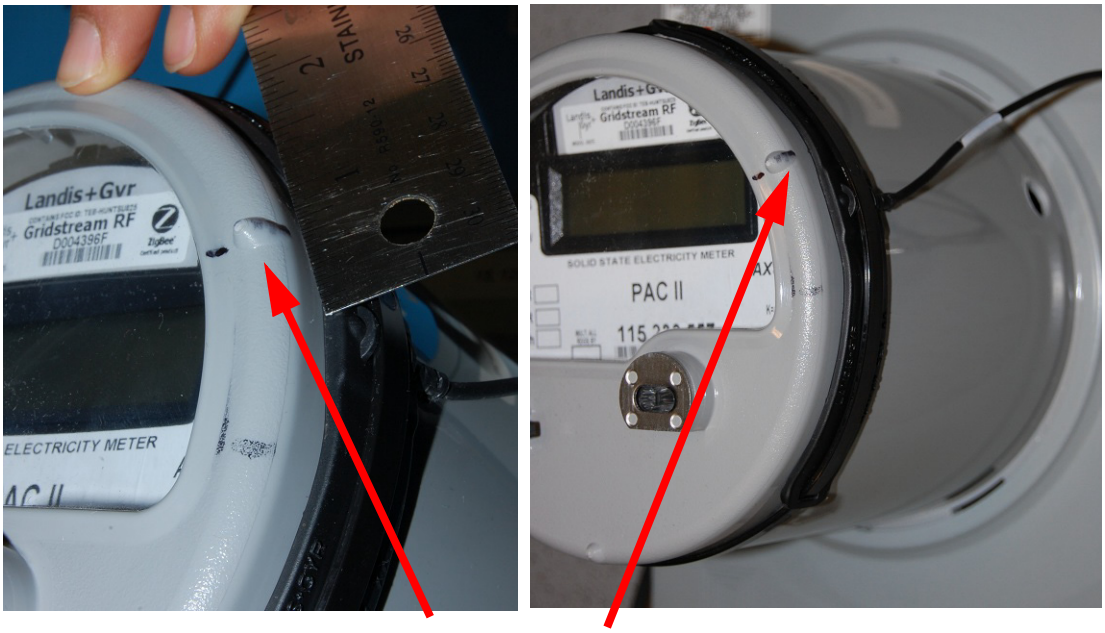
NOTE: The passive antenna should be mounted within 5 mm (0.25") of the indicated location to achieve specified performance.

1. Clean the meter cover where the flex antenna will be installed. Wipe the cover area with an alcohol wipe and let the area dry one minute before proceeding with the installation.
2. Peel the paper backing off of the adhesive tape (bottom of coupling antenna).
3. ***Firmly press the center of the antenna onto the meter housing at the 2:30 o'clock position, 1.5 cm clockwise past the nub on the outer meter cover. Align the top edge of the antenna with the texture line on the S4e meter housing.***
4. Wrap the cable tie over and through the antenna guides, and around the meter. Thread the cable tie into the mating end of itself.

Figure 4. Antenna Guides

5. Ensure that the cable tie is evenly placed over the antenna and cinch tight.
6. Install the remote antenna at the location indicated by the link assessment performed. If a link assessment tool is not available, select a location that provides the best line of sight to the nearest collector.
7. Once installed to antenna, wrap the connector using cold flow tape. Tape should be wrapped tightly around the cable and in a continuous manner. The tape should cover the cable one inch past the end of the connector.

8 Secure the cable to the side of the structure using appropriate hardware for the building construction. See Figure 5 on page 8.



Align the antenna center point on the meter housing at the 2:30 o'clock position, 1.5 cm clockwise past the nub on the outer meter cover

Figure 5. Installation On Gridstream RF Enhanced S4e Meters

Gridstream RF Integrated FOCUS AX/AX-SD Mounting Procedure

NOTE: The passive antenna should be mounted within 5 mm (0.25") of the indicated location to achieve specified performance.

1. Clean the meter cover where the flex antenna will be installed. Wipe the cover mounting area with an alcohol wipe and let the area dry for one minute before proceeding with the installation.
2. Peel the paper backing off of the adhesive tape (bottom of coupling antenna).
3. ***Firmly press the center of the antenna to the 5 o'clock position of the meter while positioning the upper edge of the antenna 3.3 cm below the top surface of the meter cover.***
4. Wrap the cable tie through and over antenna guides, and around the meter. Thread the cable tie into the mating end of itself.

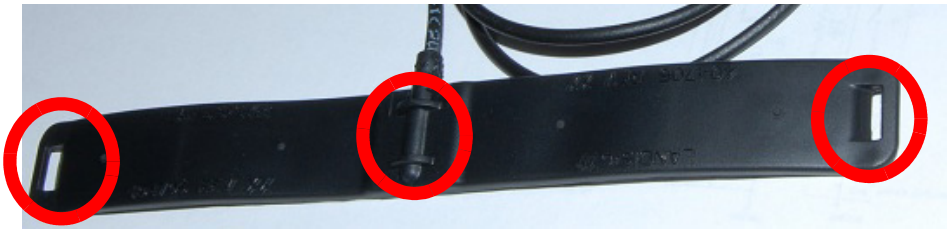


Figure 6. Antenna Guides

5. Ensure that the cable tie is evenly placed over the antenna and cinch tight.

6. Install the remote antenna at the location indicated by the link assessment performed. If a link assessment tool is not available, select a location that provides the best line of sight to the nearest collector.
7. Once installed to the antenna, wrap the connector using cold flow tape. Tape should be wrapped tightly and in a continuous manner. The tape should cover the cable one inch past the end of the connector.
8. Secure the cable to the side of the structure using appropriate hardware for the building construction.

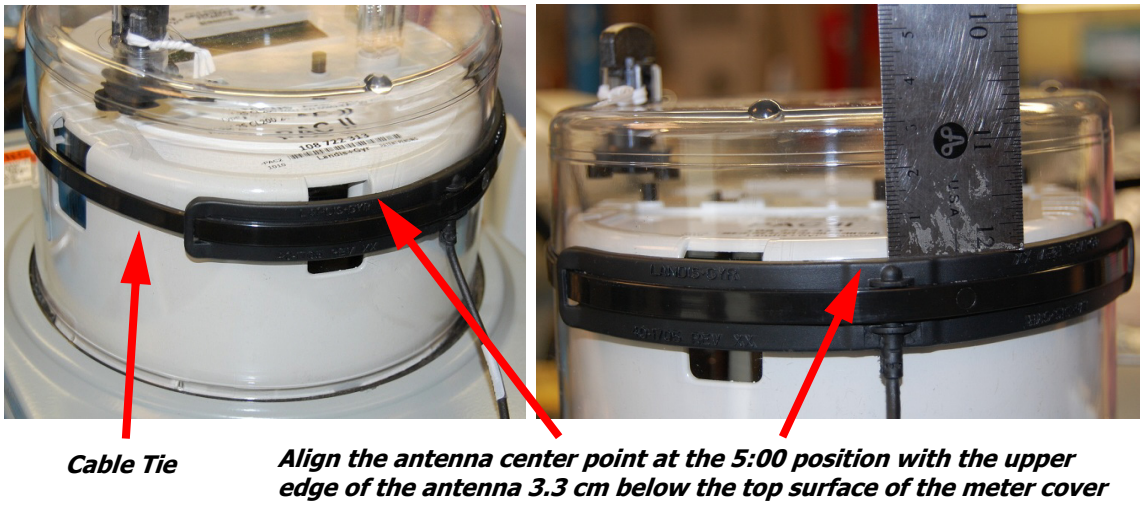


Figure 7. Installation On FOCUS Integrated AX/AX-SD Meters

Antenna Brackets and Antenna Mounting

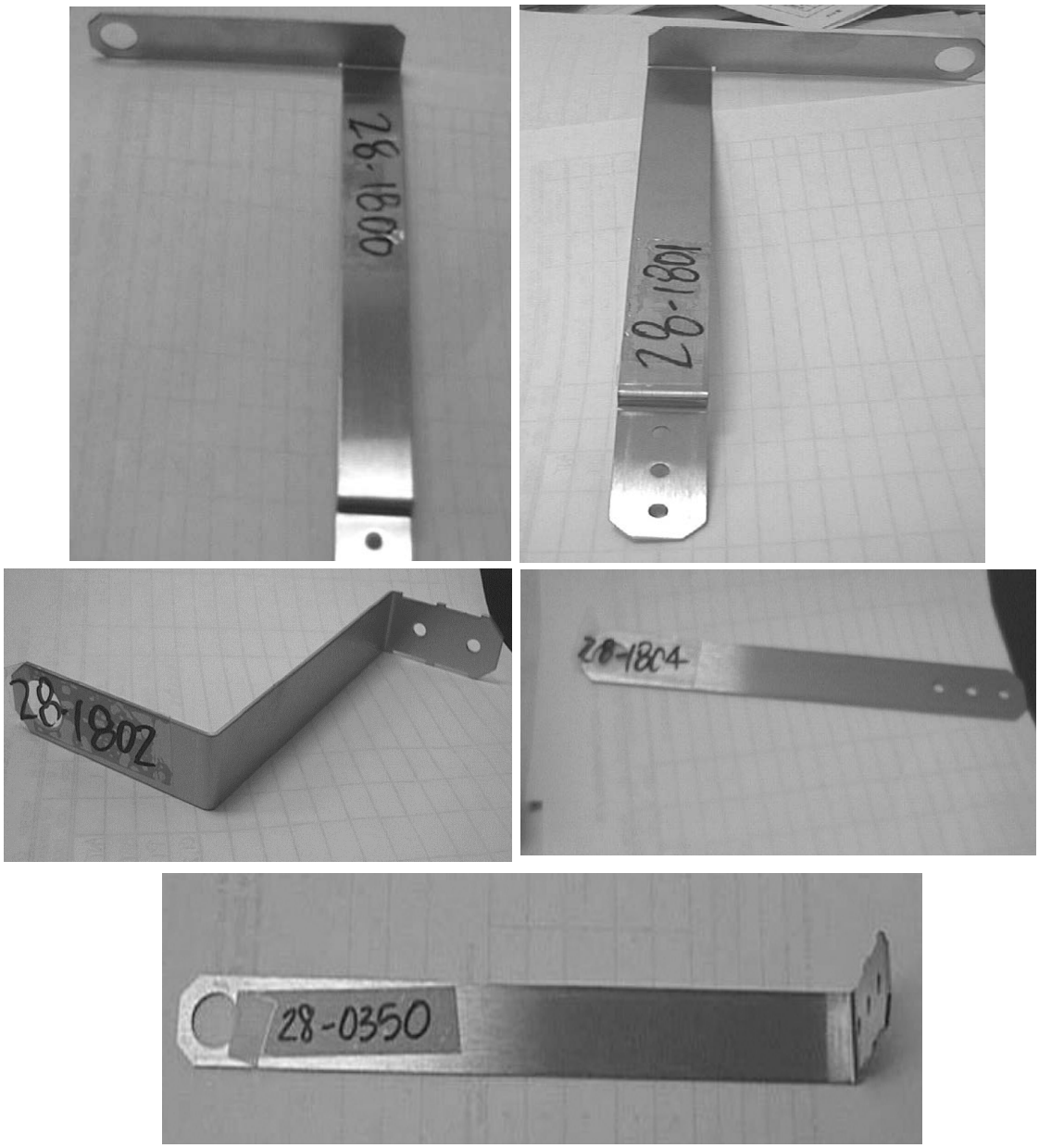


Figure 8. Typical Remote Antenna Brackets

NOTE: To mount these brackets, use screw and bolt hardware that is approved by the local utility.

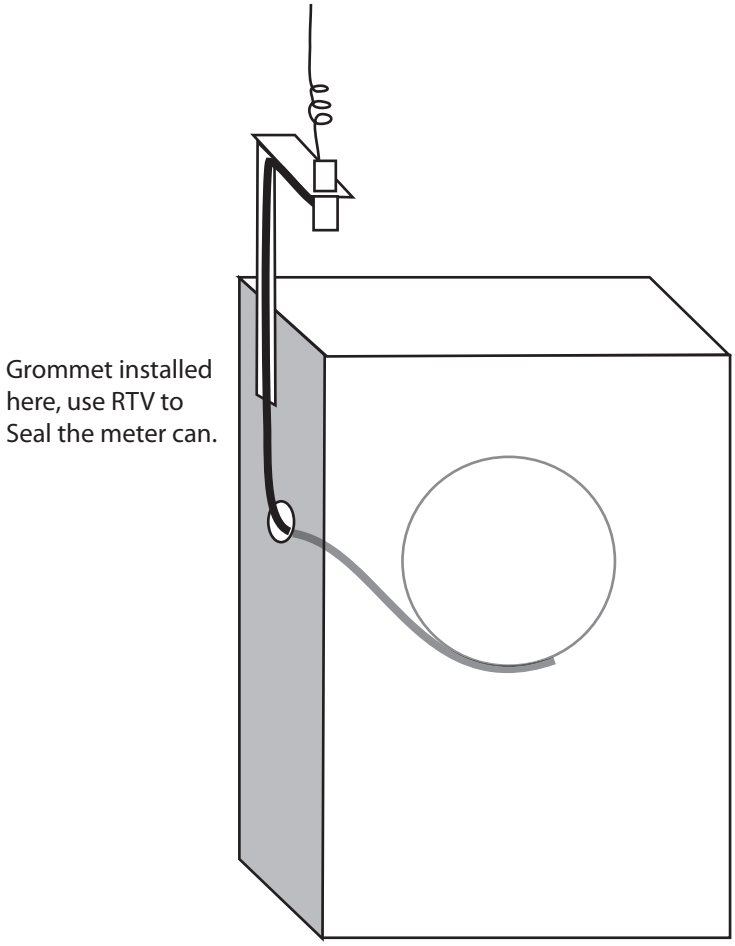


Figure 9. Example Remote Antenna Illustration