



SAMPLE Specification for a wireless water sub metering system

1.0 Introduction

This specification describes the functional and operational requirements needed for a wireless fixed network system for sub-metering. The following list shall be met once the sub-metering system is installed

- 1) Wireless communication shall occur between each transmitter/receiver connected to a water meter and the Aqura Cloud gateway.
- 2) Hourly or daily water meter readings should be sent from the water meters in individual apartments with the use of the wireless sub-metering system
- 3) The data from the gateway should be retrieved automatically via an Internet connection
- 4) The wireless sub-metering equipment should support multiple billing companies (often call Read, Bill and Collect - RBC))

2.0 Wireless sub-metering system description

The transmitters/receivers must communicate meter readings and radio status information between water meters and the gateway without the need to gain physical access to the individual apartments. The system must utilize bi-directional wireless communication technology (i.e. radio frequency based).

The wireless sub-metering system must use wireless equipment in the 2.4 GHz frequency band (2.400 to 2.483.5). In order to provide maximum reliability and interference immunity transmitters/receivers should use Direct Sequence Spread Spectrum (DSSS) in conjunction with the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) technique.

The radios must be certified by the Federal Communications Commission (FCC). The transmitters/receivers must meet the FCC established technical standards and allow the sub-metering system to operate throughout the United States without the user, supplier, or operator obtaining any type of radio license.

The major components of the wireless sub-metering system are

- 1) transmitters/receivers connected to the water meters
- 2) line powered transmitters/receivers which act as repeaters
- 3) a single transmitter/receiver coordinator connected to the gateway
- 4) a gateway and software on the gateway to read, store and forward water meter readings

The gateway and coordinator should be “Plug and Play” with no configuration required.



3.0 Wireless transmitters/receivers for water meters requirements

3.1 Transmitters/receivers physical requirements

The transmitters/receivers should be small and unobtrusive (less than 24 cubic inches).
The transmitters/receivers must operate within the temperature 32 to 120 degrees F.

3.2 Transmitters/receivers installation requirements

Installation must be possible on qualified, existing or new water meters.

The transmitter/receiver must be mounted either on the meter or on the wall. If installed on a wall, the transmitter/receiver must be mounted within 15 feet of the meter for indoor applications.

The transmitter/receiver should be installed by qualified personnel or subcontractors using standard tools and following industry standard practice.

The transmitter/receivers should have a method where the installer can confirm that the transmitter/receiver has joined the wireless network and that the transmitter/receiver can send a message to the Aqura Cloud gateway and receive an acknowledgement.

3.3 Transmitters/receivers power source requirement

The transmitter/receiver must be powered by any one of these power sources

- 3.3.1 A lithium battery that is field replaceable and has an battery life of at least 5 years
- 3.3.2 120 volt AC to 4.5 volt DC wall mount plug-in power supply
- 3.3.3 24 volt AC to 4.5 volt DC power supply
- 3.3.4 240 volt AC to 4.5 volt DC wall mount power supply

3.4 Transmitter/receiver identification requirement

3.4.1 The transmitter/receiver must have a unique permanent ID number, which is programmed by the manufacturer.

3.4.2 The transmitter/receiver ID number must be sent each time a transmission is sent.

3.4.3 The transmitter/receiver must have a label clearly stating all regulatory certifications



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3.5 Transmitter/receiver transmission requirements

- 3.5.1 Readings from the water meter should be able to be sent at any interval between once every 15 minutes to once every 1440 minutes (once per day).
- 3.5.2 The meter reading and transmitter/receiver status should be sent to the Aqura Cloud gateway/coordinator
- 3.5.3 The transmitter/receiver should have an open field transmission of 1200 feet, minimum.

4.0 Wireless transmitter/receiver repeater requirements

To accommodate multi-family sites, or to support future site expansion, a transmitter/receiver repeater product must be available. The transmitter/receiver repeater increases the range of the radio transmissions between the water meter transmitters/receivers and the Aqura Cloud gateway/coordinator.

- 4.1 The repeater should periodically transmit check in signals to monitor the integrity of the wireless links to other transmitters/receivers
- 4.2 The repeater must be capable of using the following power supplies
 - 4.2.1 A 120 volt AC to 9 volt DC wall mount plug in power supply
 - 4.2.2 A 24 volt AC to 9 volt DC power supply
- 4.3 The repeater must be available in either an outdoor or indoor enclosure
- 4.4 The repeater must operate in an ambient temperature range of -20 to 120 degrees F

5.0 Wireless transmitter/receiver coordinator requirements

- 5.1 The coordinator should interface with the Aqura Cloud gateway using a USB 2.0 cable
- 5.2 The coordinator should be less than 24 cubic inches, 5.0 inches x 3.5 inches x 1.0625 inches
- 5.3 The coordinator must operate in an ambient temperature range of -20 to 120 degrees F

6.0 Data Collection device (gateway) requirements

The wireless sub-metering system should have a data collection device (gateway) at the site which collects the messages from the RF coordinator transmitter/receiver and stores the messages. The Aqura Cloud gateway should interface with a remote computer over the Internet.

- 6.1 Data collection device (gateway) must support a 120 volt AC to 5 volt DC power supply
- 6.2 Data collection device (gateway) must be wall mountable
- 6.3 Data collection device (gateway) must support asynchronous bi-directional communications with a remote computer/server over the Internet
- 6.4 Data collection device (gateway) should be able to store 250,000 records.



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7.0 Wireless sub-metering software requirements

The software must provide a means of viewing the real time and historical data for each transmitter/receiver and the water meter it is attached to.

7.1 The software is a web based program available for the billing company to obtain meter readings from the data collection device (gateway)

7.2 Each transmitter/receiver should have a unique user defined meter ID in the software

7.3 Software should provide the following functions

7.3.1 Record and display general information

7.3.2 Show meters by building and apartment

7.3.3 Show repeaters by building and apartment

7.3.4 Show daily historical data for each water meter

7.3.5 Show hourly historical data for each water meter

7.3.6 Show total water consumption for each apartment by date range (ranked by apartment)

7.3.7 Show total daily water consumption for the entire property by date range

7.3.8 Show a daily leak report for each apartment that has toilet leaks

7.3.9 Show a list of all water meters that had water leak consumption by date range

7.3.10 Show all water meters that have no water consumption

7.3.11 Show transmitter/receiver performance for all RF devices on the property

7.3.12 Ability to send data files (often referred to PUSH) containing water meter consumption to billing companies

7.3.13 Ability to download data files (often referred to PULL) containing water meter consumption for billing companies

7.3.14 Ability to support any number of properties each with associated buildings, apartments and water meters