

TempTale RF Infrastructure and Remote Site Server Setup Instructions

FCC Part 15, Class A Manual Statement

RF GATEWAY PN: T11008340
FCC ID: SRMT11008340
IC: 6654A-11008340

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. Changes or modifications not expressly approved by Sensitech could void the users' authority to operate the equipment

RADIO AND TELEVISION INTERFERENCE

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Hardware Configuration Instructions for TTRF Infrastructure

TempTale® RF System

The TempTale® RF system uses software and hardware to capture temperature data and download the data wirelessly to a local computer. The data is then sent via Internet to a secure database where the data can be viewed and analyzed. The software is Remote Site Server (RSS) and the hardware is; TempTale RF monitors (TTRF) and three other types of RF (Radio Frequency) devices:

- Gateways - are RF monitor readers attached via Ethernet to the PC running RSS
- Repeaters - extend the area covered by the network.
- Signposts - transmit a location ID which is stored in the monitors.

Depending on geographic region, the TTRF system operates within two ISM (Industrial, Scientific and Medicine) frequency bands:

870.0 MHz in Europe and
928 MHz in North America

Within these bands, the TTRF System uses specific channels to transmit and receive data. For the 902 - 928 MHz band the following channels are used:

914.904 MHz
922.277 MHz

For the 869 MHz band the following channel is used:

869.850 MHz

The RF signal used is a narrow band transmission that transmits power at +2 dBm for the monitors and 0dBm for the Infrastructure (Gateway, Repeaters and Signposts). Both the monitor and Infrastructure devices have an ERP (Effective Radiated Power) of about 2dB below the FCC limit of 94 dB μ V/m. The channel width is 185 kHz, with 99% of energy within this channel. For US TTRF systems, the RF infrastructure (Gateways, Repeaters and Signposts) will be set to one of the two channels based on the current S/N (Signal to Noise) ratio of all the available channels at the time the system is installed at a customer site. The operating channel can be manually changed at any time if there is too much noise (i.e. interference) on the current channel¹.

US operating TTRF systems (using the 902 – 928 MHz ISM band) conform to FCC rule Part 15, Section 249, which states:

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

- *Fundamental Frequency field strength: 50 millivolts/meter.*
- *Harmonics Frequency field strength: 500 microvolts/meter*

¹ For European operations, there is currently only one channel to use for the TTRF system.

Hardware Configuration Instructions for TTRF Infrastructure

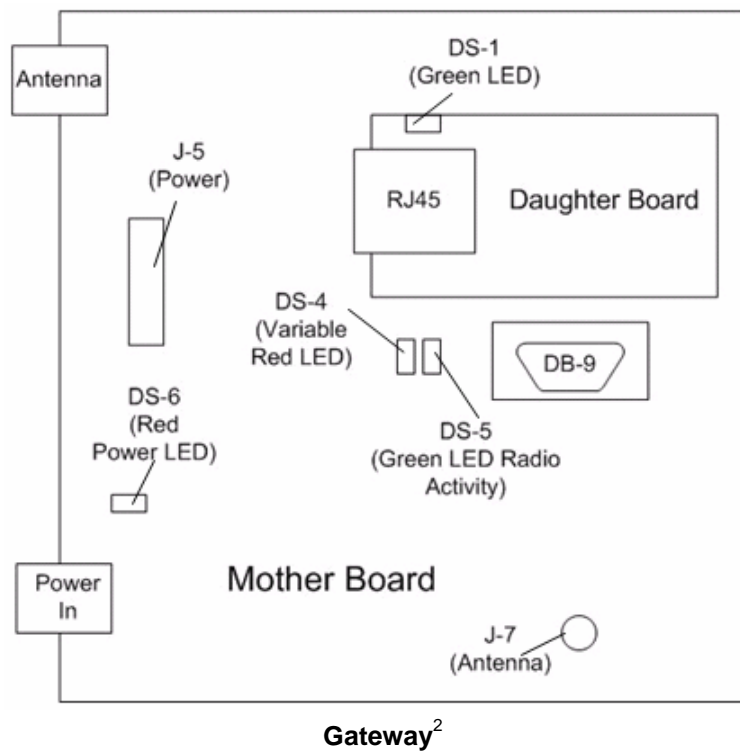
Section 1: Hardware Configuration Instructions for TTRF Infrastructure

These instructions guide a technician through the installation and configuration of the TempTale RF infrastructure.

Equipment

- RS232 Serial cable (1)
- TTL Converter (1)
- RJ45 Ethernet crossover-cable (1)
- TTRF Gateway (1)
- Repeater (1)
- Gateway Power Adaptor (1)
- Repeater Power Adaptor (1)
- PC with Start Hyper Terminal installed
- PC with scientific calculator
- Ethernet connection

Configuring the TTRF Gateway for a static IP address or DHCP agent



- 1) Make sure power is off on the TTRF Gateway.

² Repeater/Signposts use the same Motherboard.

Hardware Configuration Instructions for TTRF Infrastructure

- 2) Open up the front panel of the TTRF Gateway and connect the TTL Converter to the female DB9 Admin Port on the Motherboard.
- 3) Make sure the connector on Jumper J4 is present (attached) on the Motherboard.
- 4) Connect the Sensitech RS232 Serial cable from the TTL Converter to the COM1 port on the Control PC.
- 5) Make sure the RJ45 Ethernet cable coming from the Daughter Board is NOT connected to the Customer's Ethernet Network.
- 6) Power on the TTRF Gateway.
- 7) Verify TTRF Gateway LED light patterns:
 - Constant Red PWR Indicator LED on the Motherboard (DS6)
 - Variable blinking Red LED on mother board (DS4)
 - Possibly a variable blinking Green "Radio Activity" LED on mother board (DS5)
 - Possibly a constant Green LED (DS1) on the Daughter Board, if the RJ45 cable is connected to an active Ethernet network drop.
- 8) Start Hyper Terminal on the PC from Start/All Programs/Accessories/Communications.
- 9) Create a new Hyper Terminal Name (i.e. gateway), then press OK.
- 10) In the "Connect using" dropdown select COM1, then press OK.
- 11) Set values to: Bits per second =19200, Data bits= 8, Parity= none, Stop bits =1, Flow control =none, then press OK.
- 12) Position the cursor in the popup Hyper Terminal window, and press Enter a few times until you get an **Ember**> prompt. It might take a few seconds to come up.
- 13) At the **Ember** prompt use the "config" command to see the current gateway values:
Ember> config
- 14) If using a static IP address for the TTRF Gateway, you must first set the DHCP value to off:
Ember> ip_dhcp off
- 15) To set a static IP address, use the "static_ip" command:

Ember> ip_static <ipaddress> <netmask> <gateway>
Where: <ipaddress> is the IP address
 <netmask> is the subnet mask
 <gateway> is the default gateway on the subnet
Example:
Ember> ip_static 172.16.7.234 255.255.255.0 172.16.7.1
- 16) Type config again at the **Ember** prompt to verify the IP static information is correct.
- 17) If you are using a DHCP server, first set the DHCP value to on:
Ember> ip_dhcp on
- 18) To set the DHCP hostname of the TTRF Gateway, use the "hostname set" command:
Ember> hostname set <name>
Where <name> is the DHCP hostname of the TTRF Gateway (20 characters or less).

Hardware Configuration Instructions for TTRF Infrastructure

Note: For the DHCP settings to take effect, the TTRF Gateway has to have its power recycled.

- 19) To read the current DHCP hostname set in the TTRF Gateway, use the “hostname read” command:

Ember> hostname read

- 20) For a list of commands, enter:

Ember> ?

- 21) For help on a specific command, enter, “?” followed by the command name. Example:

Ember> ? ip_static

- 22) Make note of the Gateway’s IP configuration values since they will need to be entered into configuration files on the RF Control PC and, if using DHCP, the hostname will need to be listed on the DHCP server.
- 23) Turn off power to the TTRF Gateway and connect the RJ45 Ethernet cable from the TTRF Gateway “Daughter Board” to the Customer’s Network drop.
- 24) Power on the TTRF Gateway.
- 25) Verify the TTRF Gateway LED light patterns, as described in step 6 above.
- 26) Verify you can ping the Gateway IP from the PC or any other computer on the same subnet.

Configure the Repeater/Signpost with a GLN and set Modes

- 1) Make sure power is off on the TTRF Repeater/Signpost.
- 2) Open up the front panel of the TTRF Repeater/Signpost and attach the Serial-10 pin cable to the 10 pin connector on the Motherboard (SP1). **Make sure the red colored side of the cable is aligned with the “o” on the Motherboard.**
- 3) Attach the TTL Converter to the Serial-10pin cable.
- 4) Connect the Serial RS232 cable from the TTL Converter to the COM1 port on the Control PC.
- 5) Power on the TTRF Repeater/Signpost.
- 6) Verify LED light patterns:
 - Constant Red PWR Indicator LED on the Motherboard (DS6)
 - Variable blinking Red LED on Motherboard (DS4)
 - Possibly a variable blinking Green “Radio Activity” LED on mother board (DS5)
- 7) Start Hyper Terminal on the PC from Start/All Programs/Accessories/Communications.
- 8) Create a new Hyper Terminal Name (i.e. repeater), then press OK.
- 9) In the “Connect using” dropdown select COM1, then press OK.
- 10) Set values to: Bits per second =19200, Data bits= 8, Parity= none, Stop bits =1, Flow control =none, then press OK.
- 11) Position the cursor in the popup Hyper Terminal window, and press Enter a few times until you see the following list of commands appear: (**Note:** It might take a few seconds to come up).

Hardware Configuration Instructions for TTRF Infrastructure

Signpost-Repeater commands:

- * - Unbind from gateway
- C** - Clear location ID (forces repeater mode)
- R** - Set Repeater mode
- S** - Set Signpost mode
- L** - Enter 12 byte location ID
- D** - Display configuration settings
- E** - Reset for changes to take effect

Note: there is no prompt to enter a command and commands are not echoed back to Hyper Terminal. All commands need to be followed by <Enter>, and anytime you configure or change a setting, the “e” command also needs to be used for the changes to take effect. After using the “e” command, it takes the Repeater/Signpost about 20 seconds to reboot. After a reboot, you will not see any prompt, until you again press <Enter>.

- 12) To display the current configuration, use the “d” command. For example,

d <Enter>

Searching for a gateway on channel 0

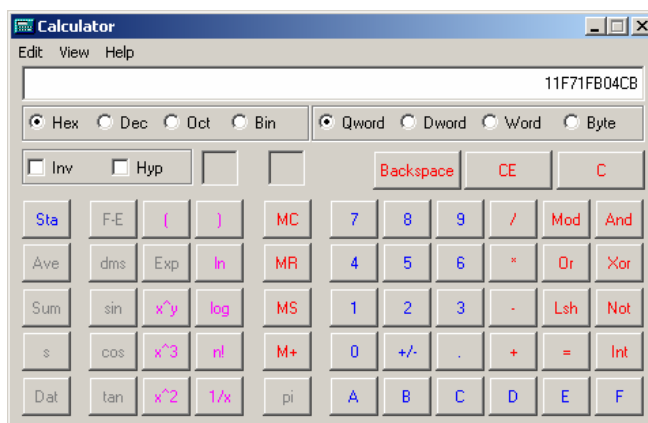
Signpost always mode is off

My EUI64: 000D6F00000049C8

- 13) To configure the Repeater/Signpost to always be a Signpost, use the “s” command, followed by the “e” command.

- 14) To configure a Signpost with a GLN, use the “l” command, followed by the “e” command. The “l” command will prompt you for each of the 12 digits of the GLN. Each time you enter a single digit, press <Enter>

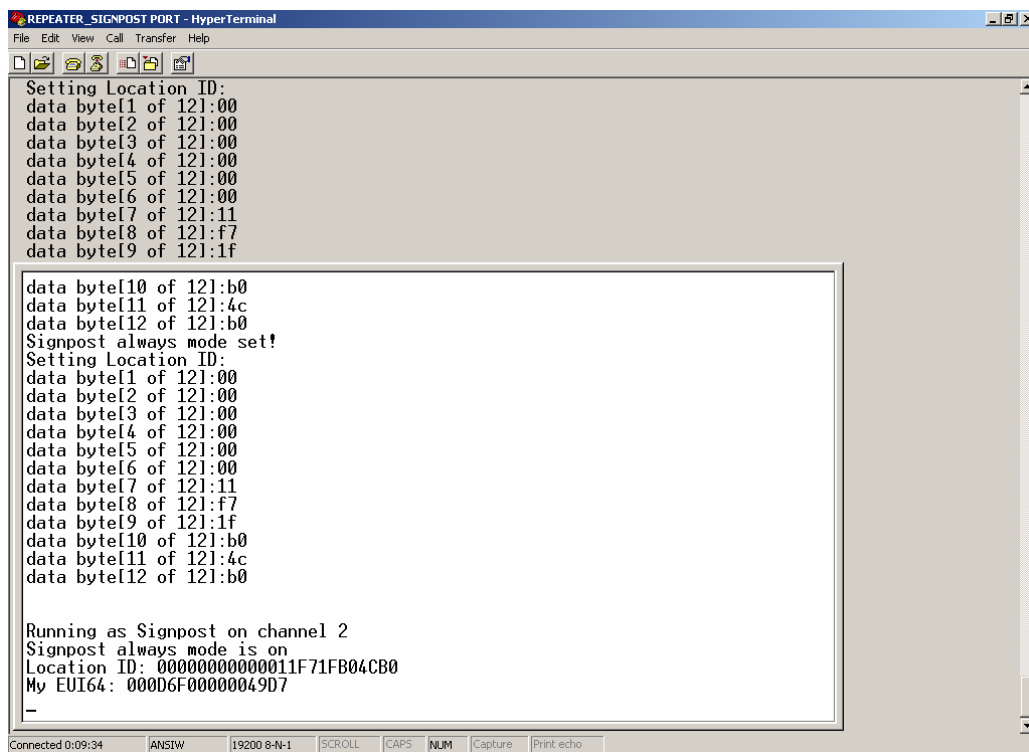
- 15) To set the Repeater/Signpost to Signpost mode, Press S. Press L to Enter Signpost GLN number. Convert the 13 digit decimal number, i.e **1234567890123** into Hex. It should be displayed as shown on the calculator screen.



Convert Decimal to Hex

Hardware Configuration Instructions for TTRF Infrastructure

- 16) Enter the Hex GLN number starting at byte [7 of 12]. The following screen should be displayed.



```
REPEATER_SIGNPOST PORT - HyperTerminal
File Edit View Call Transfer Help

Setting Location ID:
data byte1 of 121:00
data byte2 of 121:00
data byte3 of 121:00
data byte4 of 121:00
data byte5 of 121:00
data byte6 of 121:00
data byte7 of 121:11
data byte8 of 121:f7
data byte9 of 121:1f

data byte10 of 121:b0
data byte11 of 121:4c
data byte12 of 121:b0
Signpost always mode set!
Setting Location ID:
data byte1 of 121:00
data byte2 of 121:00
data byte3 of 121:00
data byte4 of 121:00
data byte5 of 121:00
data byte6 of 121:00
data byte7 of 121:11
data byte8 of 121:f7
data byte9 of 121:1f
data byte10 of 121:b0
data byte11 of 121:4c
data byte12 of 121:b0

Running as Signpost on channel 2
Signpost always mode is on
Location ID: 00000000000011F71FB04CB0
My EUI64: 000D6F00000049D7
-
```

Hex GLN Number in Hyper Terminal

- 17) To clear the GLN and turn the Signpost back in to a Repeater/Signpost, use the “c” command, followed by the “e” command.
- 18) You can also configure the Signpost to be a Repeater/Signpost, use the “r” command, followed by the “e” command.
- 19) Use the “*” command to unbind a Repeater that has previously been “Bound” to a specific TTRF Gateway. **Note:** You can also use the “Unbind” button (SW1) on the Repeater/Signpost Motherboard to unbind from a TTRF Gateway.

Hardware Configuration Instructions for TTRF Infrastructure

LED Patterns

The TTRF Gateway's Red LED (DS4) will blink the following pattern:

1 second on

1 second off

n 0.5 second interval blinks indicating channel n. (**Note:** will be 1 flash for channel 1)

1 second off

The TTRF Repeater/Signpost's Red LED (DS4) will blink the following pattern:

0.33 second blink rate: Functioning as a Repeater, bound to a specific Gateway.

1 second blink rate: Functioning as a Signpost.

2 second blink rate: Neither a Repeater nor a Signpost, actively scanning channels for the beacon from a TTRF Gateway.

Software Installation Instructions

TTM Remote Site Server

Section 2: Software Installation Instructions TTM Remote Site Server

These instructions guide a technician through the installation and configuration of the TempTale Manager Remote Site Server software installation.

System Requirements

- All RF hardware has been configured, installed and verified.
- Windows 2000 Professional with latest Service Pack (SP)
- Windows XP with latest SP
- Anti Virus Software
- Direct internet connection
- Internet Explorer 6.0 Service Pack 1
- Dedicated Internet Connections
- All event logs should be set to "overwrite as needed".

Configuration Values Required

- IP or Name of Client Computer gateway is connected to.
- IP or Name of machine SNMP manager is running on.
- Application ID of monitors being used in application.
- Location of rfupload folder where data files are to be sent.

Media

- TempTale Manager Remote Site Server ver 5.1

Installation

The Following application and services will be installed

- TTM Desktop ver 4.2
 - TTRF Service ver 1.0
 - Receive RF Data ver 1.0
 - Send Data to Central Site ver 1.0
- 1) Click the Windows start button and select "Run", browse to the Install.bat file located on the CD media and select "open". This will add the location of the .bat file to the run dialog. Place cursor in dialog box after the file location. Now add the value in quotes of where the software is to be installed, leaving a space between the two. For example: d:\install.bat "C:\Program Files" **Note:** Leaving the destination blank will install the software to the system's default program files directory.
 - 2) This .bat file will launch 2 silent installs, one installing TTM Desktop and the second the services listed above.

Software Installation Instructions

TTM Remote Site Server

Configuration

A. RfNetCfg.xml Refer to Appendix A

- 1) Browse to the RfNetCfg.xml file in the installed application folder (default c:\program files\Sensitech\ TTRF Service.
- 2) Open RfNetCfg.xml with Notepad.
- 3) <maxthreads> Verify that the value is 3.
- 4) <Gateway> Set the "id" equal to that of location number which will be written to the monitor when it enters the network.
- 5) Set "GwNameOrIp" equal to that of the IP address (static or DHCP) or network machine name of the gateway being used in the network.
- 6) Set "TstConnIntvl" equal to 900.
- 7) Set "ReConnIntvl" equal to 60.
- 8) <Repeater> Verify that there is a tag for each repeater being installed.
- 9) Set "HwId" equal to that of the serial number labeled on the repeater.
- 10) Set "GwBoundTo" equal to that of the IP address or network machine name of the gateway being used in the network. **Note:** Verify the value does actually exist as a gateway.
- 11) <ForceAcquireInterval> Verify value is 1800. **Note:** this has to be less than the depart time in RFSiteCfg. (Section B in Configuration)
- 12) <Snmp> Set the "MgrNameOrIP" equal to that of the IP Address or network machine name of the machine running the SNMP Manager (i.e. HP Open View)
- 13) Verify the "MgrPort" is set to 162. **Note:** Value can only be 161 or 162
- 14) Verify that if SNMP is being used that both "NotifyLnkDwn" and "NotifyLnkUp" are set to true.
- 15) Leave the defaults for "enterprise", "GwDwnOid", "DwUpOid", "RptrDwnOid", "RptrUpOid" values.
- 16) Save all changes to file and close.

B. RfSiteCfg.xml Refer to Appendix B

- 1) Browse to the RfSiteCfg.xml file in the installed application folder(default c:\program files\Sensitech\ TTRF Service.
- 2) Open RfSiteCfg.xml with Notepad.
- 3) <RFDownloadPath> Set the path to where TTM Desktop is installed + \RFDrop
i.e. default would be C:\Program Files\Sensitech\TempTale Manager Desktop\RFDrop
- 4) <RfApp> Verify there is a tag for each type of application being used in the network.
- 5) Set "id" equal to that determined in section 3.
- 6) Set "descript" equal to that of a description of the application. i.e. Closed Loop, Plant to Shelf
- 7) Set "download", "start", "stop", "restart", "mindeptim" **Note:** for Plant to Shelf applications the mindeptim should be set accordingly. It is the amount of time where a monitor has considered to have left the network and gone on a trip so data will be downloaded again. This is more so used in Closed Loop applications.
- 8) Verify "radiosleep" is set to false.
- 9) Save all changes to file and close

Software Installation Instructions

TTM Remote Site Server

C. Receive RF Data App.Config Refer to Appendix C

- 1) Browse to the App.Config file location in the installed application folder (default c:\Program Files\Sensitech\ReceiveRFData
- 2) Open the config file in Notepad.
- 3) Verify that the "TimerInterval" value is set to 60.
- 4) Set the "CompanyRegValue" to that of the ID of the database where the data will be sent.
- 5) Leave the "DC_XML Path" to the default directory. **Note:** This file is not used in Plant to Shelf, default value needs to exist so don't edit.
- 6) Verify the "DC_XMLPathExists" value is set to false.

D. Send Data to Central Site App.Config Refer to Appendix D

- 1) Browse to the App.Config file location in the installed application folder (default c:\Program Files\Sensitech\SendDataToCentralSite
- 2) Open the config file in Notepad.
- 3) "FlowDefaultCredentialsToWebProxy" Setting this element to "true" will result in the default credentials of the user account our web server is running under to be sent to the proxy server (if any proxy is configured).

Note: Be sure that the user account that the service is running under is authorized to use the proxy server: by default, windows services run under the local "SYSTEM" user account, which will probably not have authorization to use the proxy. Instead, you'll probably need to setup the service to run under some domain user account that has the appropriate permissions on the proxy server.

- 4) Verify the "TimerInterval" value is set to 60
- 5) Set the "ServerAddress" value equal to that of the upload location on web server.
Example:

<https://pilot.sensitech.com/rfupload>

Starting the services

1. Select: Start > Control Panel > Administrative Tools
2. Expand Services and Applications and click on Services.
3. Find the Sensitech TTRF Service.
4. If the start up type is manual then right click and select properties and change the start up type to auto on the general tab. If it's already auto then go to the next step.
5. Right click on Sensitech TTRF Service and select Start. If you receive an error starting the service, verify you have not mistyped any information in either of the config files. Verify that the Gateway is connected to same network and the IP is correct in the xml file
6. Repeat step for with both the Receive RF Data and Send Data to Central Site services.
7. Check the event log to verify there were no errors starting any of the services.
8. If you received any errors, verify the supporting config and xml files were edited correctly.

If you need to edit any of the xml files, then simply stop the Sensitech TTRF Service, edit the files and then restart the service.

Software Installation Instructions

TTM Remote Site Server

Appendix A RfNetCfg.xml

```
<RfNetCfg>
  <maxthreads>3</maxthreads>
  - <!-- max number of monitors to be dowloaded at a time-->
  - <!-- Gateway id upto 12 digits must be numeric this is the location id
    transmitted to the omegarfs -->
  - <!-- Gateway GwNameOrIP IP address or machine name of gateway -->
  - <!-- Gateway TstConnIntvl interval in seconds to check gateway
    connection -->
  - <!-- Gateway ReConnIntvl interval in seconds to retry connection to
    gateway -->
  - <!-- Gateway id="1965" GwNameOrIP="172.16.24.92" TstConnIntvl="900"
    ReConnIntvl="60" -->
  <Gateway id="1965" GwNameOrIP="192.168.1.92" TstConnIntvl="900"
    ReConnIntvl="60" />
  <Repeater HwId="3781220487940567" GwBoundTo="192.168.1.92" />
  <Repeater HwId="3781220487940339" GwBoundTo="192.168.1.92" />
  <ForceAcquireInterval>1800</ForceAcquireInterval>
  - <!-- Interval in seconds to reacquire all omegarfs -->
  <Snmp MgrNameOrIP="192.168.1.47" MgrPort="162" NotifyLnkDwn="true"
    NotifyLnkUp="true" enterprise="1.3.6.1.4.1.23684.6.1.0"
    GwDwnOid="1.3.6.1.4.1.23684.6.1.0.5.0" GwUpOid="1.3.6.1.4.1.23684.6.1.0.6.0"
    RptrDwnOid="1.3.6.1.4.1.23684.6.1.0.7.0"
    RptrUpOid="1.3.6.1.4.1.23684.6.1.0.8.0" />
</RfNetCfg>
```

Software Installation Instructions

TTM Remote Site Server

Appendix B RfSiteCfg.xml

```
<RfSiteCfg>
  <RfDownloadPath> C:\Program Files\Sensitech\TempTale Manager Desktop\RFDrop
    </RfDownloadPath>
  - <!-- path to which temptalerf files are automatically downloaded to -->
  - <!-- the following are the definition for the RFApp attributes-->
  - <!-- id is the application id programmed into the monitor to tell the
    control software what is to be done with the monitor -->
  - <!-- descript is not currently put in to describe the application being
    executed -->
  - <!-- download,true to download monitor, false won't -->
  - <!-- start, true to start monitor, false won't -->
  - <!-- stop, true to stop monitor, false won't -->
  - <!-- restart, reactivates monitor current config and start it, false
    won't -->
  - <!-- mindeptim, in seconds the time inwhich we decide a monitor has left
    for a valid trip -->
  - <!-- radiosleep, true to put radio to sleep, will not wake til it see a
    different network,false won't -->
  <RfApp id="0" descript="InBound Transit" download="true" start="false" stop="false"
    restart="false" mindeptim="200" radiosleep="false" />
  <RfApp id="1" descript="Closed Loop" download="true" start="false" stop="false"
    restart="false" mindeptim="200" radiosleep="false" />
  <RfApp id="2" descript="Plant to Shelf" download="true" start="false" stop="false"
    restart="false" mindeptim="200" radiosleep="false" />
</RfSiteCfg>
```

Software Installation Instructions

TTM Remote Site Server

Appendix C ReceiveRFData.exe.config.xml

```
<?xml version="1.0" encoding="utf-8" ?>
- <?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <appSettings>
    <add key="TimerInterval" value="60" /> <!-- seconds -->
    <add key="CompanyRegValue" value="16839586920" /> <!--
    registration value to map to customer database -->
    <add key="DC_XMLPath" value="c:\DC_Configuration.xml" /> <!--
    location of customer config file -->
    <add key="DC_XMLPathExists" value="false" /> <!-- will there be
    a customer config file-->
  </appSettings>
</configuration>
```

Appendix D SendDataToCentralSite.xml

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <appSettings>
    <add key="FlowDefaultCredentialsToWebProxy" value="false" />
    <add key="TimerInterval" value="60" /><!-- seconds -->
    <add key="ServerAddress"
value="https://reg.sensitechdms.com/rfpload/default.aspx" /> <!--
location of where to send files -->
  </appSettings>
</configuration>
```

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