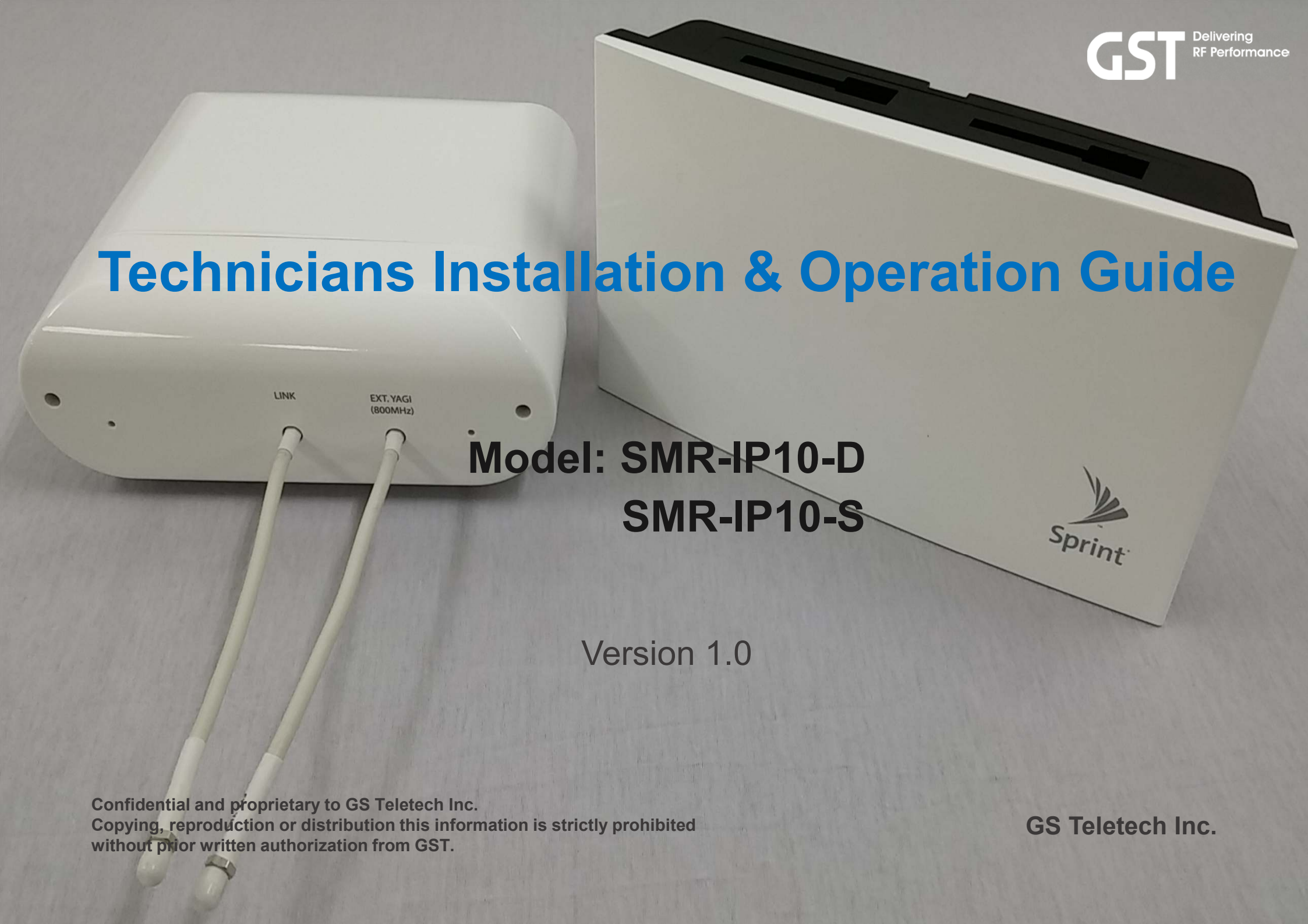



# Technicians Installation & Operation Guide

## Model: SMR-IP10-D
## SMR-IP10-S

Version 1.0



GS Teletech Inc.

# SMR-IP10-D/-S

- ✓ Smart Mobile Repeater for 800MHz and 1900MHz Bands
- ✓ Application: Small Business, Enterprise and Public venues.
- ✓ Coverage: Up to 5k sq. ft. per unit.

**This publication provides instructions for installing the 800MHz and 1900MHz Smart Mobile Repeater.**

**The images for the User Interface in this publication may vary depending on it's S/W version.**

**Copyright**



**Version History:**

| Date | Version | Changes |
|---|---|---|
| 04/2015 | 1.0 | |

**Certification**

UL/FCC: This equipment complies with UL and FCC

# Warnings and Hazards

**WARNING! ELECTRIC SHOCK**
**Opening the BDA (bi-directional amplifier) could result in electric shock and may cause severe injury.**


**WARNING! EXPOSURE TO RF**
**Working with the repeater while in operation, may expose the technician to RF electromagnetic fields that exceed FCC rules for human exposure. Visit the FCC website at http://www.fcc.gov/oet/rfsafety to learn more about the effects of exposure to RF electromagnetic fields.**

**WARNING! DAMAGE TO EQUIPMENT**
**Operating the BDA with antennas in very close proximity facing each other could lead to severe damage to the repeater.**

**RF EXPOSURE & ANTENNA PLACEMENT**
**Actual separation distance is determined upon gain of antenna used.**
**Please maintain a minimum safe distance of at least 8 inch while operating near the donor and the server antennas. Also, the donor antenna needs to be mounted outdoors on a permanent structure.**

**WARRANTY**
**Opening or tampering the BDA will void all warranties.**

- **CAUTION: REPEATER SHOULD BE INSTALLED AS CLOSE AS POSSIBLE TO POWER SOURCE.**
- **CAUTION: THIS REPEATER IS FOR INDOOR USE ONLY AND SHOULD BE LOCATED INSIDE OF BUILDING.**
- **CAUTION: RISK OF EXPLOSION IF BATTERY ON CONTROLLER BOARD IS REPLACED WITH AN INCORRECT TYPE.**
- **CAUTION: DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.**

# Warnings and Hazards

**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.**

**FCC Part 15.21 statement**
**Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.**

**RF Exposure Statement**
**The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times. This device must not be co-located or operating in conjunction with any other antenna or transmitter.**

**Part 90.635 requirement**
**Antennas must be installed in accordance with FCC 90.635. With 9 dBi gain antennas the height of the antenna above average terrain (HAAT) is permitted over 1372m. For different gain antennas refer to the relevant rules.**

WARNING. This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

# Contents of Box (1/2)

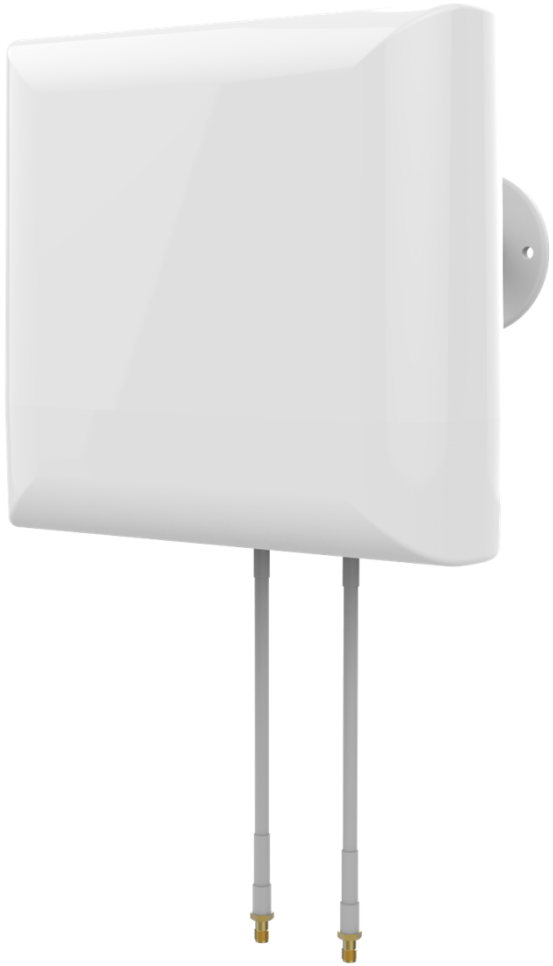
# Contents of Box (2/2)

| No | Item | Q-ty | Picture |
|---|---|---|---|
| 1 | Donor Antenna Unit (DAU) | 1 |  |
| 2 | Service Antenna Unit (SAU) | 1 |  |
| 3 | Link cable (1.5D) 50m | 1 |  |
| 4 | AC/DC Adaptor | 1 |  |
| 5 | AC Power Cord | 1 |  |
| 6 | Quick Installation Guide | 1 |  |

| No | Item | Q-ty | Picture |
|---|---|---|---|
| 7 | Operation and Troubleshooting Guide | 1 |  |
| 8 | DAU Bracket Set | 1 |  |
| | • Tapping screw (PH(+) Φ5X25)<br>• Anchor bolt | 4 | |
| 9 | SAU Bracket Set | 1 |  |
| | •Tapping screw (PH(+) Φ5X25) | 4 | |
| 10 | Jumper Cable for both 800MHz and 1900Mhz | 1 |  |

# Repeater Design

## SMR-IP10-D

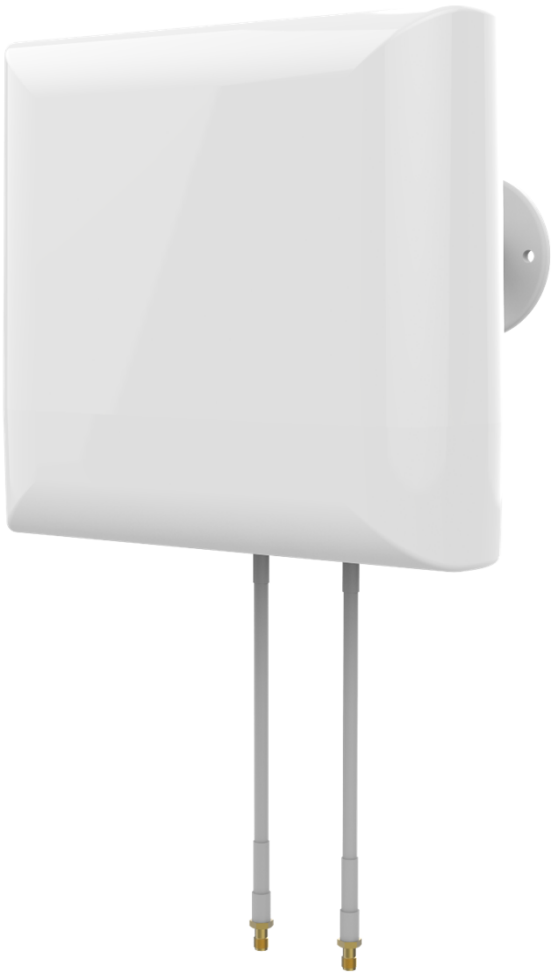
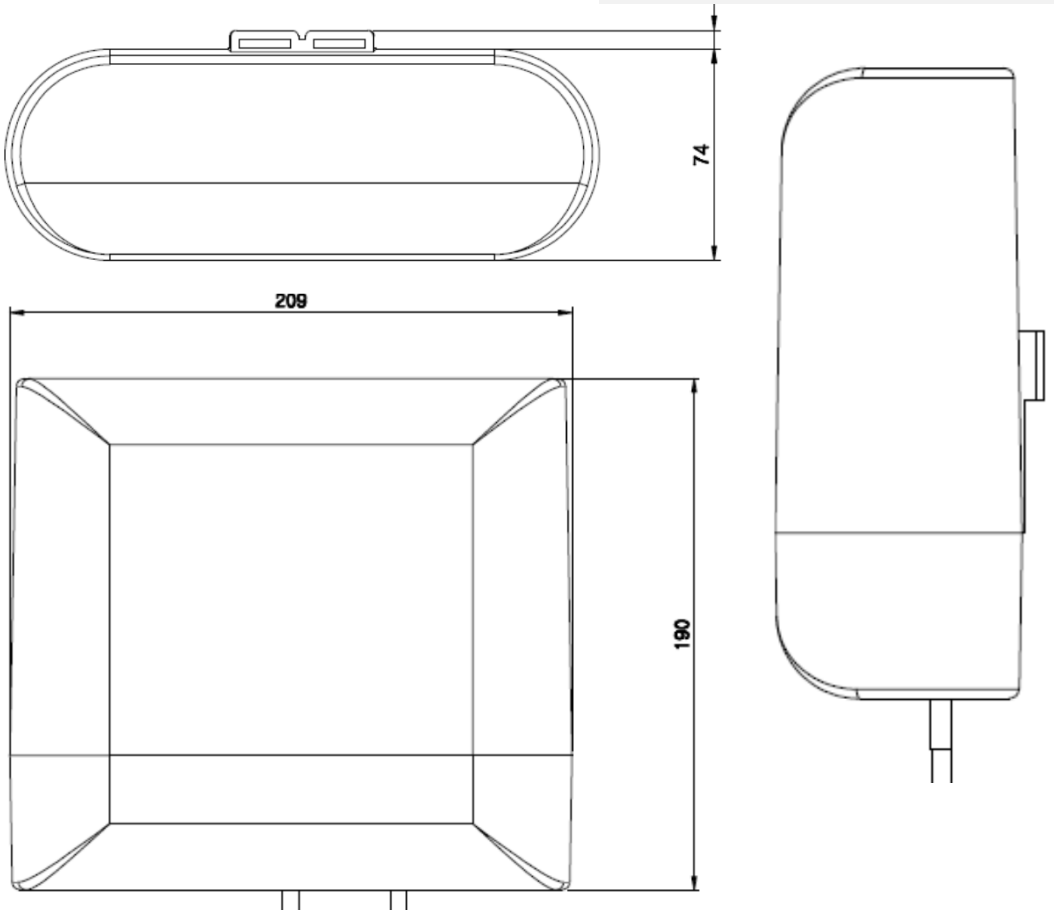


**Donor Antenna Unit (DAU)**

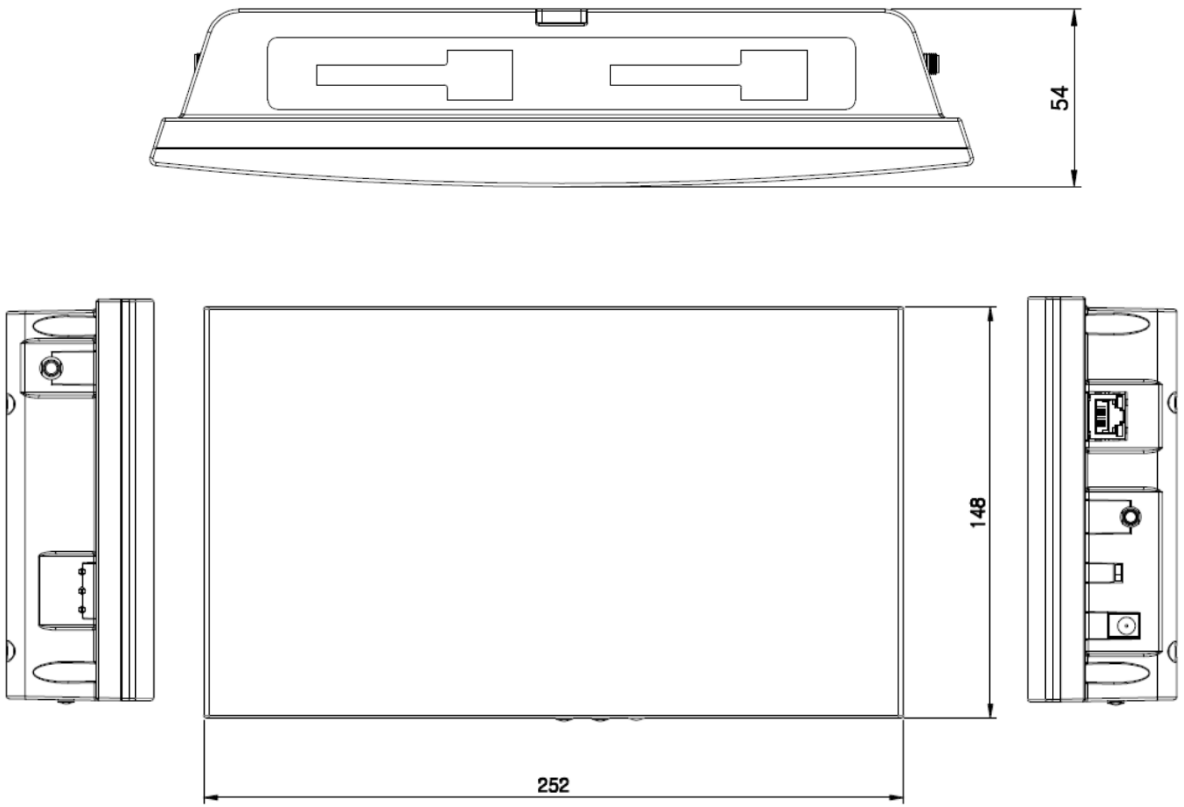
## SMR-IP10-S


**Service Antenna Unit (SAU)**

# Repeater Design: Donor Antenna Unit (DAU)

| DAU (SMR-IP10-D) | Dimensions |
|---|---|
|  | 209(W) X 190(H) X 74(D) [mm]<br>8.2(W) X 7.4(H) X 2.9(D) [in]<br>  |

# Repeater Design: Service Antenna Unit (SAU)

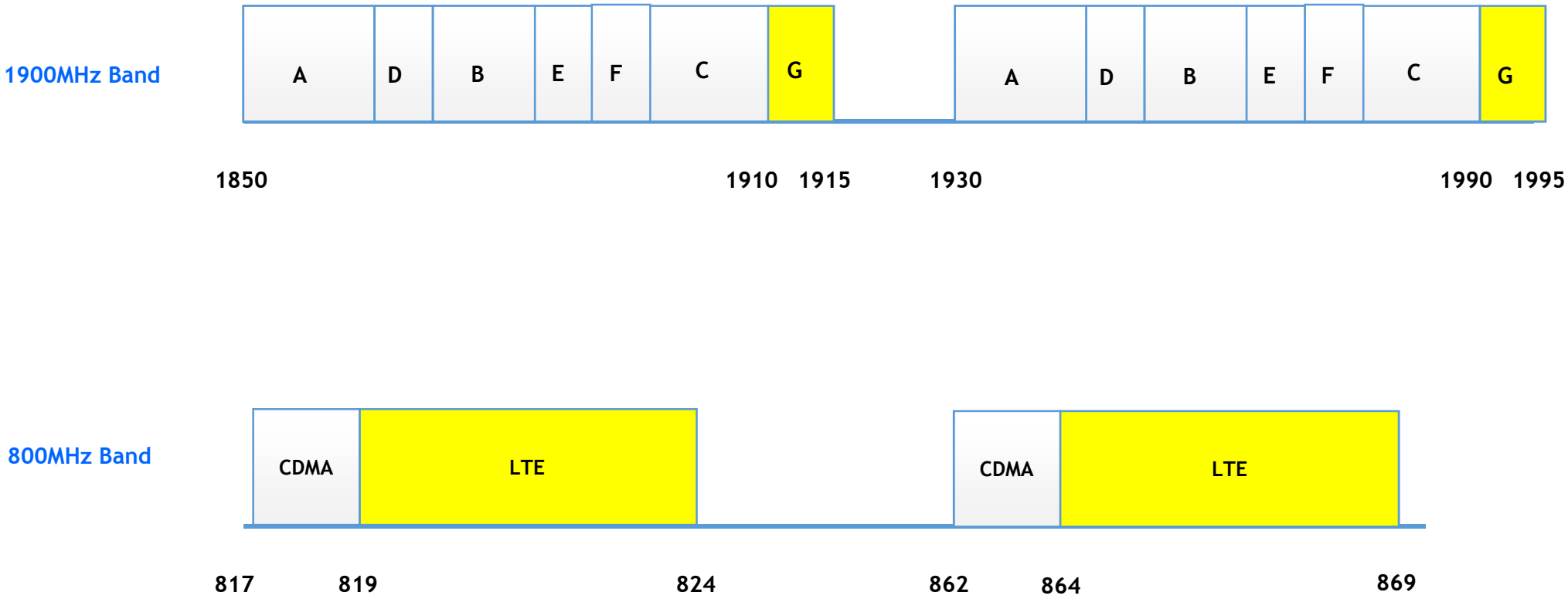
| SAU (SMR-IP10-S) | Dimensions |
|---|---|
|  |  |



252(W) X 148(H) X 54(D) [mm]
9.9(W) X 5.8(H) X 2.1(D) [in]

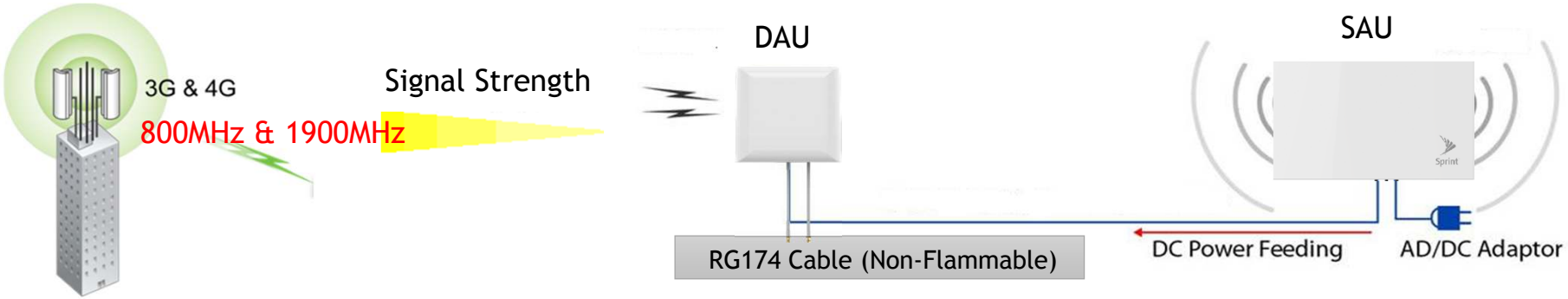
# 800MHz & 1900MHz Frequency Bands

## Service Band Blocks



# Introduction

The SMR-IP10 is a paired repeater solution consisting of a Donor Antenna Unit (DAU) and a Service Antenna Unit (SAU). The SMR-IP10 can be installed with a maximum of 4 service antennas using external antenna ports. The installer should consider a link budget from the SAU to Service Antennas while using external antennas and dividers (splitters). Before turning on the SMR-IP10, the installer should connect the link cable, so that the link cable losses are optimized automatically.




## Main Features

- Built-in antennas in Donor Antenna Unit (DAU) and Service Antenna Unit (SAU).
- Link Distance: 50m (from DAU to SAU) using RG174 (1.5D) cable (Non-Flammable).
- Electric DC power feeding from Service Antenna Unit to Donor Antenna Unit.
- Easy setting of 5/10/15MHz bands via WebGUI.
- Improved C/N (Carrier to Noise) and NF (Noise Figure).
- Plug & play (Automatic RF Setting).

# Installation Guideline

## Donor Antenna Unit (DAU)

The Donor Antenna Unit (DAU)'s position is very important to receive clear and stable signals from the base station.

- ✓ Find a location where the RF signal is the most stable and install the DAU.
- ✓ If 800MHz and 1900MHz BTS directions are different and 800MHz signal level is weak (less than -95dBm), installer may connect the DAU to 800MHz external donor antenna for receiving and transmitting signals from 800MHz Base Station.
- ✓ Check measurement criteria via WebGUI.
- ✓ Install the DAU in a location where people cannot easily reach.
- ✓ Do not install the DAU, SAU or Service antenna in the same room. (Ensure enough isolation)
- ✓ Do not install unit near antennas of other carriers. (within 10ft)
- ✓ Do not install antenna beam to the sea side direction.
- ✓ Do not install at exceeded heights. (Higher than 65ft to prevent interference)

# Installation Guideline

## Service Antenna Unit (SAU)

The Service Antenna Unit (SAU) shall be positioned in the direction of target service area.

- ✓ Secure enough distance between the Donor Antenna Unit and the Service Antenna Unit to prevent oscillation.
- ✓ Install the SAU on the wall or ceiling.
- ✓ Install the SAU in a location where people cannot easily reach.
- ✓ Secure isolation over 10ft between antennas if you install SAU near other carrier antennas.

# Installation Guideline

## Application

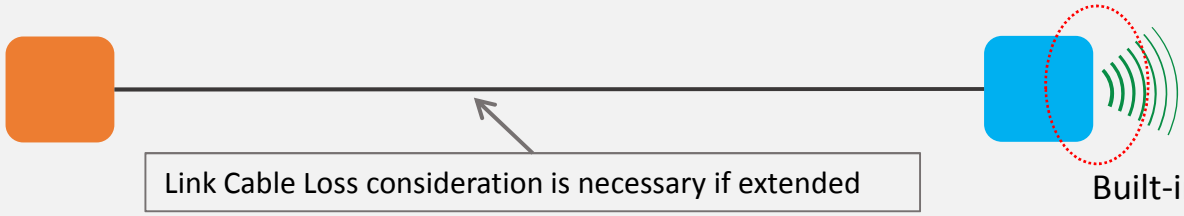
Donor Antenna Unit

Service Antenna Unit

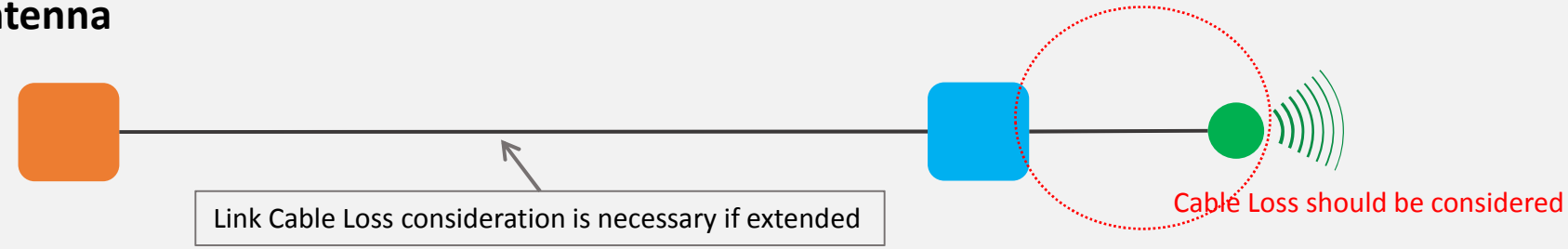
Divider (Splitter)

Service Antenna

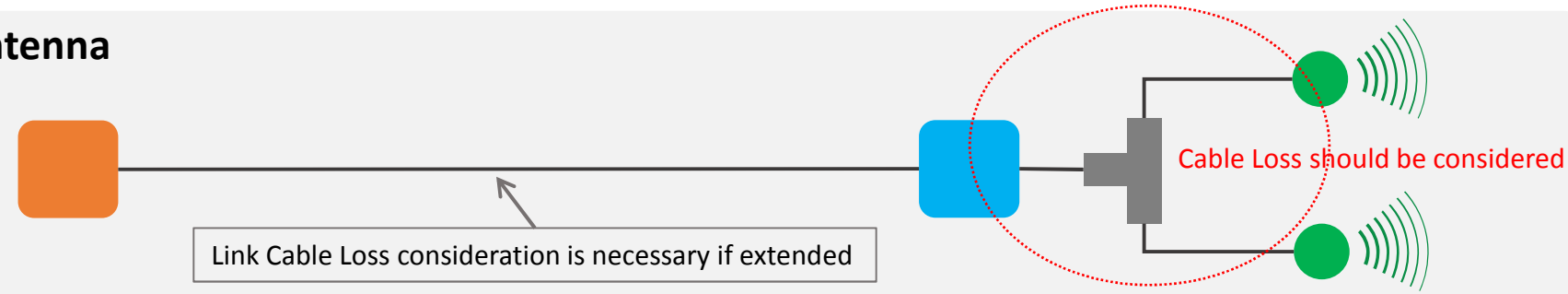
### Basic Structure (Recommended)




### 1 External Antenna




### 2 External Antenna

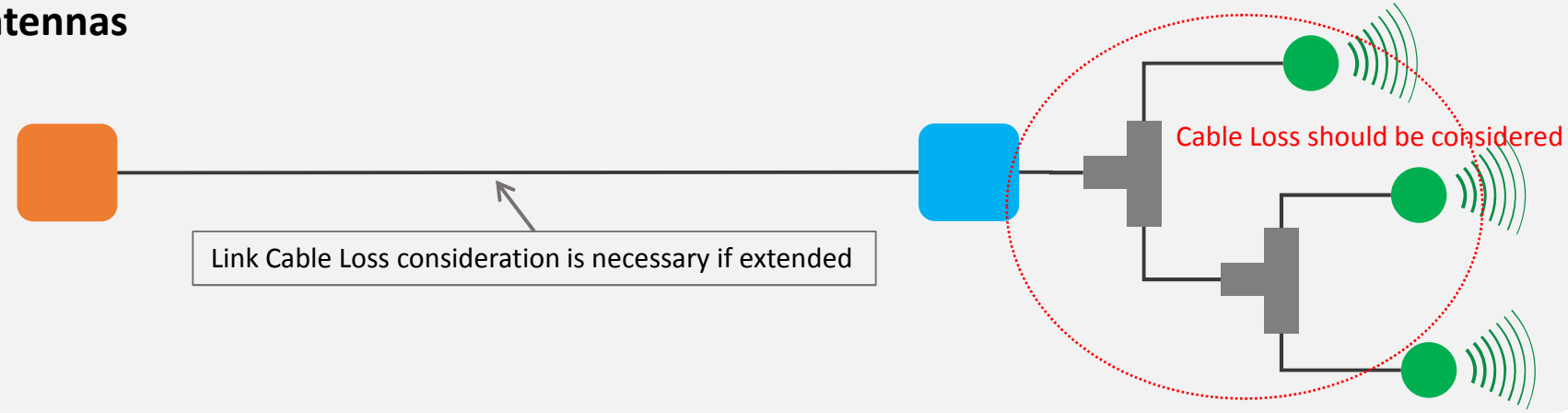


# Installation Guideline

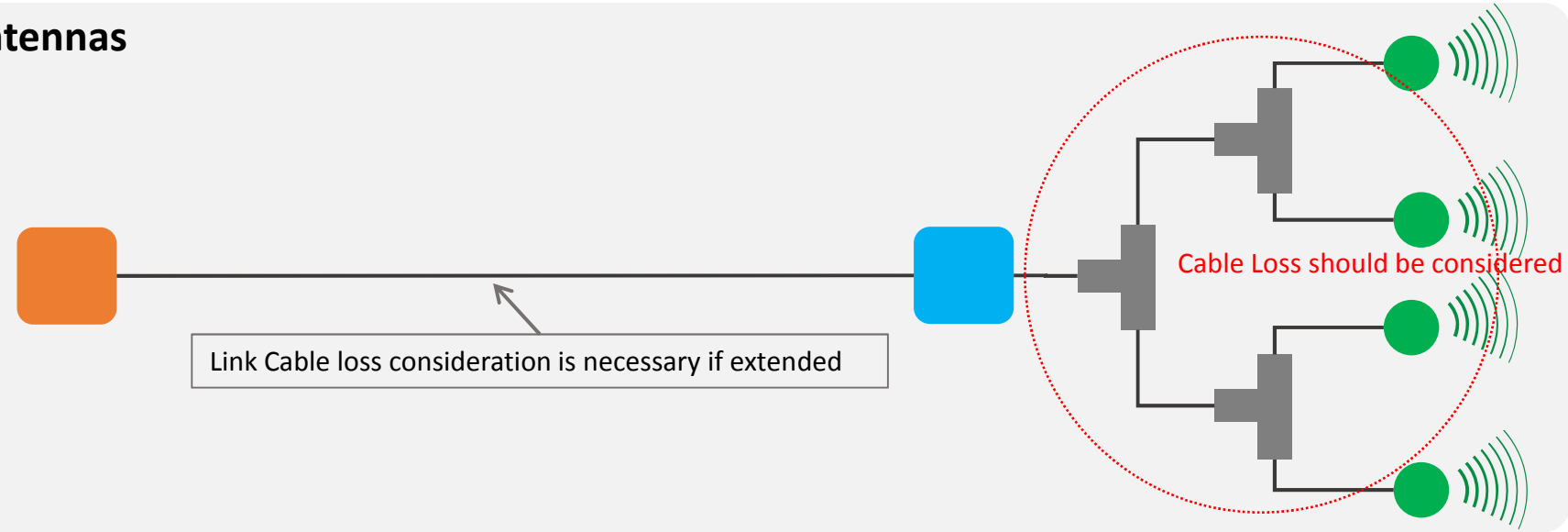
When using 4 dividers, the following architecture will be applicable and the divider shall stay the same.
When using 3 dividers, the longest cable should be connected to the first divider for equalization of the EIRP)

## Application

### 3 External Antennas




### 4 External Antennas



# Installation Guideline

## Coverage Area - CDMA 1X RSSI

The expected line of sight coverage area is shown below. The total loss of service includes cable losses and divider losses. The following table shows Uplink coverage. The downlink coverage is wider than the Uplink coverage.

For example, when the input signal level of Donor Antenna Unit (DAU) is -90dBm and coverage is 15m, the total loss of service side is necessary to make less than 15dB.

| Donor input level (1x RSSI) | Coverage | Total loss of service side (between SAU and Antennas) |
|---|---|---|
| ≧-75dBm | ≦15m | ≦25dB |
| | ≦30m | ≦20dB |
| ≧-80dBm | ≦15m | ≦20dB |
| | ≦30m | ≦15dB |
| ≧-85dBm | ≦15m | ≦20dB |
| | ≦30m | ≦10dB |
| ≧-90dBm | ≦15m | ≦15dB |
| | ≦30m | ≦5dB |
| ≧-95dBm | ≦15m | ≦5dB |
| | ≦30m | 0dB |

# Installation Guideline

## Coverage Area - LTE

The Downlink and Uplink throughput shall be measured at over 80% of outdoor throughput measurement.

| Post-Installation Measurement (Retail/Sales Area) | | |
|---|---|---|
| **EVDO** | **800 MHz** | **1900 MHz** |
| DL Throughput (Mb/sec) | N/A | Over 80% of outdoor measurement |
| UL Throughput (Mb/sec) | N/A | Over 80% of outdoor measurement |
| **LTE** | **800 MHz** | **1900 MHz** |
| DL Throughput (Mb/sec) | Over 80% of outdoor measurement | Over 80% of outdoor measurement |
| UL Throughput (Mb/sec) | Over 80% of outdoor measurement | Over 80% of outdoor measurement |

# Installation Guideline

## Link cable

**Cable Length: 50m (164 ft.)**

# Installation Guideline

## Link Cable Extension

- DC Drop: No Problem (AC/DC Adaptor (DC Source): +19V) for below cables
- Cable Loss range: **9dB ~ 15dB (Mandatory)**

[Strongly recommended]

| Cable Type | Link Distance | Remark |
|---|---|---|
| 1/8 inch Coaxial Cable | 50m (164ft) ~ 100m (328ft) | Approximately |
| 1/4 inch Coaxial Cable | 100m (328ft) ~ 180m (590ft) | Approximately |
| 3/8 inch Coaxial Cable | 180m (590ft) ~ 270m (885ft) | Approximately |

3/8 ”
Coaxial Cable(50 ohm)

1/4”
Coaxial Cable(50 ohm)

1/8”
Coaxial Cable (ohm)

# Measurement Criteria

## Site Survey (Roof): Conditions for DAU Positioning

| Site Survey (Roof) | | |
|---|---|---|
| 1x CDMA | 800 MHz | 1900 MHz |
| PN | *Serving Physical Cell Identity* | *Serving Physical Cell Identity* |
| RSSI (dBm) | -95dBm or above | -95dBm or above |
| Ec/Io (dB) | -12dB or above | -12dB or above |
| EVDO | 800 MHz | 1900 MHz |
| PN | N/A | *Serving Physical Cell Identity* |
| RSSI (dBm) | N/A | -95dBm or above |
| Ec/Io (dB) | N/A | -12dB or above |
| LTE | 800 MHz | 1900 MHz |
| PCI | *Serving Physical Cell Identity* | *Serving Physical Cell Identity* |
| RSRP (dBm) | -105dBm or above | -105dBm or above |
| RSRQ (dB) | -8dB | -8dB |

# Measurement Criteria

## Site Survey (Target Area): Conditions for SAU Positioning

**SMR-IP10 shall be installed even if one of the following 1x CDMA, EVDO and LTE criteria's are satisfied .**

| Site Survey (Service Target Area) | | |
|---|---|---|
| **1x CDMA** | **800 MHz** | **1900 MHz** |
| PN | *Serving Physical Cell Identity* | *Serving Physical Cell Identity* |
| RSSI (dBm) | -95dBm or less | -95dBm or less |
| **EVDO** | **800 MHz** | **1900 MHz** |
| PN | N/A | *Serving Physical Cell Identity* |
| RSSI (dBm) | N/A | -95dBm or less |
| **LTE** | **800 MHz** | **1900 MHz** |
| PCI | *Serving Physical Cell Identity* | *Serving Physical Cell Identity* |
| RSRP (dBm) | -105dBm or less | -105dBm or less |

# Measurement Criteria

## Post-installation (Service Area):

**Measurement Condition: More than 80% of coverage area**

| Post-Installation Measurements (Retail/Sales Area) | | |
|---|---|---|
| **1x CDMA** | **800 MHz** | **1900 MHz** |
| PN | *Serving Physical Cell Identity* | *Serving Physical Cell Identity* |
| RSSI (dBm) | -85dBm or above | -85dBm or above |
| Ec/Io (dB) | -10dB or above | -8dB or above |
| Mobile TX power | | 0dBm or less |
| **EVDO** | **800 MHz** | **1900 MHz** |
| PN | N/A | *Serving Physical Cell Identity* |
| RSSI (dBm) | N/A | -85dBm or above |
| Ec/Io (dB) | N/A | -8dB or above |
| Mobile TX power | N/A | 0dBm or less |
| DL Throughput (Mb/sec) | N/A | Over 80% of outdoor measurement |
| UL Throughput (Mb/sec) | N/A | Over 80% of outdoor measurement |
| **LTE** | **800 MHz** | **1900 MHz** |
| PCI | *Serving Physical Cell Identity* | *Serving Physical Cell Identity* |
| RSRP (dBm) | -85dBm or above | -85dBm or above |
| RSRQ (dB) | -8dB or above | -8dB or above |
| Mobile TX power | 0dBm or less | 0dBm or less |
| DL Throughput (Mb/sec) | Over 80% of outdoor measurement | Over 80% of outdoor measurement |
| UL Throughput (Mb/sec) | Over 80% of outdoor measurement | Over 80% of outdoor measurement |

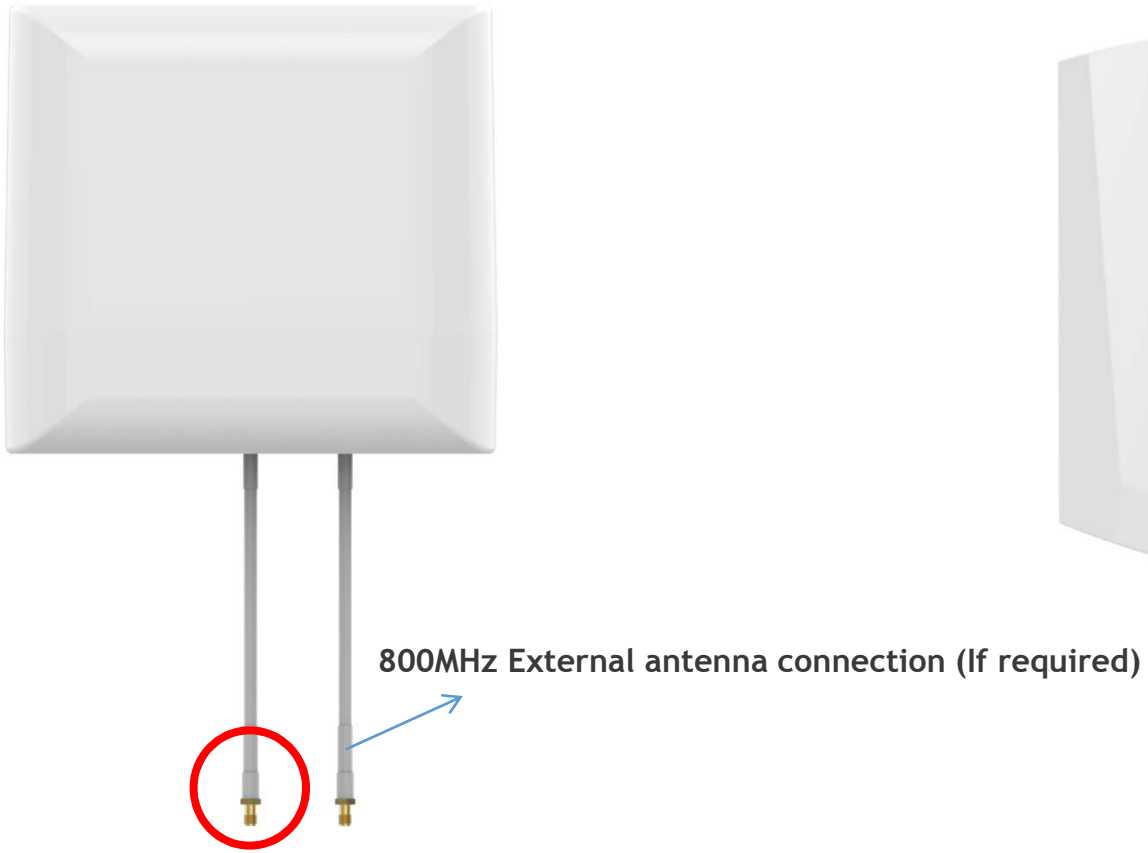
# Cable Connections

## Link Cable Ports

**CAUTION**

Do not connect or disconnect cable from ANT port when power is ON.

**[DAU Link port]**




**[SAU Link Cable port]**

# Repeater Port Design

## Donor Antenna Unit

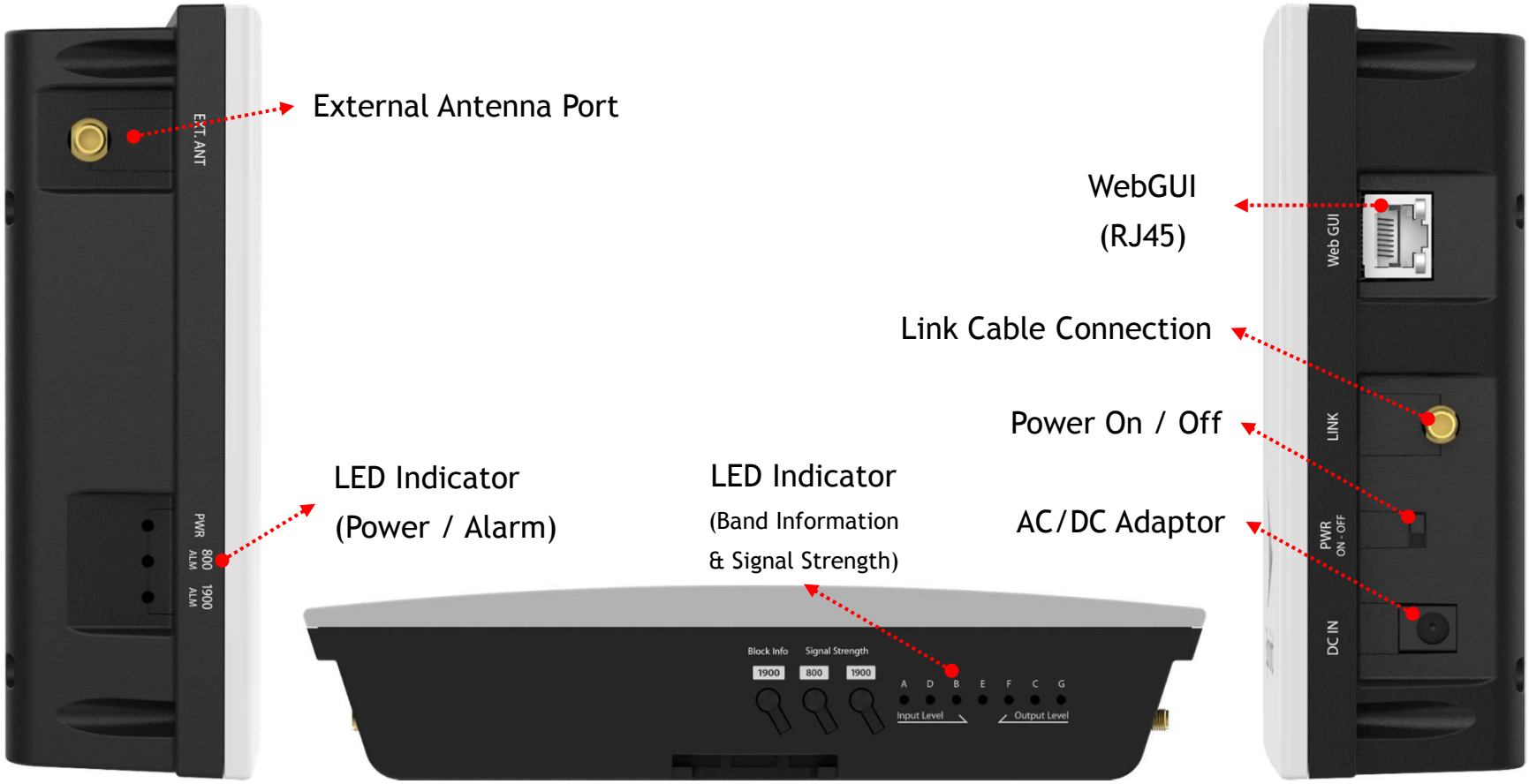

**[DAU Bottom Side]**

| No | Port | Connector |
|---|---|---|
| 1 | Link Cable Port | SMA (F) |
| 2 | 800MHz Antenna Port<br>(If required) | SMA (F) |
| 2 | Both 800MHz and 1900MHz Antenna Port<br>(if extremely required) | SMA (F) |

In special cases, the DAU's EXT.ANT can be connected with a high gain antenna for both 800MHz and 1900MHz.
Please refer to page 32 for 'Jumper connection' in this document, and it shall be confirmed and approved by GST.

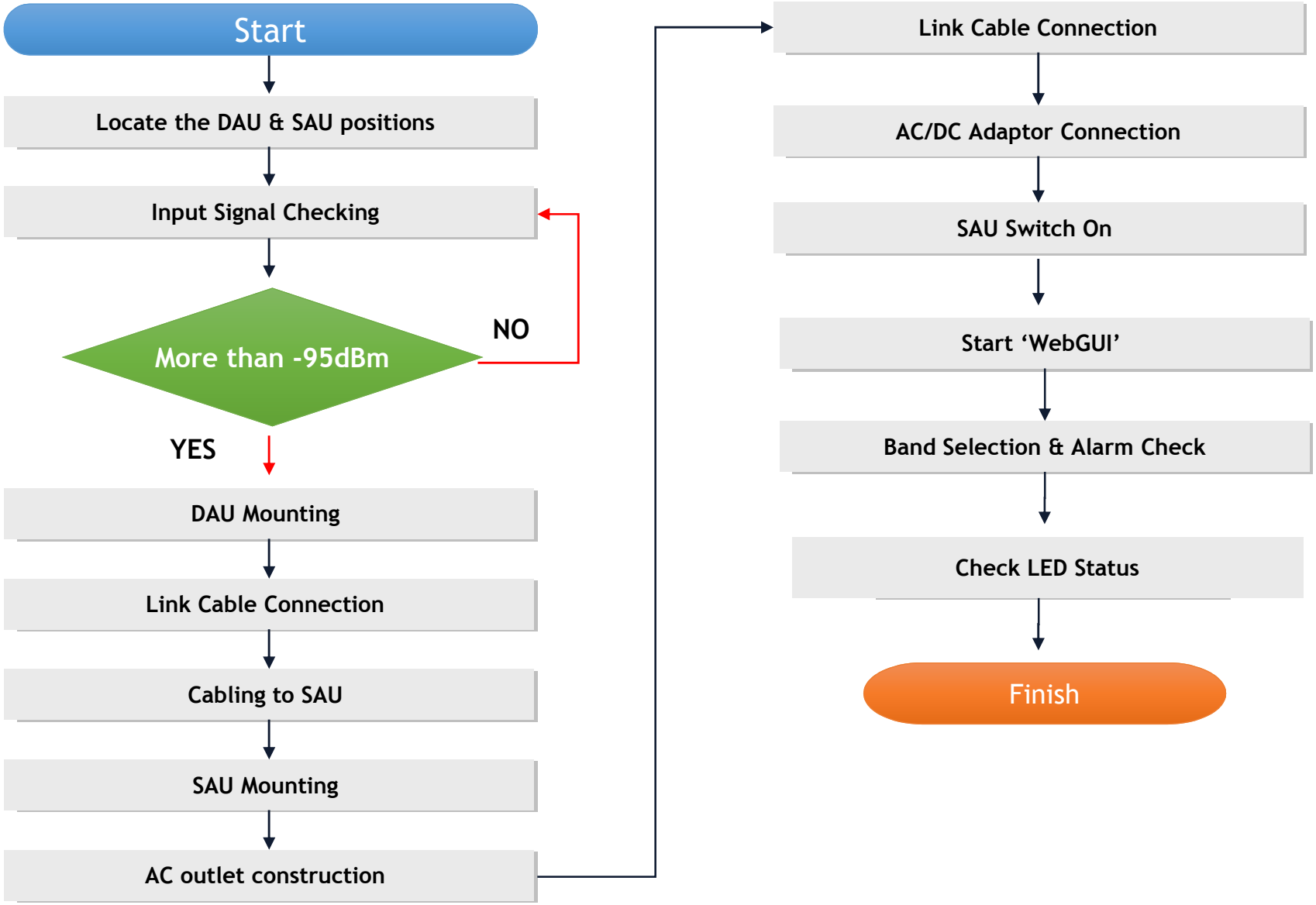
# Repeater External Port Design

## Service Antenna Unit




[Left Side] [Bottom Side] [Right Side]

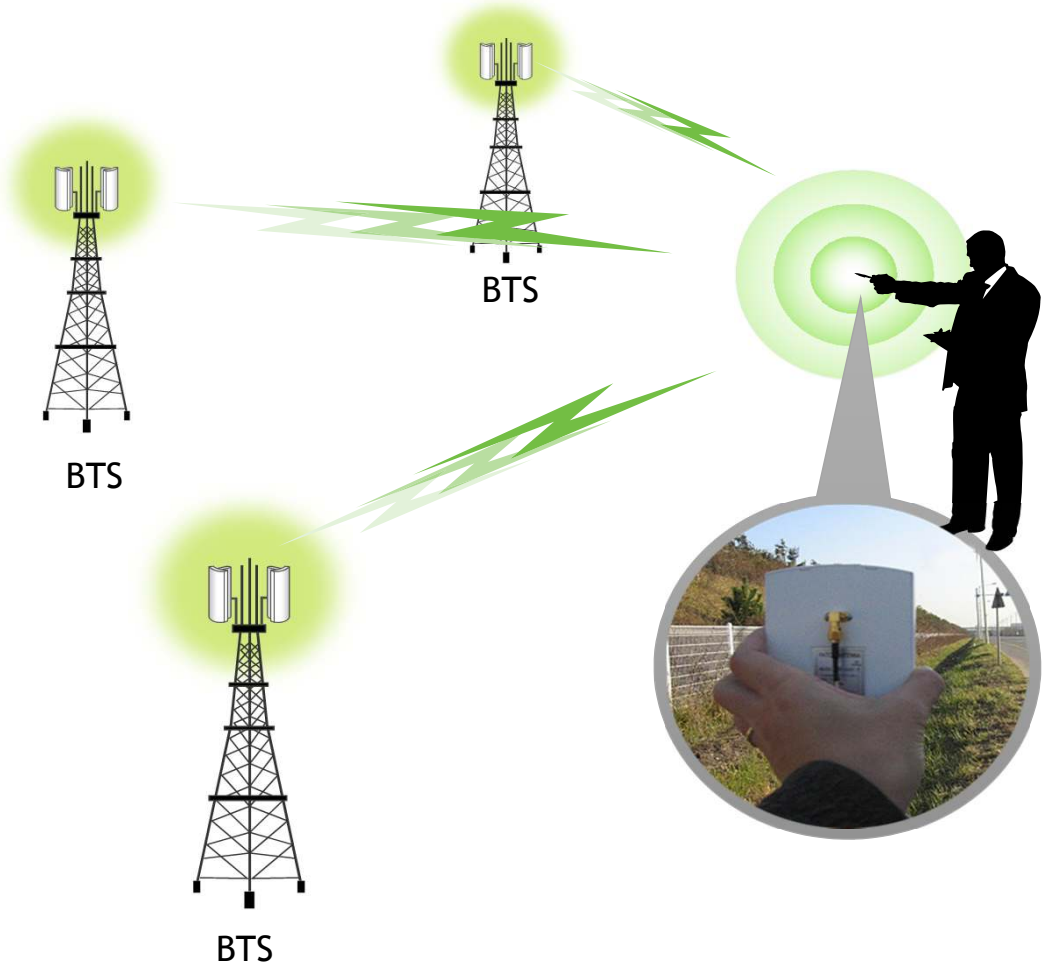
# Setup


Start
Locate the DAU & SAU positions
Input Signal Checking
More than -95dBm
NO
YES
DAU Mounting
Link Cable Connection
Cabling to SAU
SAU Mounting
AC outlet construction
Link Cable Connection
AC/DC Adaptor Connection
SAU Switch On
Start 'WebGUI'
Band Selection & Alarm Check
Check LED Status
Finish

# Positioning of DAU

## Search for the proper BTS location

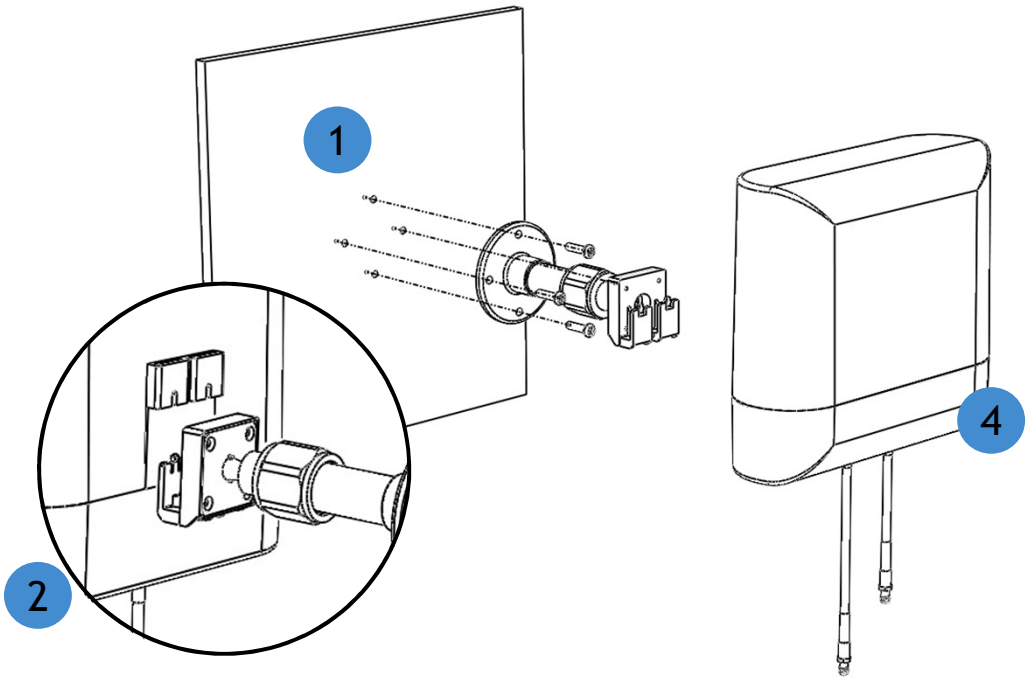
**Please refer to 'Measurement Criteria' .**

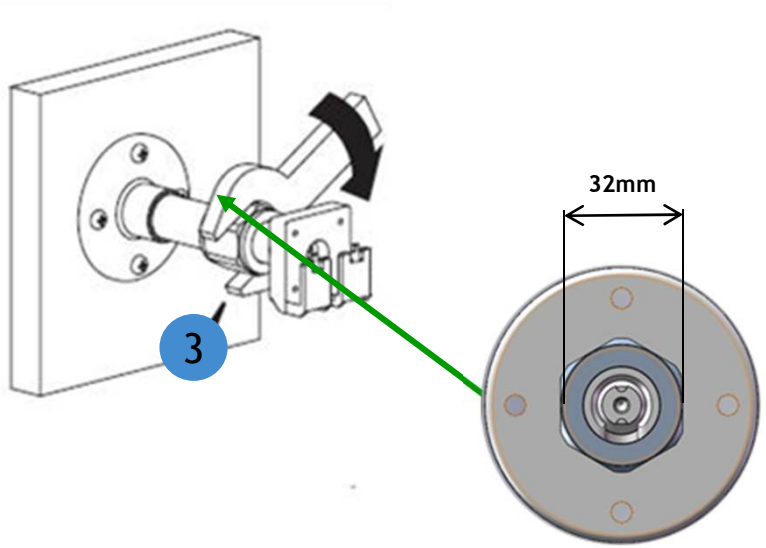


# Mounting SMR-IP10

## ▪ Donor Antenna Unit (DAU)

1. Find a location which provides good LTE signals from the Base Station.
2. Using a pencil, mark the location of each of the DAU Bracket's four mounting holes on the wall.
3. Drill holes in the wall at the locations marked in step 1.
4. Set the anchors in the wall, position the bracket, and tighten tapping screws until secured.
5. Put the DAU into mounting bracket.
6. Tighten the mounting bracket with a wrench (32 mm).
7. Connect the link cable to DAU.



# Mounting SMR-IP10

## Installed DAU Example.

The DAU should be installed pointing toward a Base Station to receive clear and stable CDMA/LTE signals.

# External Antenna Installation for 800MHz.

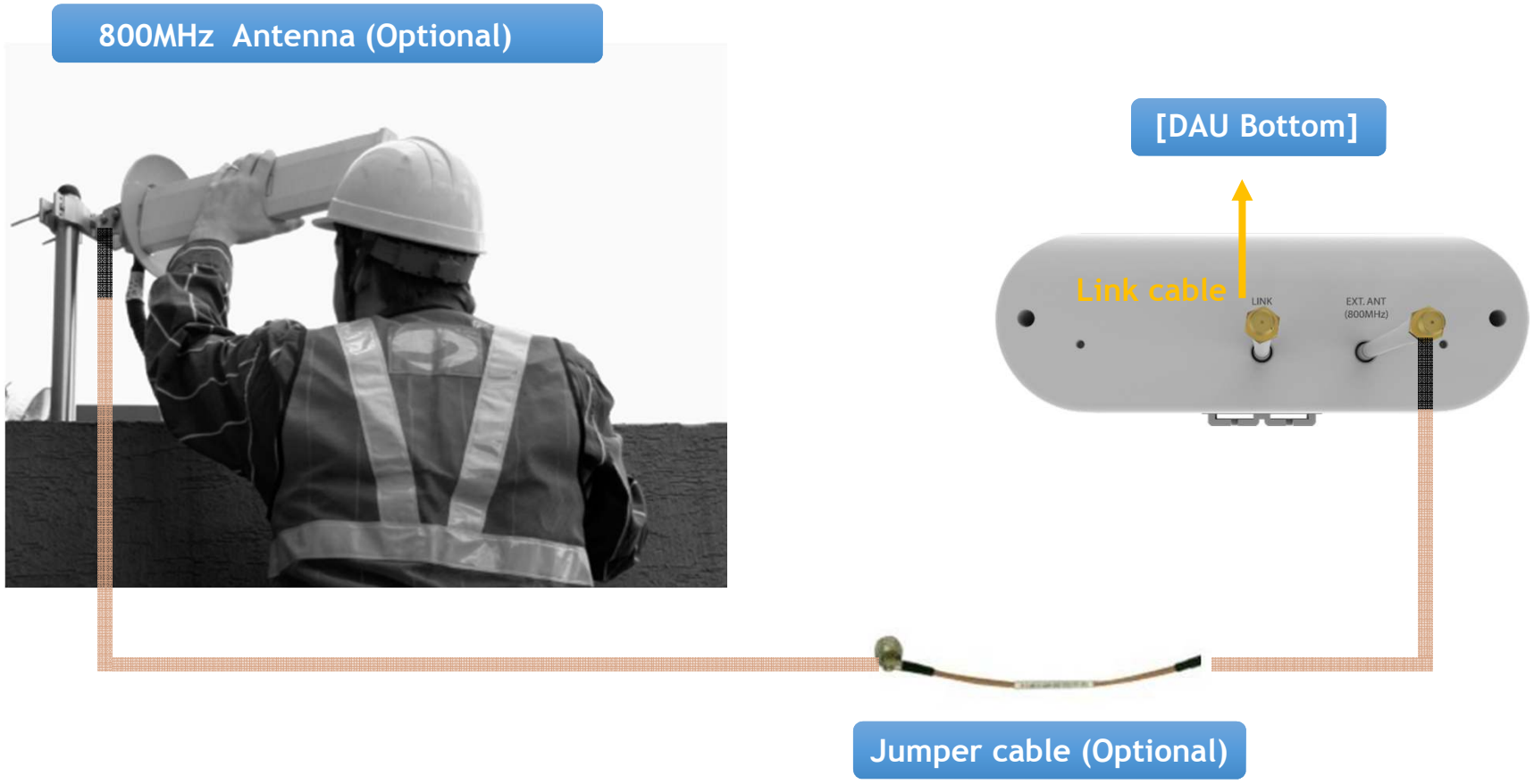


If required

## Installed DAU and 800MHz External antenna

※ Depending on Base Station's location for both 800MHz and 1900Mhz.

- ✓ Collocated Site: DAU installation Only (recommended)
- ✓ Individual Site: DAU (recommended) but if required, add 800MHz antenna

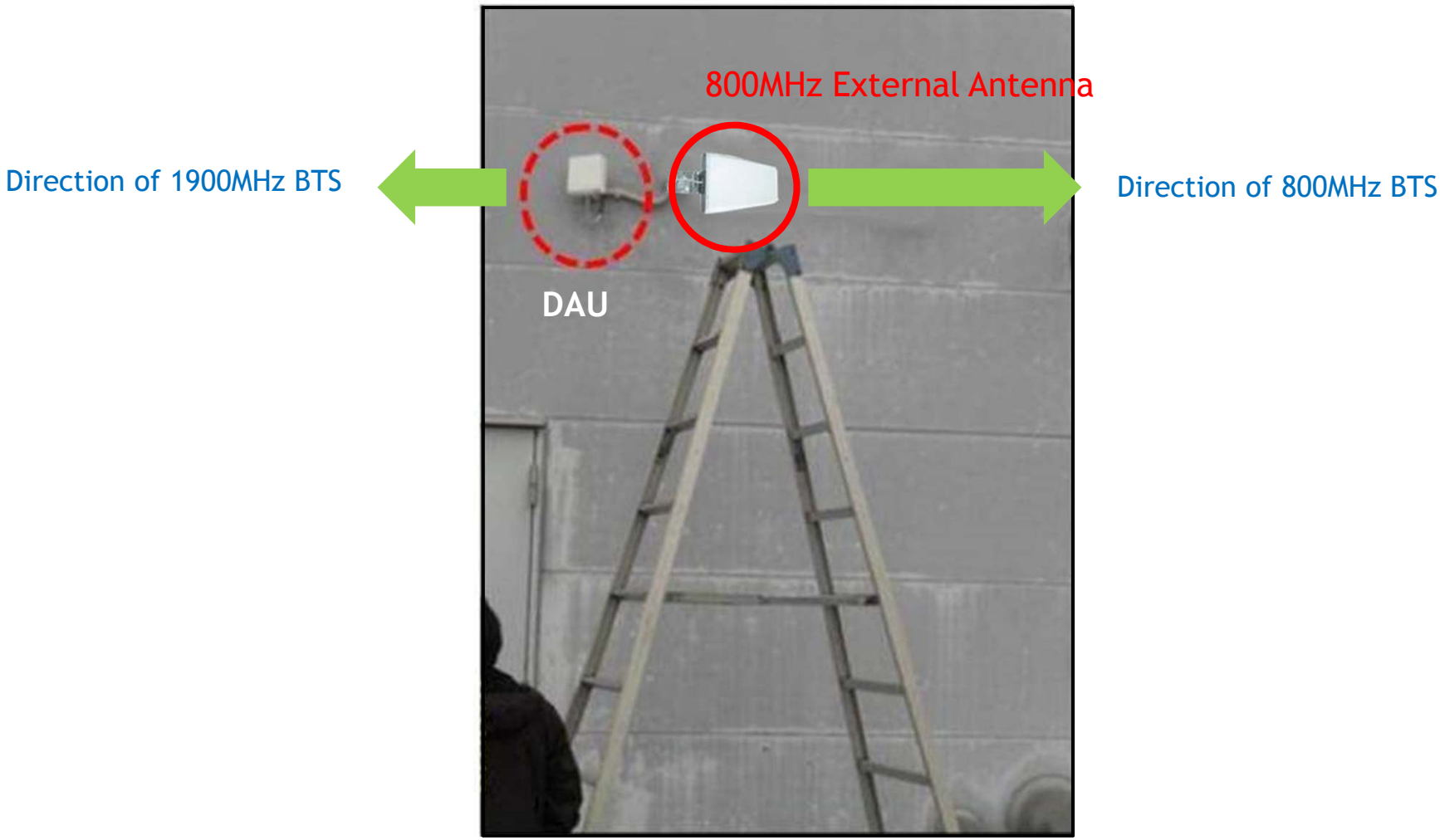


# External Antenna Installation for 800MHz.

If required

## Installed DAU and 800MHz External antenna

The external antenna should be positioned toward the Base Station (BTS) from individual BTS site for both 800MHz and 1900MHz network.



# Upgrading Existing Repeater With SMR-IP10

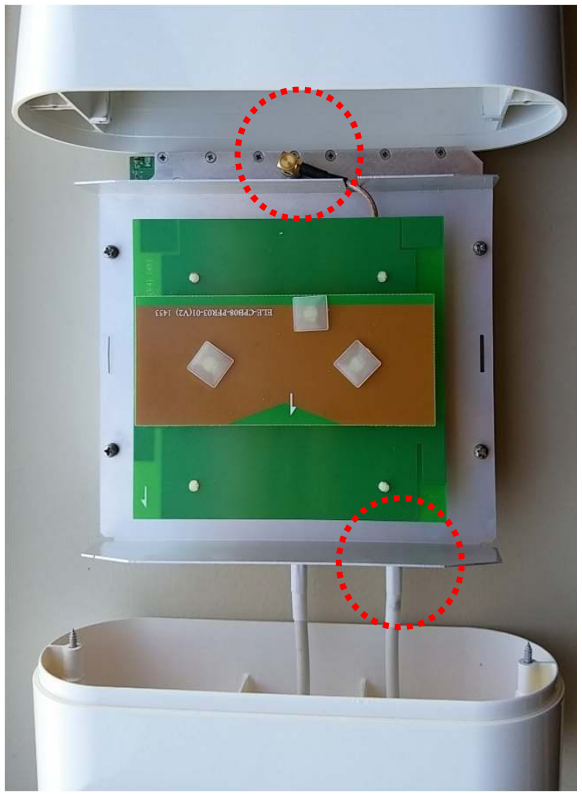
- **For replacing an existing repeater**

If necessary

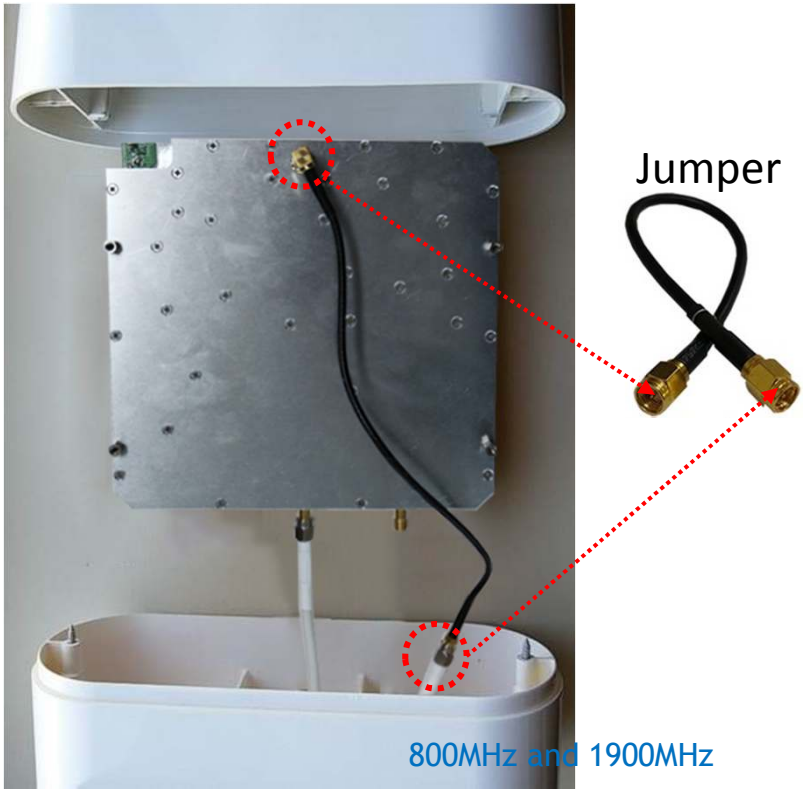
## Jumper cable connection for adapting both 800MHz and 1900MHz

**The Dual band antenna port for both 800MHz and 1900MHz should be connected with a jumper cable.**
Please remove Antenna kit attached on DAU module.


1. Open DAU.



2. Loosen screws




3. Connect jumper cable.

# Upgrading Existing Repeater With SMR-IP10



- **Replacement of existing repeater**

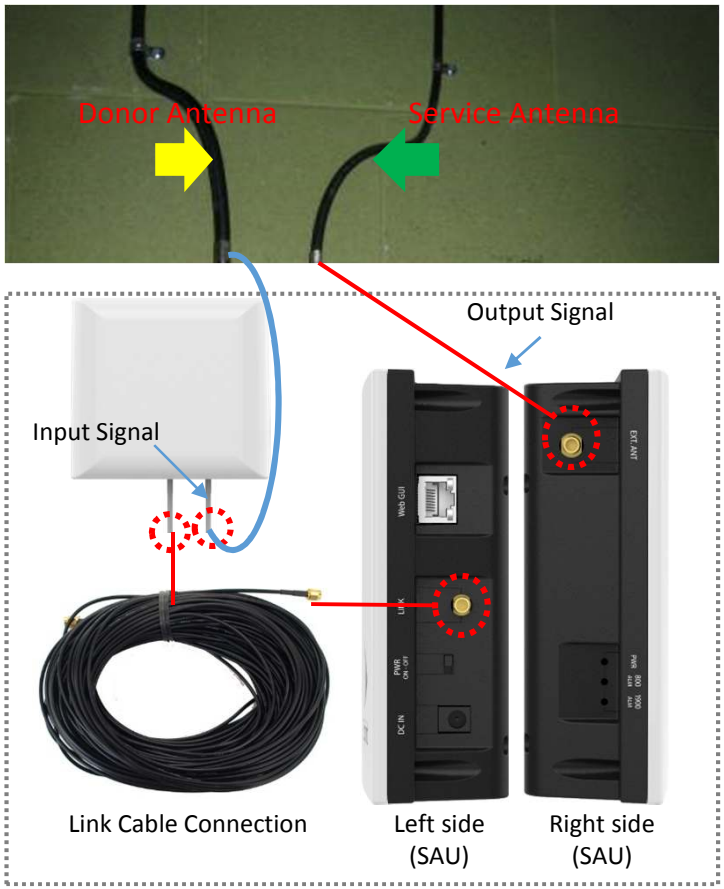
If necessary

## Existing Donor Antenna Connection and Replacement of existing Repeater

**You may save cabling time and labor costs by using existing Donor Antenna and cable to existing Repeater**



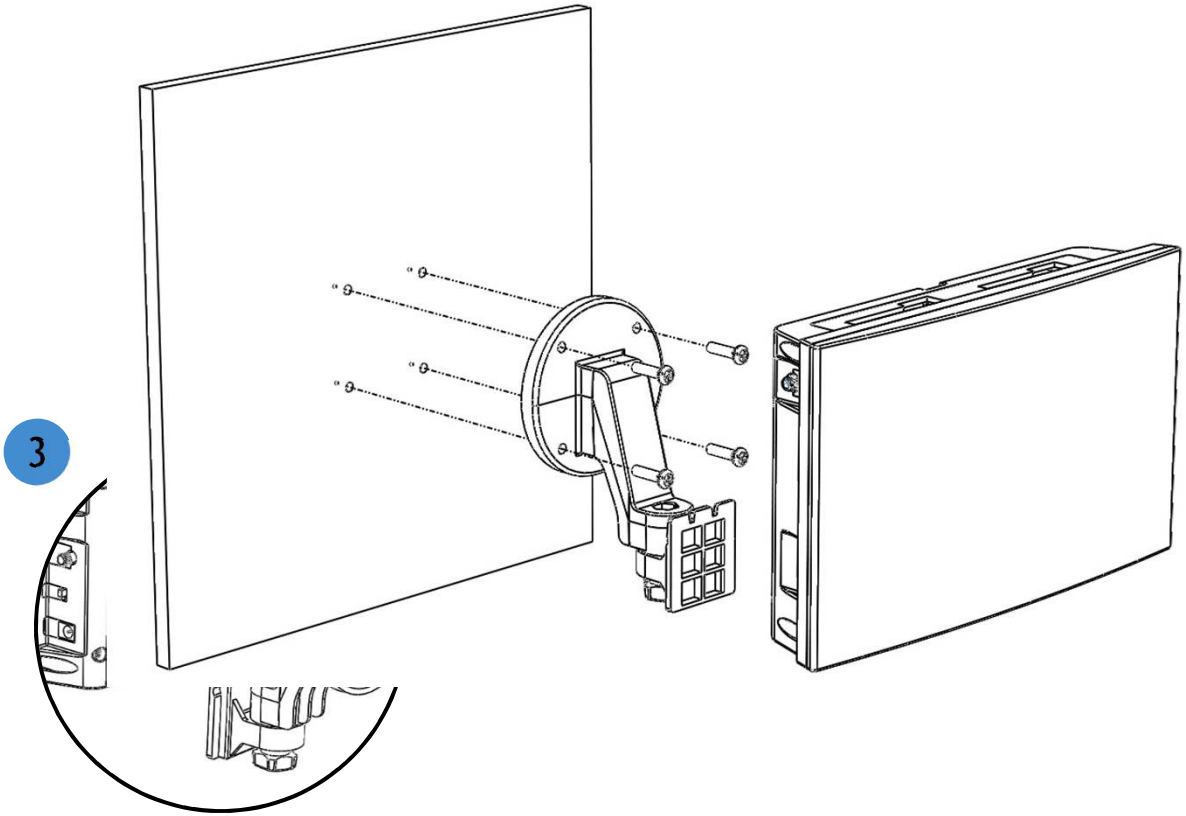
Existing Donor Antenna for both 800MHz and 1900MHz

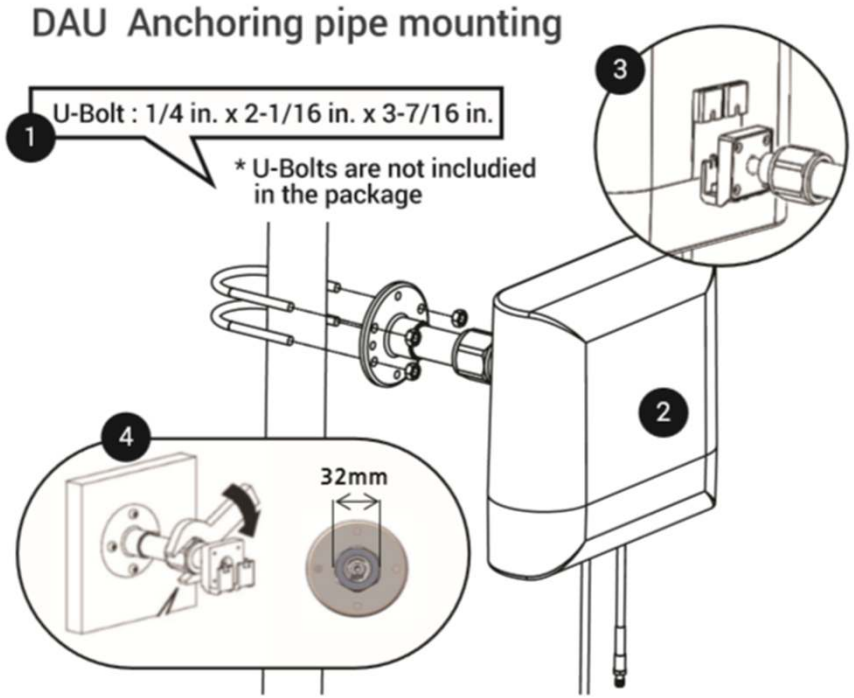


# Mounting The SAU

## ▪ Service Antenna Unit (SAU) - Wall-Mounting

1. Using a pencil, mark the location of each of the SAU Bracket's four mounting holes on the wall.
2. Drill holes in the wall at the locations marked in step 1.
3. Set the anchors in the wall, position the bracket, and tighten tapping screws until secured.
4. Put the SAU into the mounting bracket.
5. Tighten the mounting bracket with a cross screwdriver.
6. Connect the link cable to SAU.



# Service Coverage and Quality

## Service Quality Measurement

**Please refer to 'Measurement Criteria'**


※ The SAU should be well-positioned to provide the best CDMA / LTE service and coverage.

# External Port of SAU

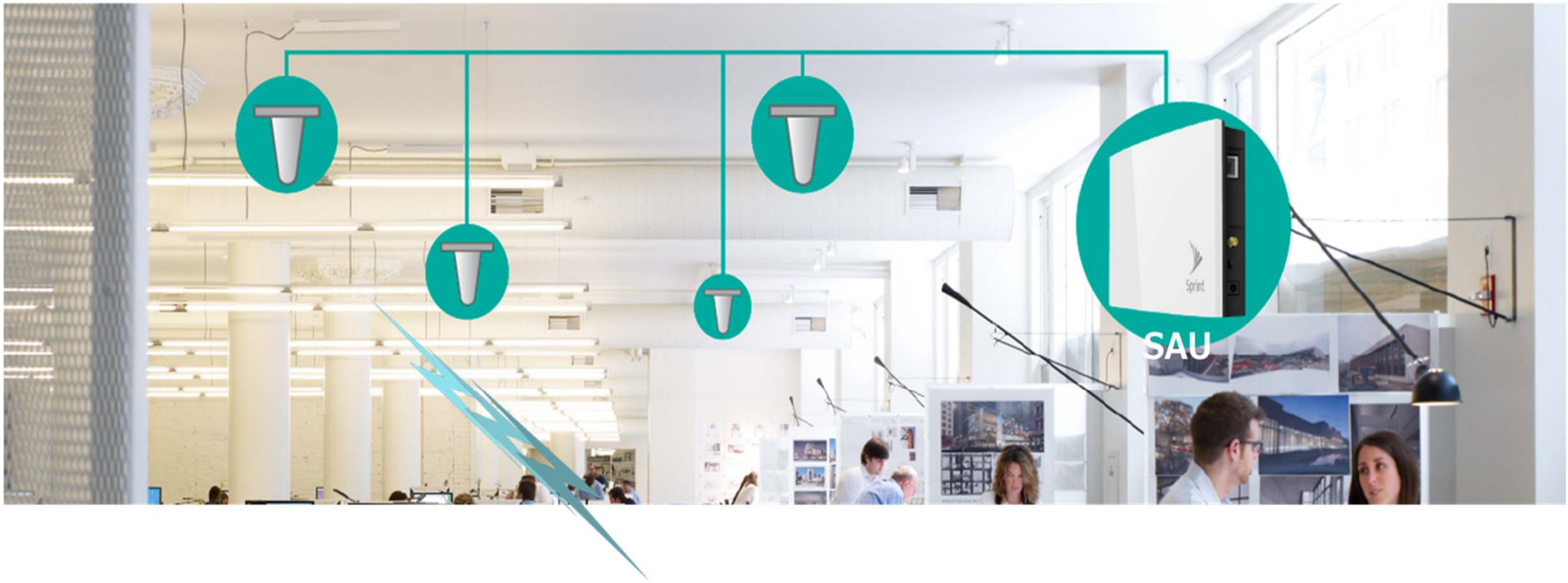
## External Antenna Port

The external antenna port can be used to add external service antenna's. Once the external service antenna port is used, the internal SAU antenna will be disabled.

# Service and Quality

## Service Quality Measurement

**Please refer to 'Measurement Criteria'**

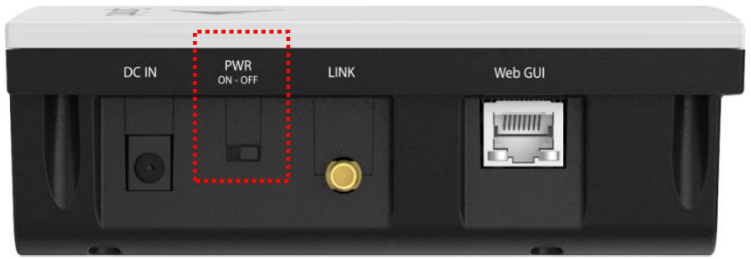



※ The SAU should be well-positioned to provide excellent CDMA / LTE  service and coverage.

# LED Display



## Power On / Plug & Play






- Power
- 800MHz Alarm
- 1900MHz Alarm

| No | Item | LED Indication | Description |
|---|---|---|---|
| 1 | Checking | GREEN LED Blinking in sequence<br>(PWR→1900→800 ) | Auto Setup |
| 2 | Normal | PWR→ GREEN LED ON<br>Alarm_1900 → GREEN LED ON<br>Alarm_800 → GREEN LED ON | Standard operation |

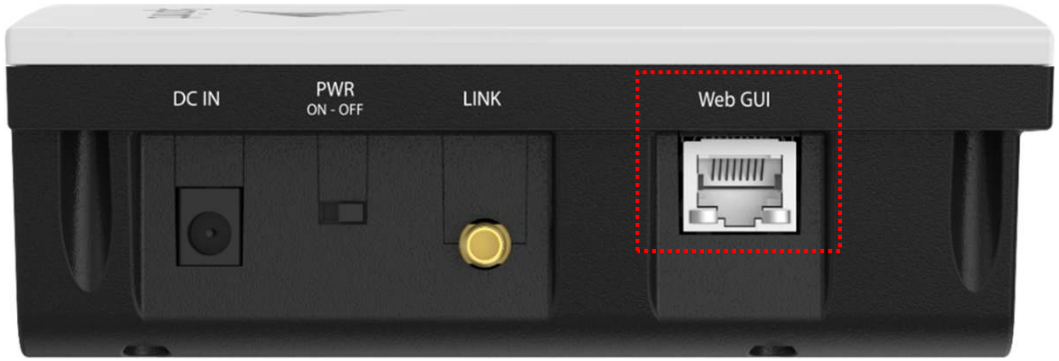
# LED Display

## LED Display: operating and alarm status

| No | Item | LED Indication | Description |
|---|---|---|---|
| 1 | Checking | Alarm_1900 → GREEN LED Blinking<br>Power → GREEN LED Blinking | 1900_Isolation Re-Check |
| 2 | Checking | Alarm_800 → GREEN LED Blinking<br>Power → GREEN LED Blinking | 800_Isolation Re-Check |
| 3 | Alarm | Alarm_800 & Alarm_1900 → LED OFF<br>Power → RED LED ON | Low Input Voltage (DC Feeding to DAU) |
| 4 | Alarm | Alarm_800 & Alarm_1900 → RED LED ON<br>Power → RED LED Blinking | Link Fail between DAU and SAU |
| 5 | Alarm | Alarm_1900 → RED LED Blinking<br>Power → RED LED Blinking | Lack of Isolation between DAU and SAU @1900 |
| 6 | Alarm | Alarm_800 → RED LED Blinking<br>Power → RED LED Blinking | Lack of Isolation between DAU and SAU @800 |
| 7 | Alarm | Alarm_1900 → RED LED ON<br>Power → RED LED Blinking | 1900 PLL Fail |
| 8 | Alarm | Alarm_800 → RED LED ON<br>Power → RED LED Blinking | 800 PLL Fail |
| 9 | Alarm | Alarm_1900 → RED LED ON<br>Power → RED LED ON | 1900 Shut Down |
| 10 | Alarm | Alarm_800 → RED LED ON<br>Power → RED LED ON | 800 Shut Down |

# 1900MHz Band Block Selection

## Service Band Information

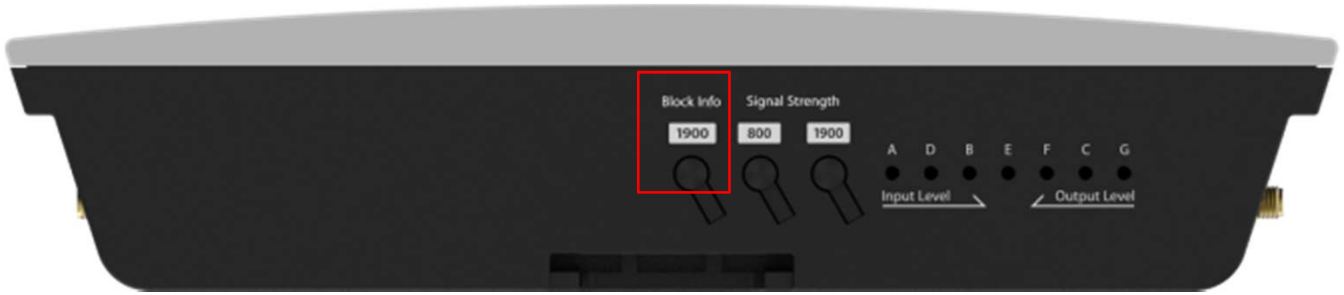



**IP: 192.168.1.1**

| Frequency | Band & Service | Instruction | Bandwidth |
|---|---|---|---|
| 1900MHz | A, D and B | Select one band | 5MHz or 10MHz or 15MHz |
| | E, F and C | Select one band | 5MHz or 10MHz |
| | G | - | 5MHz |
| 800MHz | CDMA | - | 2MHz |
| | CDMA + LTE | - | 7MHz |

# Factory Default Setting

**Push 'Block Info' button for 10 seconds to return to 'Factory Default Settings'.**




Block Info
1900

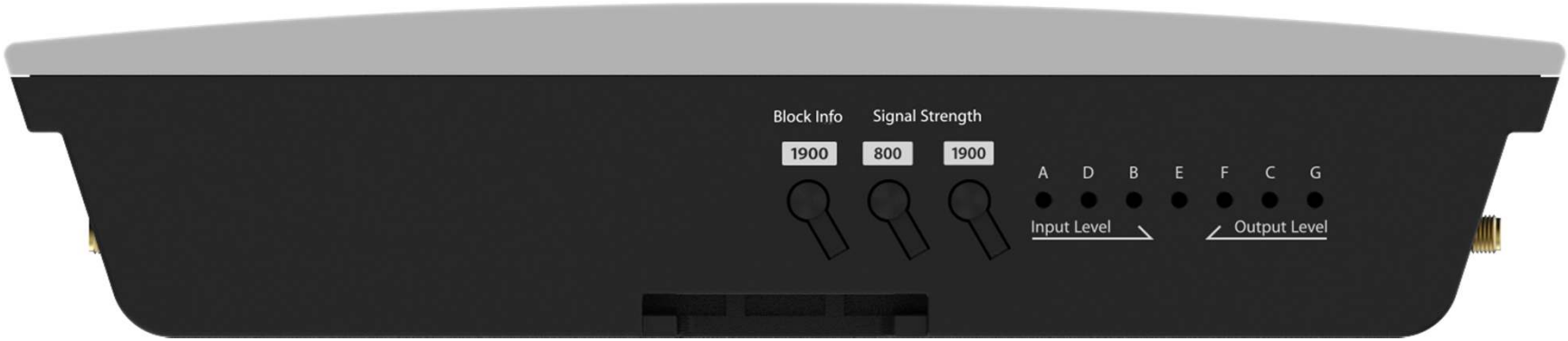
* LEDs will be off after 30seconds automatically

**None of the bands will be preset.**
**The installer should select the necessary blocks for 800MHz and 1900MHz using WebGUI.**

| Frequencies | Band & Service | Instruction | Bandwidth |
|---|---|---|---|
| 1900MHz | A, D and B | Select one band | 5MHz or 10MHz or 15MHz |
| | E, F and C | Select one band | 5MHz or 10MHz |
| | G | - | 5MHz |
| 800MHz | CDMA | - | 2MHz |
| | CDMA + LTE | - | 7MHz |

# LED Indicator

## Band Block Information and Signal Strength

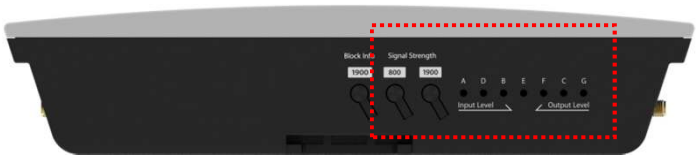


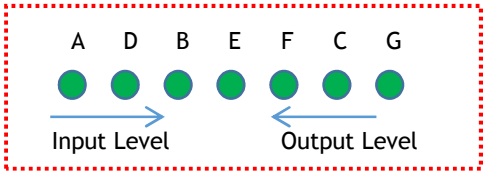

* LEDs will be off after 30 seconds automatically

| LED Display Info | | | |
|---|---|---|---|
| **Button** | **Frequency** | **Instruction** | **Description** |
| Block Info | 1900 | Band Information | 1900MHz Service Block Information |
| Signal Strength | 800 | 1st Click | 800MHz Input Signal Level (RSSI) |
| | | 2nd Click | 800MHz Output Power Level |
| | 1900 | 1st Click | 1900MHz Input Signal Level (RSSI) |
| | | 2nd Click | 1900MHz Output Power Level |

# LED Indicator

## Signal Strength Indicator






* LED will be off after 30 seconds automatically

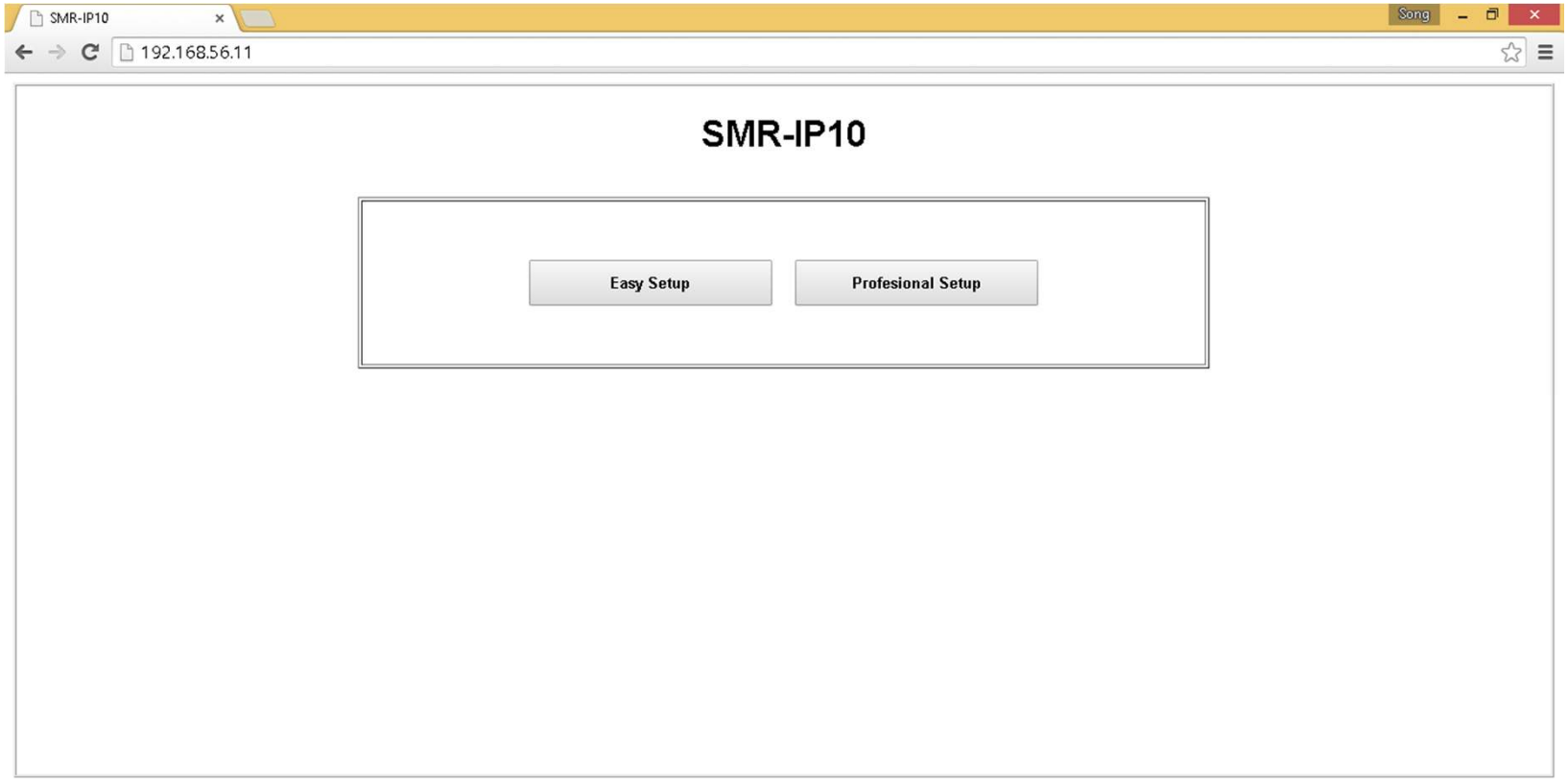
| LED Level Bar ( A / D / B / E / F / C / G) | | | |
|---|---|---|---|
| **Items** | **LED** | **Values** | **Status** |
| Input Signal Level | A (blinking) | -85dBm below | Bad |
| | AD | -84dBm ~ -75dBm | Satisfactory |
| | ADBE | -74dBm ~ -70dBm | Good |
| | ADBEFC | -69dBm above | Excellent |
| Output Power | G (blinking) | -10dBm below | Bad |
| | GC | -9dBm ~ 0dBm | Satisfactory |
| | GCFE | +1dBm ~ +5dBm | Good |
| | GCFEBD | +6dBm ~ +10dBm | Excellent |

# WebGUI

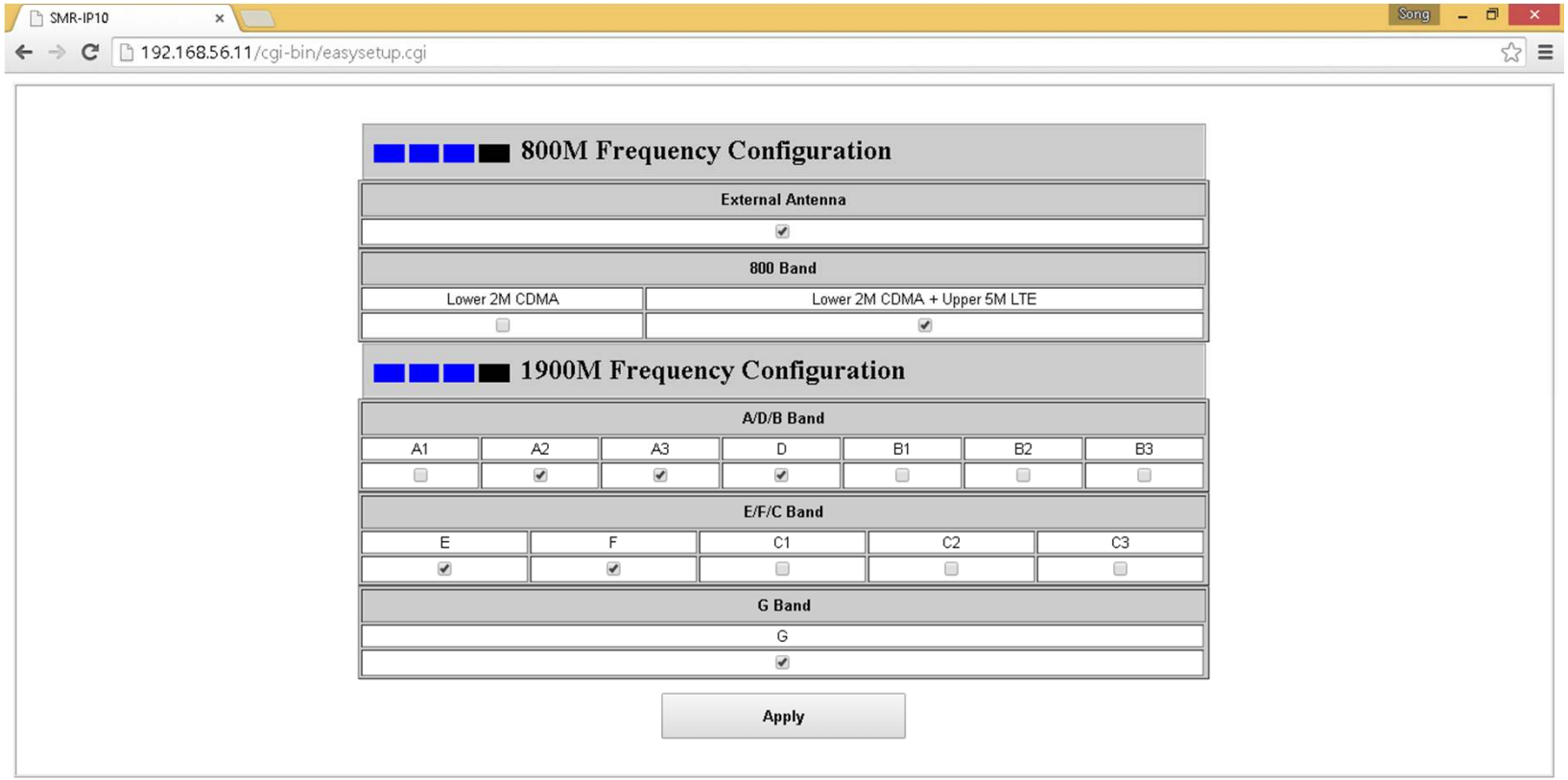
The GST SMR repeater can be configured using a standard web browser. The repeater can be accessed locally with a cross-over UTP cable or remotely with an optional external modem. The images for the User Interface in this publication may vary depending repeater's S/W version.

# Log In

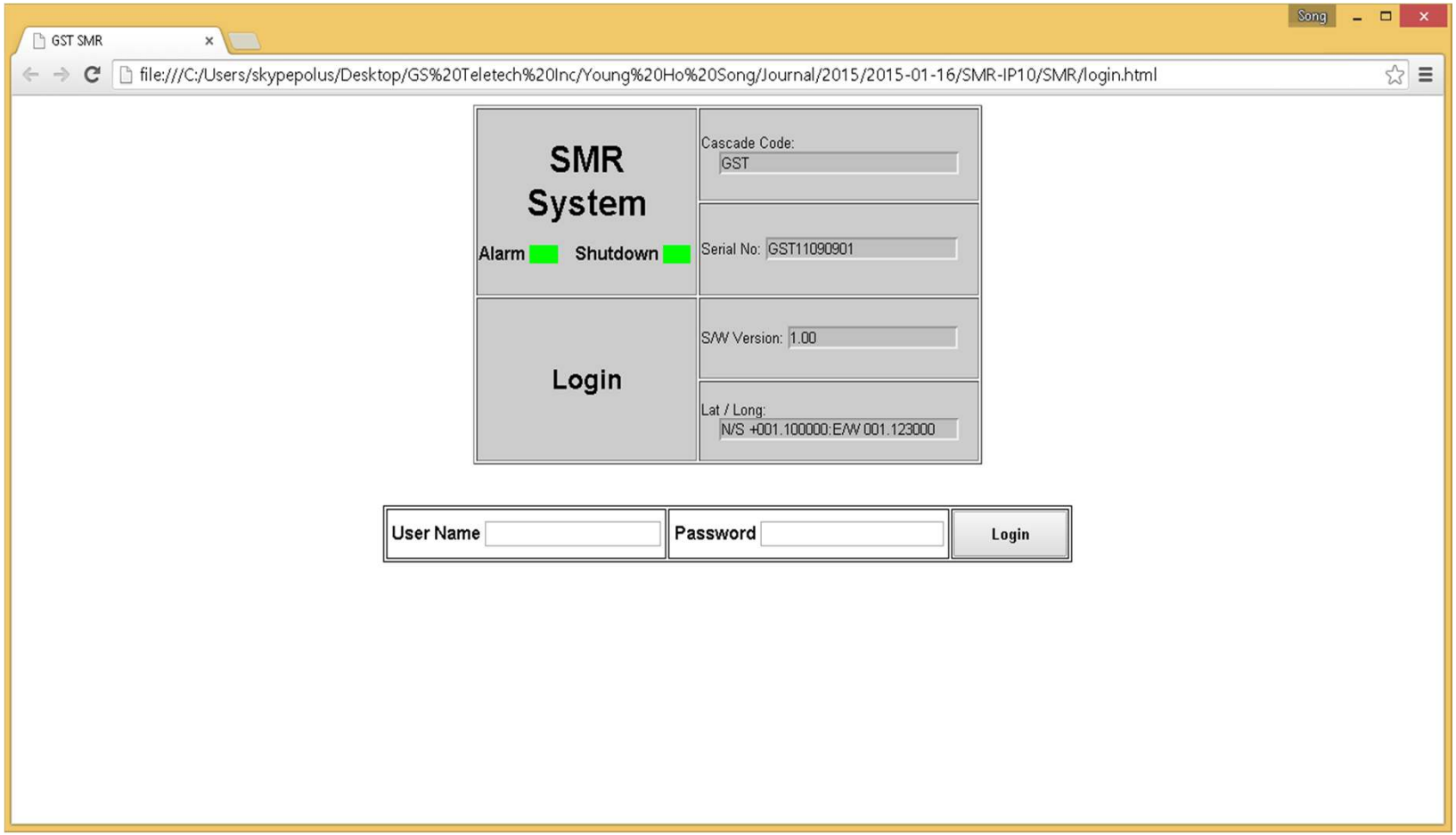
IP Address: **192.168.1.1**



# Easy Setup

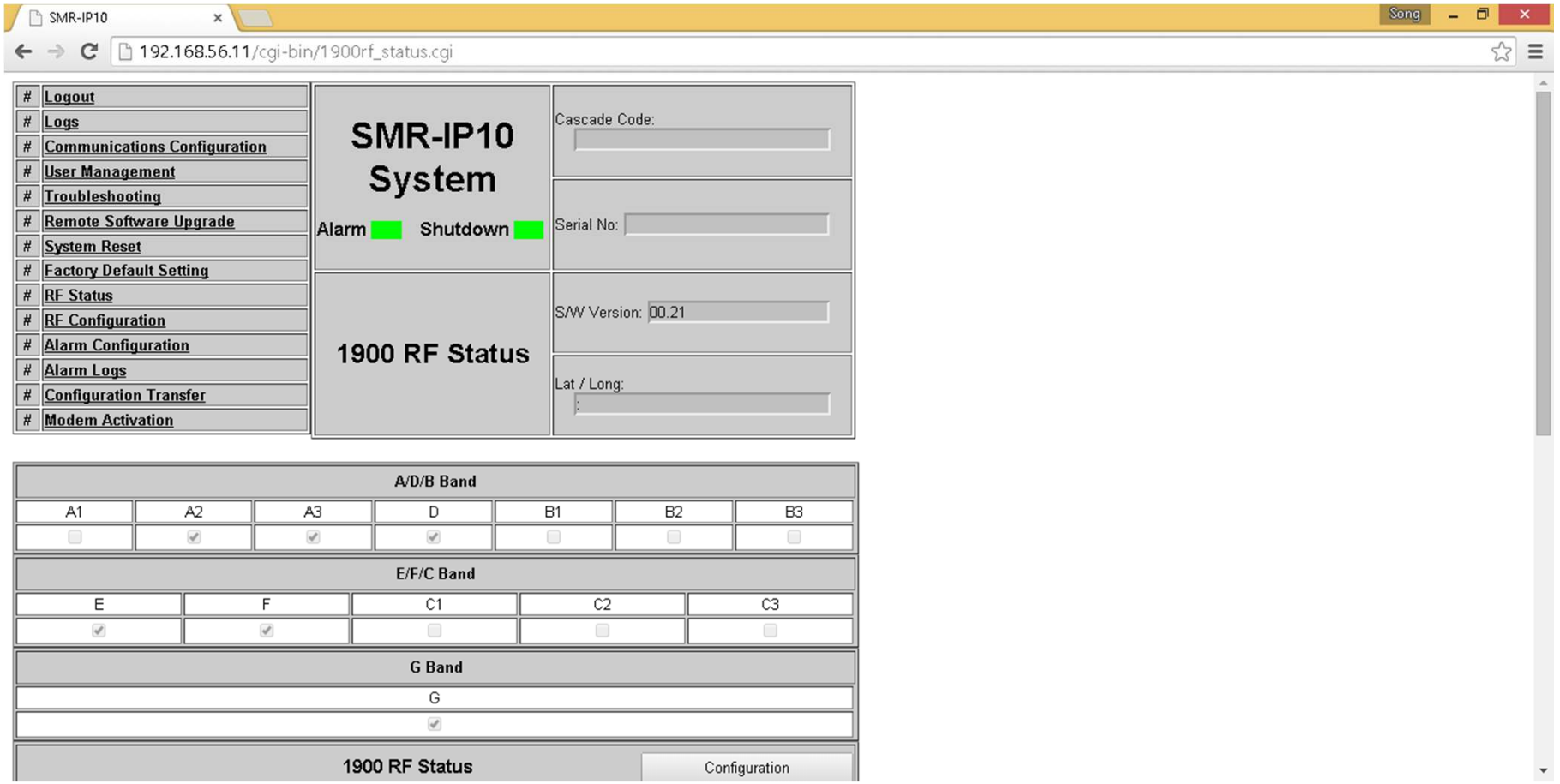

SMR-IP10
192.168.56.11/cgi-bin/easysetup.cgi
800M Frequency Configuration
External Antenna
800 Band
Lower 2M CDMA
Lower 2M CDMA + Upper 5M LTE
1900M Frequency Configuration
A/D/B Band
A1
A2
A3
D
B1
B2
B3
E/F/C Band
E
F
C1
C2
C3
G Band
G
Apply

# Professional Setup



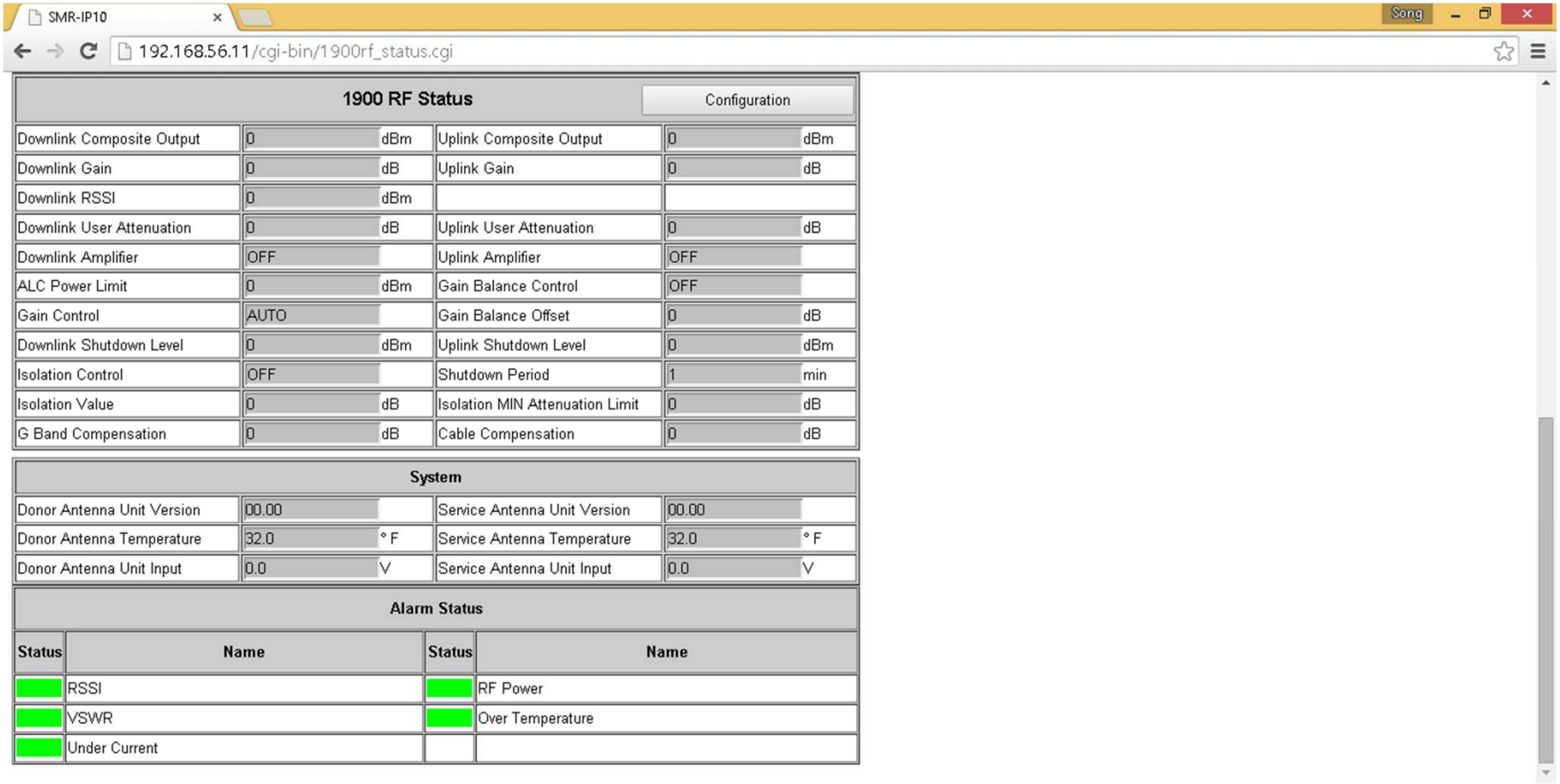
# RF Status: 1900MHz band.

You can check the status of the RF operation on the status page.



# RF Status: 1900MHz band.

You can check the status of the RF operation on the status page.



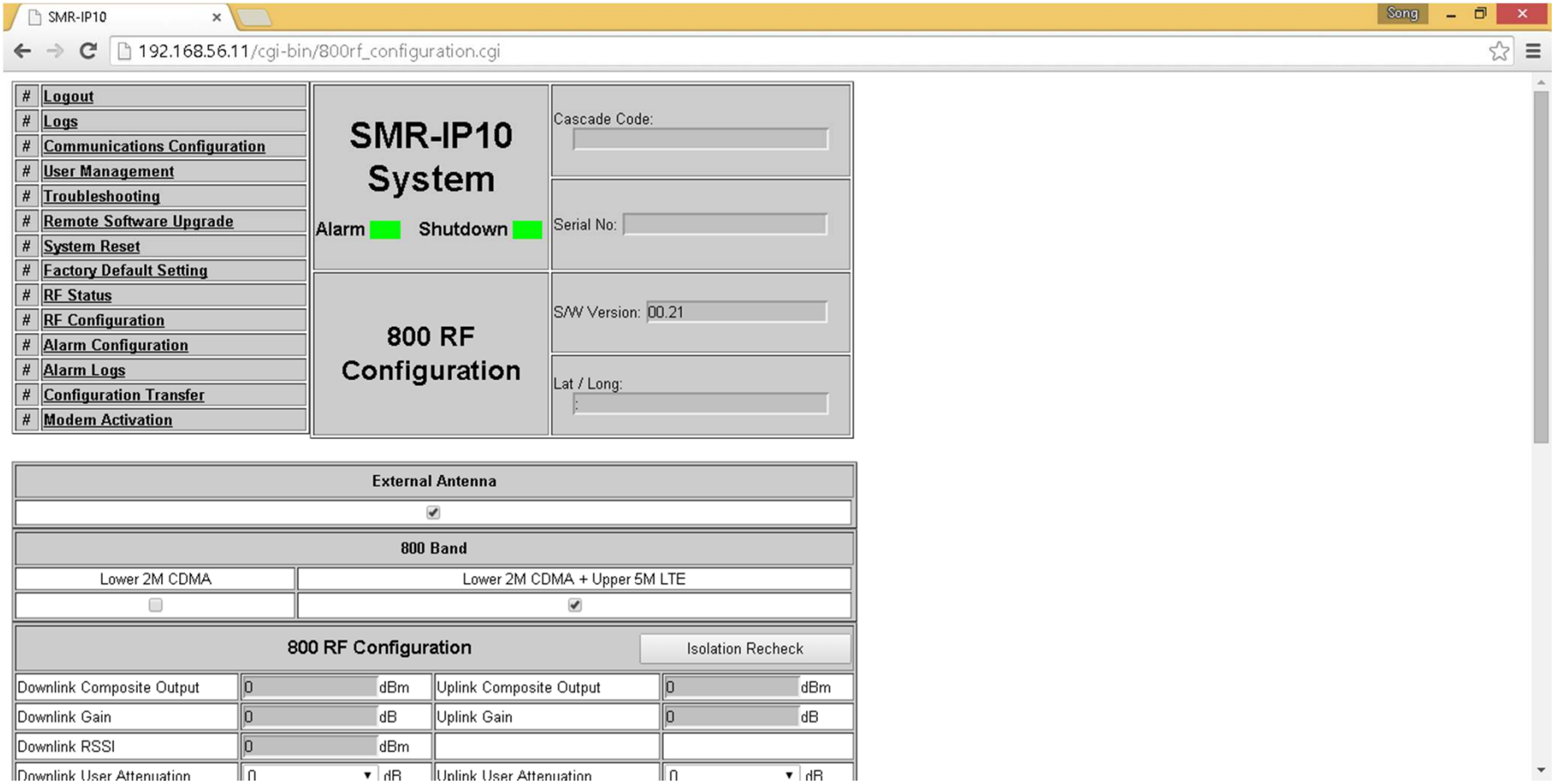

| 1900 RF Status | | | Configuration | | |
|---|---|---|---|---|---|
| Downlink Composite Output | 0 | dBm | Uplink Composite Output | 0 | dBm |
| Downlink Gain | 0 | dB | Uplink Gain | 0 | dB |
| Downlink RSSI | 0 | dBm | | | |
| Downlink User Attenuation | 0 | dB | Uplink User Attenuation | 0 | dB |
| Downlink Amplifier | OFF | | Uplink Amplifier | OFF | |
| ALC Power Limit | 0 | dBm | Gain Balance Control | OFF | |
| Gain Control | AUTO | | Gain Balance Offset | 0 | dB |
| Downlink Shutdown Level | 0 | dBm | Uplink Shutdown Level | 0 | dBm |
| Isolation Control | OFF | | Shutdown Period | 1 | min |
| Isolation Value | 0 | dB | Isolation MIN Attenuation Limit | 0 | dB |
| G Band Compensation | 0 | dB | Cable Compensation | 0 | dB |

| System | | | | | |
|---|---|---|---|---|---|
| Donor Antenna Unit Version | 00.00 | | Service Antenna Unit Version | 00.00 | |
| Donor Antenna Temperature | 32.0 | ° F | Service Antenna Temperature | 32.0 | ° F |
| Donor Antenna Unit Input | 0.0 | V | Service Antenna Unit Input | 0.0 | V |

| Alarm Status | | | |
|---|---|---|---|
| Status | Name | Status | Name |
| | RSSI | | RF Power |
| | VSWR | | Over Temperature |
| | Under Current | | |

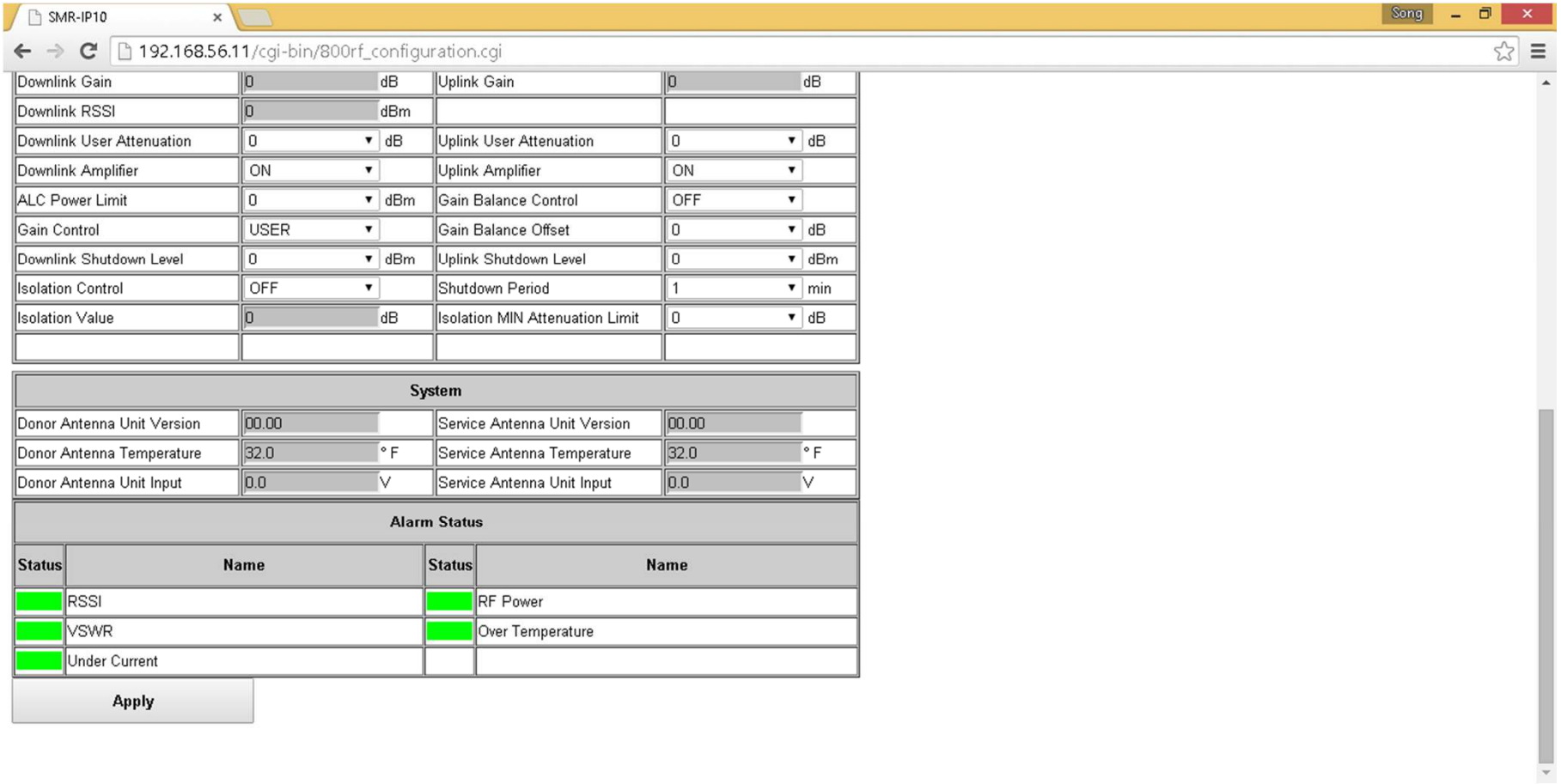
# RF Configuration

RF changes can be made on the RF configuration page.



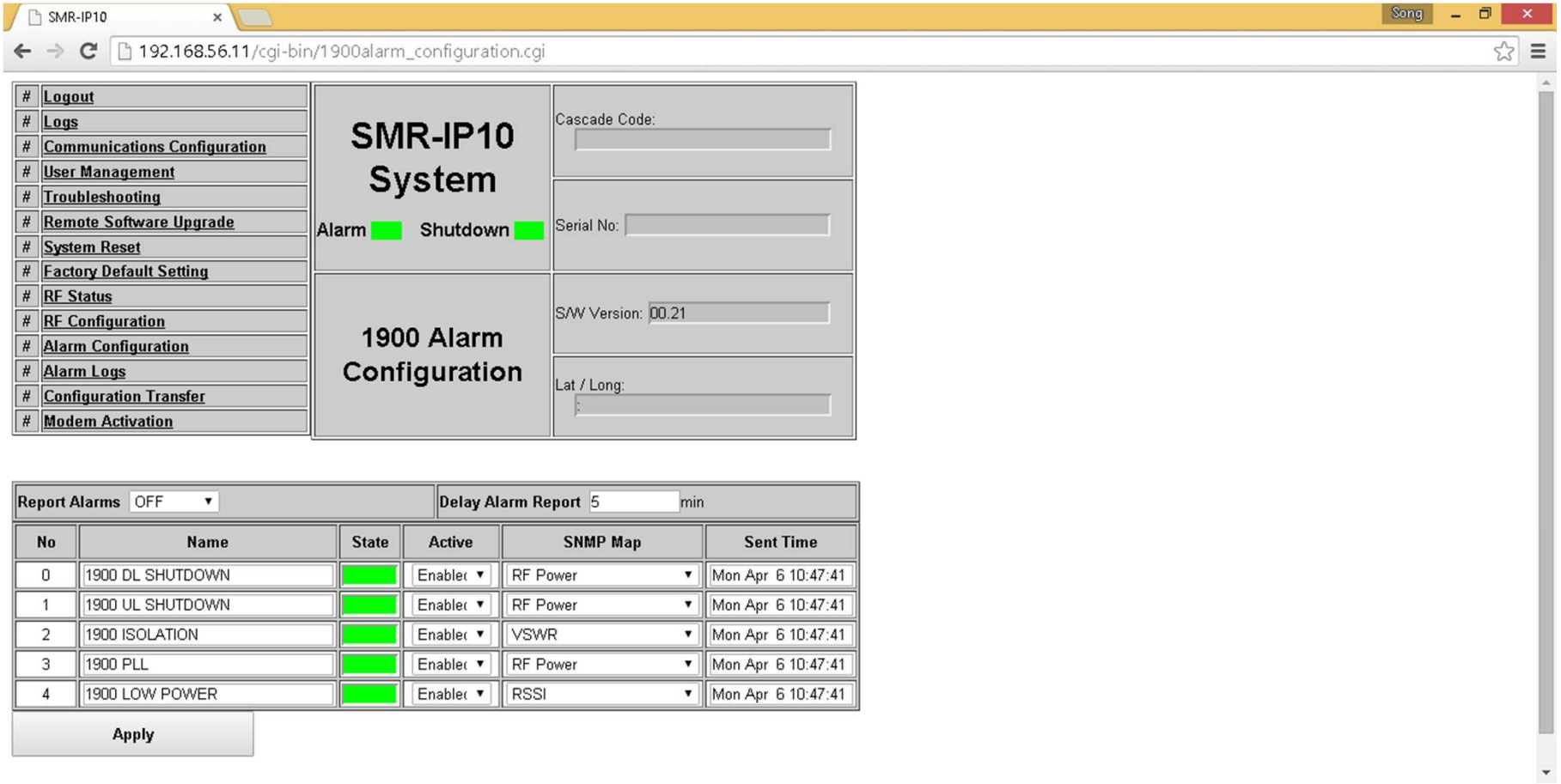
# RF Configuration

RF changes can be made on the RF configuration page.



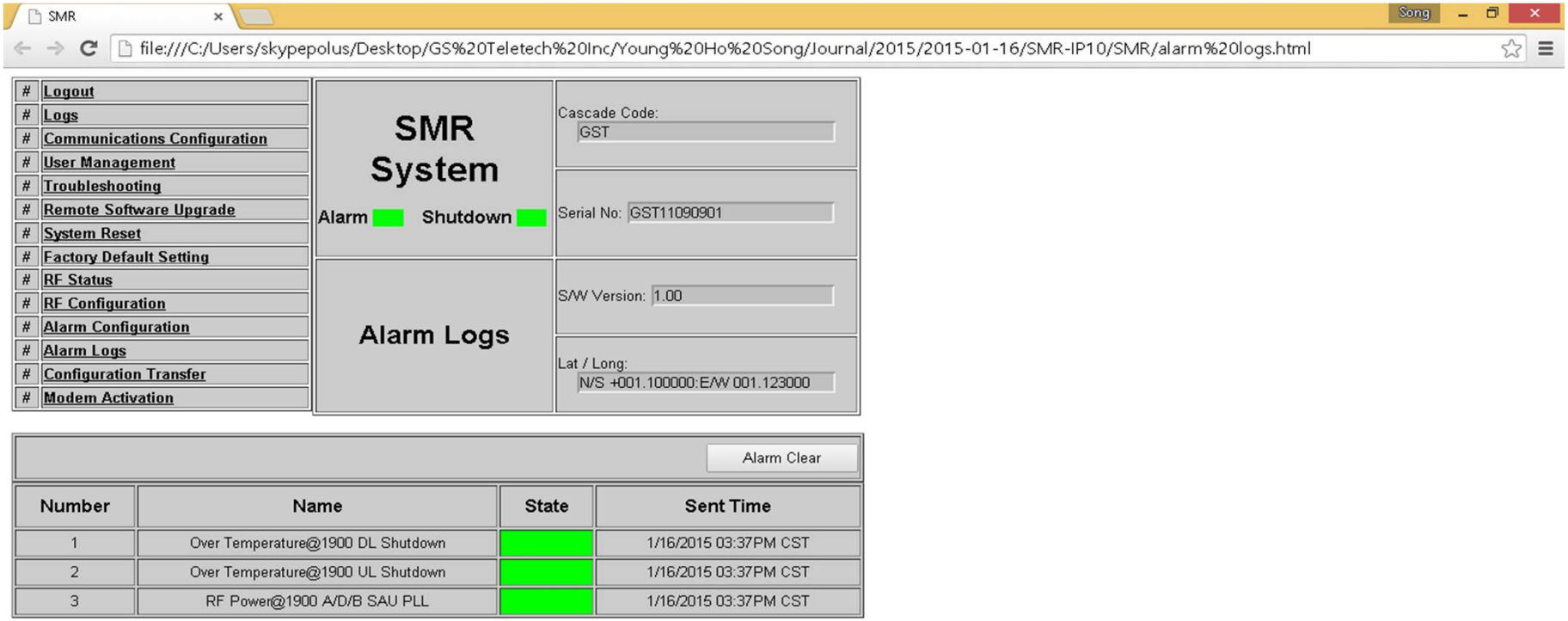
# Alarm Configuration

Alarms and SNMP mapping can be configured on the Alarm Configuration page.



# Alarm Logs

The alarm logs page allows you to check the system alarms.

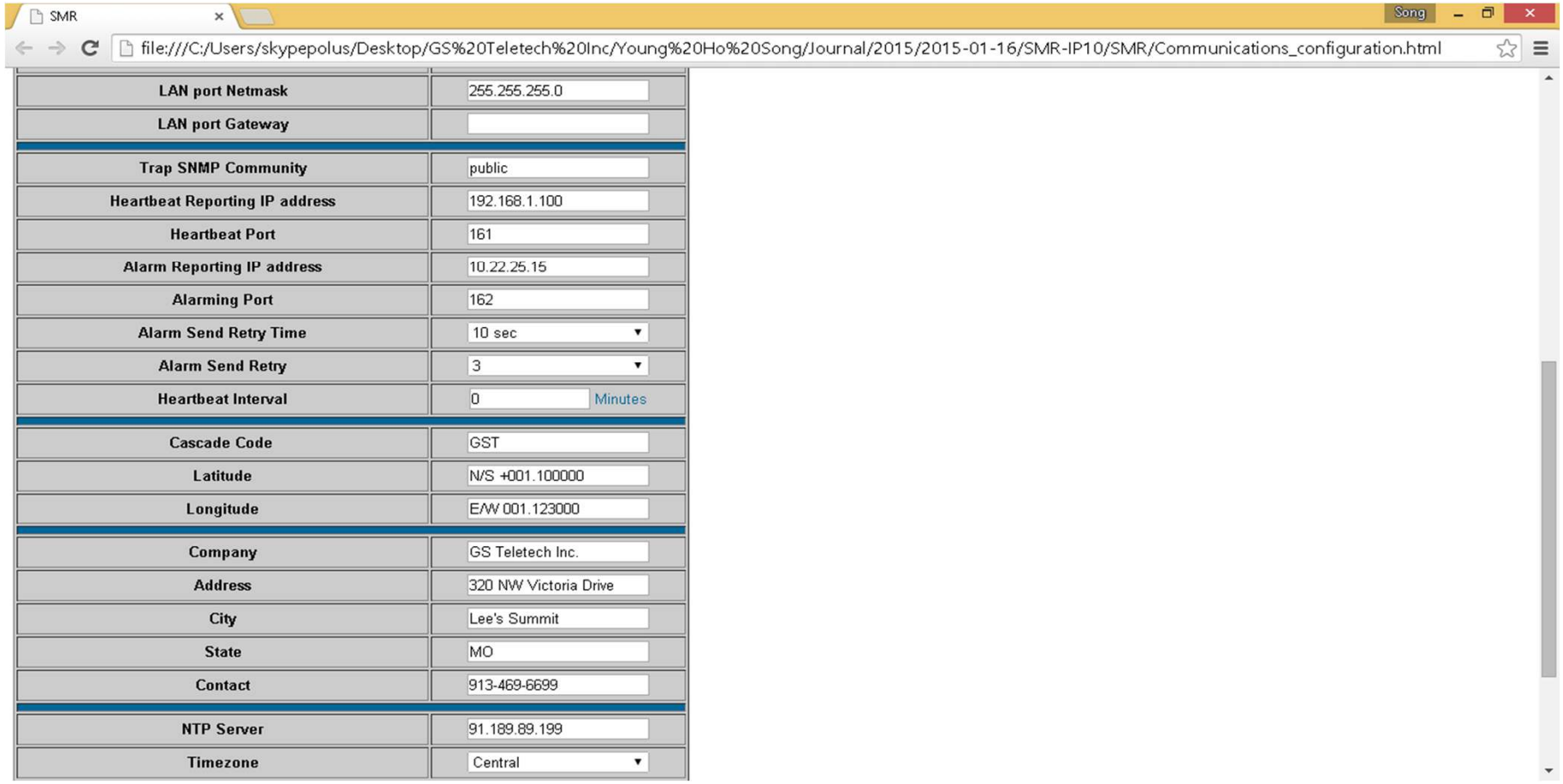


# Communication Configuration

You can configure alarming/remote access on the Communication Configuration page.

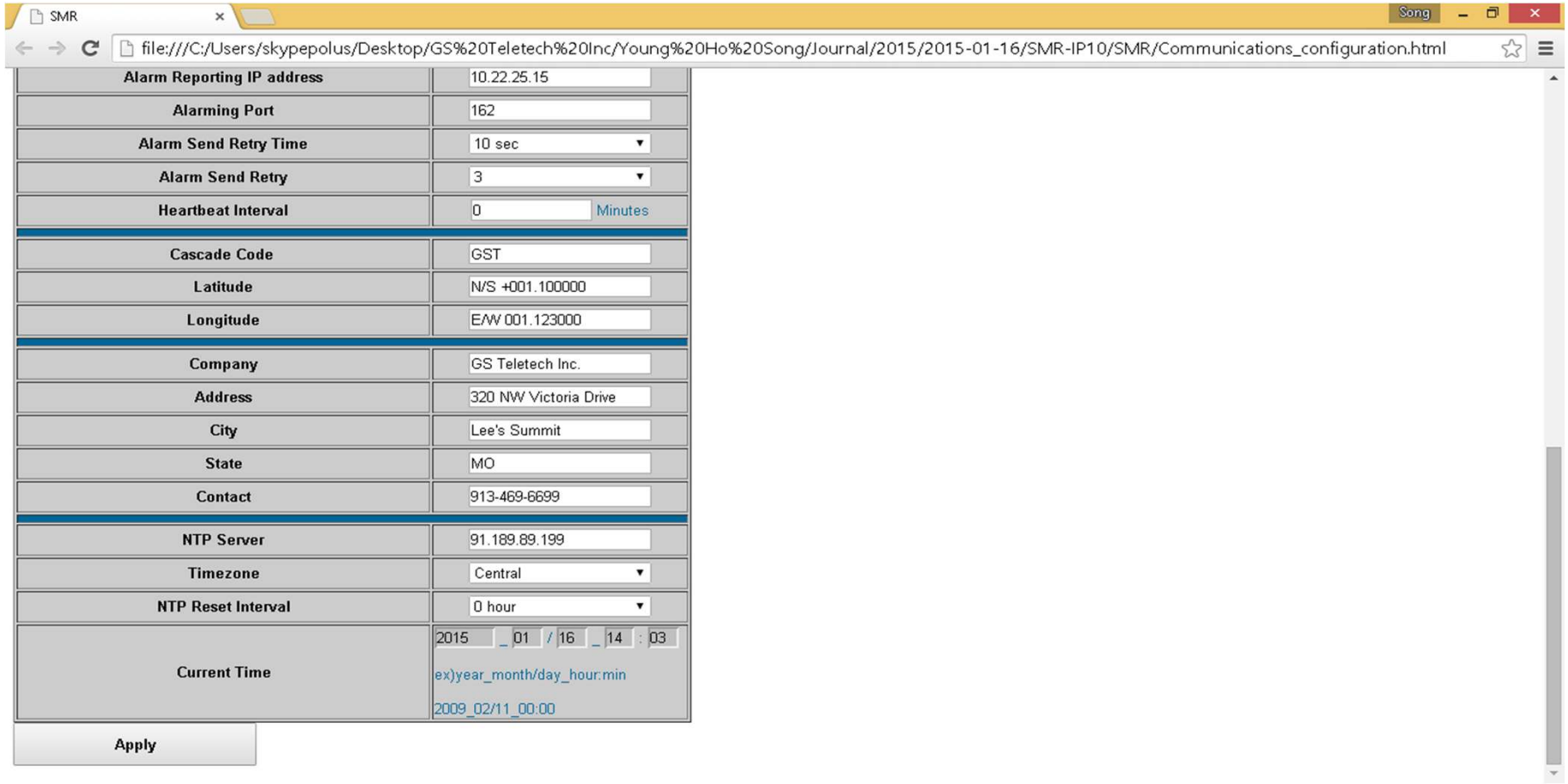
# Communication Configuration

You can configure alarming/remote access on the Communication Configuration page.



# Communication Configuration

You can configure alarming/remote access on the Communication Configuration page.



# Technical Specifications : 1900MHz band

| Parameter | | Specifications | Remark |
|---|---|---|---|
| Frequency Range (DL / UL) | | 1930 ~ 1965 MHz / 1850 ~1885 MHz | A/D/B Block |
| | | 1965 ~ 1990 MHz / 1885 ~1910 MHz | E/F/C Block |
| | | 1990 ~ 1995 MHz & 1910 ~1915MHz | G Block |
| Bandwidth | A/D/B Block | 5 or 10 or 15MHz | A/D/B+E/F/C+G (three (3) sub-bands) |
| | E/F/C Block | 5 or 10 MHz | |
| | G Block | 5 MHz | |
| Gain | DL & UL | 35~75dB ± 2dB | AGC dynamic Range: 40dB |
| Gain Flatness | DL & UL | ≤ ± 2dB | Any sub-band |
| Composite Output Power (ERP: Effective Radiated Power) | DL | +10dBm/Total | 1x/EVDO & LTE |
| | UL | +10dBm/Total | |
| Composite Output Power (EIRP: Effective Isotropic Radiated Power) | DL | +12dBm/Total | Coverage Ant. Gain: ≥ 2dBi |
| | UL | +17dBm/Total | Donor Ant. Gain: ≥ 7dBi |
| Shutdown Level | DL / UL | +15dBm ± within 2dB | Automatically shutdown less than 1 min |
| System Group Delay | DL / UL | ≤ 7usec | |

# Technical Specifications : 1900MHz band

| Parameter | | Specifications | Remark |
|---|---|---|---|
| EVM (Error Vector Magnitude)<br>Rho (Waveform Quality Factor) | LTE | Downlink: < 8%, Uplink: <12.5% | LTE & 1x/EVDO |
| | 1x/EVDO | > 0.912 | |
| In/Out VSWR | DL / UL | < 2 : 1 | |
| Roll-off | DL / UL | > 50dBc | @ F(edge)±1MHz |
| Out-of-band<br>Spurious Emissions | DL / UL | > 45dBc @ Fc±885kHz | Meet FCC Title 47 CFR<br>Part 15/22/24 |
| | | > 50dBc @ Fc±1.98MHz | |
| | | < -13dBm @Fc±2.25MHz (RBW = 1MHz) | |
| Noise Figure | UL | ≤ 7dB | Max. gain |

# Technical Specifications : 800MHz band

| Parameter | | Specifications | Remark |
|---|---|---|---|
| Frequency Range (DL / UL) | | 862 ~ 864 MHz / 817 ~ 819 MHz<br>864 ~ 869 MHz / 819 ~ 824 MHz | CDMA<br>LTE |
| Bandwidth | CDMA | 1.25 MHz | CDMA & LTE (7MHz) |
| | LTE | 5 MHz | |
| Gain | DL & UL | 35~75dB ± 2dB | AGC dynamic<br>Range:40dB |
| Gain Flatness | DL & UL | ≤ ± 2dB | LTE & CDMA |
| Composite Output Power<br>(ERP: Effective Radiated Power) | DL | +10dBm/Total | CDMA & LTE |
| | UL | +10dBm/Total | |
| Composite Output Power<br>(EIRP: Effective Isotropic Radiated Power) | DL | +10dBm/Total | Coverage Ant. Gain: ≥ 0dBi |
| | UL | +15dBm/Total | Donor Ant. Gain: ≥ 5dBi |
| Shutdown Level | DL / UL | +15dBm ± within 2dB | Automatically shutdown<br>less than 1 min |
| System Group Delay | DL / UL | ≤ 7usec | |
| Rho (Waveform Quality Factor)<br>EVM (Error Vector Magnitude) | CDMA | > 0.912 | CDMA<br>LTE |
| | LTE | Downlink: < 8%, Uplink: <12.5% | |

# Technical Specifications: 800MHz band

| Parameter | | Specifications | Remark |
|---|---|---|---|
| In/Out VSWR | DL / UL | < 2 : 1 | |
| Roll-off | DL / UL | > 65dBc | @ F(edge)±1MHz |
| Out-of-band Spurious Emissions | DL / UL | > 45dBc @ Fc±885kHz | Meet FCC Title 47 CFR Part 15/22/24 |
| | | > 50dBc @ Fc±1.98MHz | |
| | | < -13dBm @Fc±2.25MHz (RBW = 1MHz) | |
| Noise Figure | UL | ≤ 7dB | Max. gain |

# Mechanical Specifications

| Parameter | | Specifications | Remark |
|---|---|---|---|
| Connector Information | DAU | SMA (F) | IF Link Port |
| | SAU | SMA (F) | IF Link Port |
| | | SMA (F) | Coverage External Port |
| | | RJ-45 | Web UI |
| | | DC Jack | AC/DC Adaptor |
| | | Slide Switch | Power ON/OFF |
| SIZE (H x W x D) | DAU | 6.69 x 7.67 x 2.67 [Inch] | 170x195x68 [mm] |
| | SAU | 9.64 x 5.90 x 2.20 [Inch] | 245x150x56 [mm] |
| Weight | DAU | < 3.52 [lbs.] | 1.6 [Kgs] |
| | SAU | < 3.52 [lbs.] | 1.6 [Kgs] |
| User Interface | Local GUI | Web-UI | |
| Operating Temperature | | +14° F ~ +122° F (-10°C ~ +50°C) | |
| Humidity | | 0% ~ 95% | |
| Power Consumption | DAU & SAU | < 36W | External AC/DC Adaptor 19V/3.5A |

# Link Cable Specifications

| No | Parameter | Specifications | Remark |
|---|---|---|---|
| 1 | Impedance | 50Ω (Nominal) | |
| 2 | Frequency | 10 MHz ~ 350 MHz | |
| 3 | V.S.W.R | 1.2 : 1 | |
| 4 | Insertion Loss | -3.5dB ~ -25dB | |
| 5 | Contact Resistance | Center Contact: 3.0mΩ (Max.) | |
| | | Outer Contact: 2.5mΩ (Max.) | |
| 6 | Insulation Resistance | 5,000 MΩ (Min.) | |
| 7 | Dielectric Withstanding Voltage | 750 Vrms | |
| 8 | DC Resistance | 4.0~5.0 Ω | |
| 9 | Link Distance | 164ft(50m) | |

# Troubleshooting

| No | Item | Description | Troubleshooting |
|---|---|---|---|
| 1 | Alarm | Low Input Signal | Check the 'DL RSSI' signal level on the WebGUI.<br>Input signal level should be more than -85dBm (Recommendation)<br>If the signal level is not strong enough, move the DAU to another position to receive stronger signals from BTS |
| 2 | Alarm | Isolation | Caused by the lack of isolation between DAU and SAU.<br>Change position of DAU to improve isolation between DAU and SAU<br><br>✓ Isolation value ≤ Gain + 15dB |
| 3 | Alarm | Isolation Re-Check | This is a self-checking stage when the isolation between DAU built-in antenna and SAU built-in antenna is not enough. |
| 4 | Alarm | Low Input Voltage | DAU needs to have more than +12VDC of Input DC power.<br>Check connection of Link Cable to both DAU and SAU.<br>Check DC output level at DC jack of AC/DC adaptor by Multi-meter (Testing tool),<br>Its value shall be 19VDC±1V. |
| 5 | Alarm | Link Fail | Check connection of Link cable to both DAU and SAU.<br>Check cable DC Resistance.<br><br>✓ Normal DC Resistance: 4.0 Ω ~5.0 Ω |
| 6 | Alarm | Shutdown | Check input signal level of DAU site.<br>If Input signal level is stronger than -25dBm (RSSI on WebGUI), then DAU's position.<br><br>✓ Input signal level range: -25dBm above<br><br>Check ALC status on WebGUI and turn on ALC if it is off. |
| 7 | Alarm | PLL Fail | Replace installed SMR-IP10 with the new one. |

# GST Technical Support

## Phone

Toll Free: 1-866-9 GST USA

Phone: 913-469-6699

## Write

GS Teletech Inc.

320 NW Victoria Drive

Lee's Summit, MO 64086 , USA

## Product Information and Technical Assistance

www.gsteletechinc.com

support@gsteletechinc.com

*Specifications and features of this installation guide are subject to change without notice or obligation.*