

Technicians Installation & Operation Guide

**Model: SMR-IP10-D
SMR-IP10-S**

Version 1.0

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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.

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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)



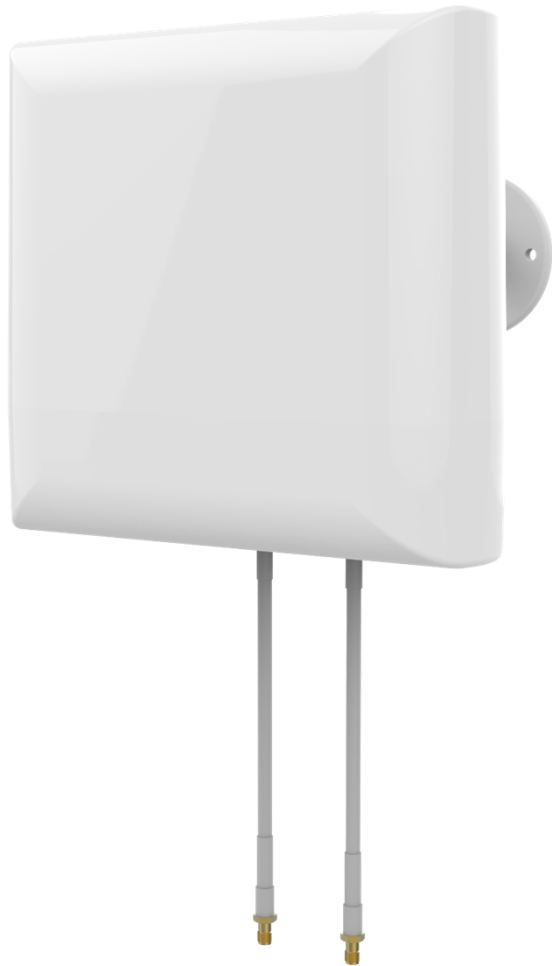
Contents of Box (2/2)

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) • 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



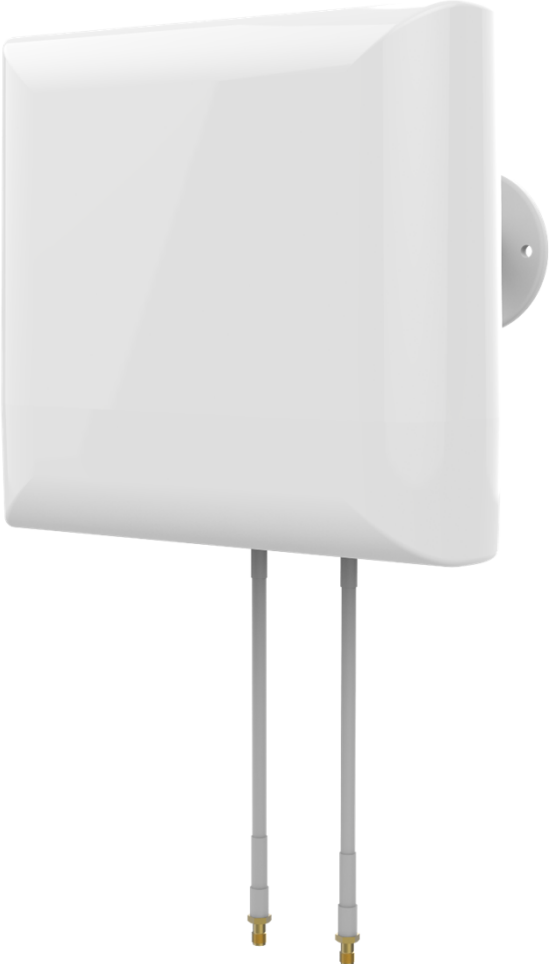
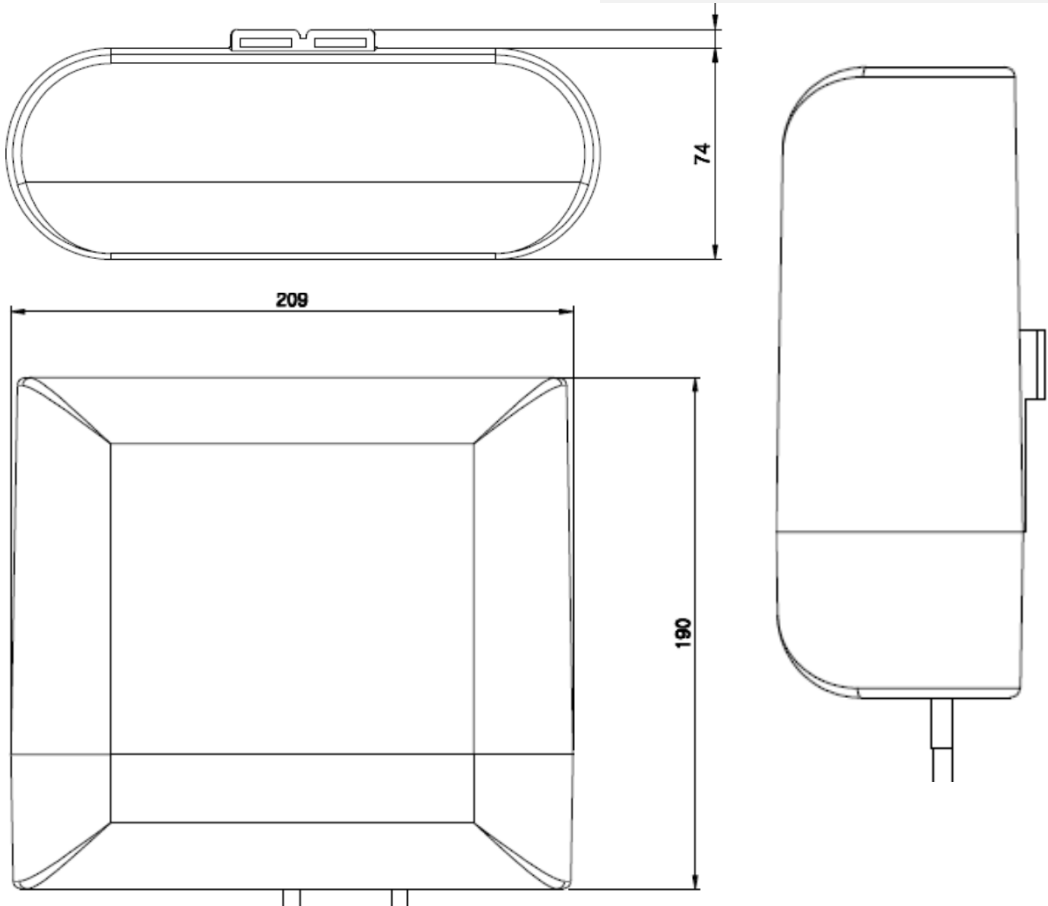
Donor Antenna Unit (DAU)

SMR-IP10-S

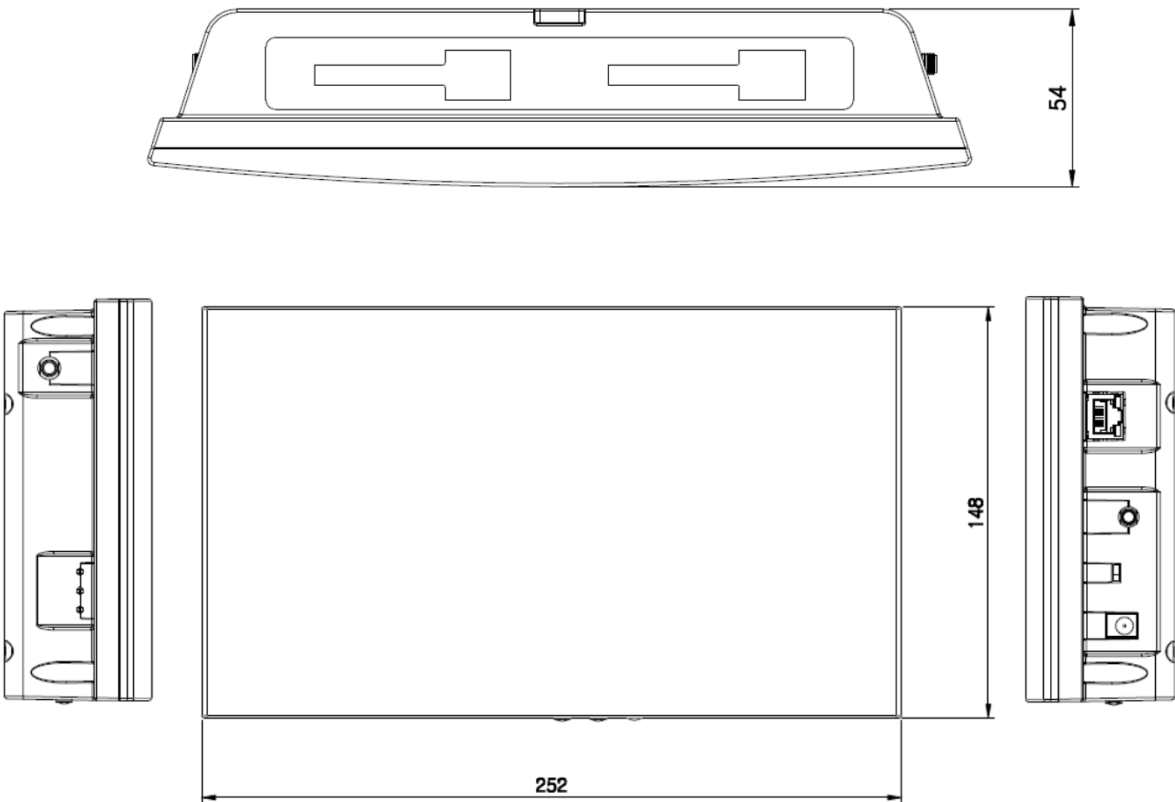


Service Antenna Unit (SAU)

Repeater Design: Donor Antenna Unit (DAU)

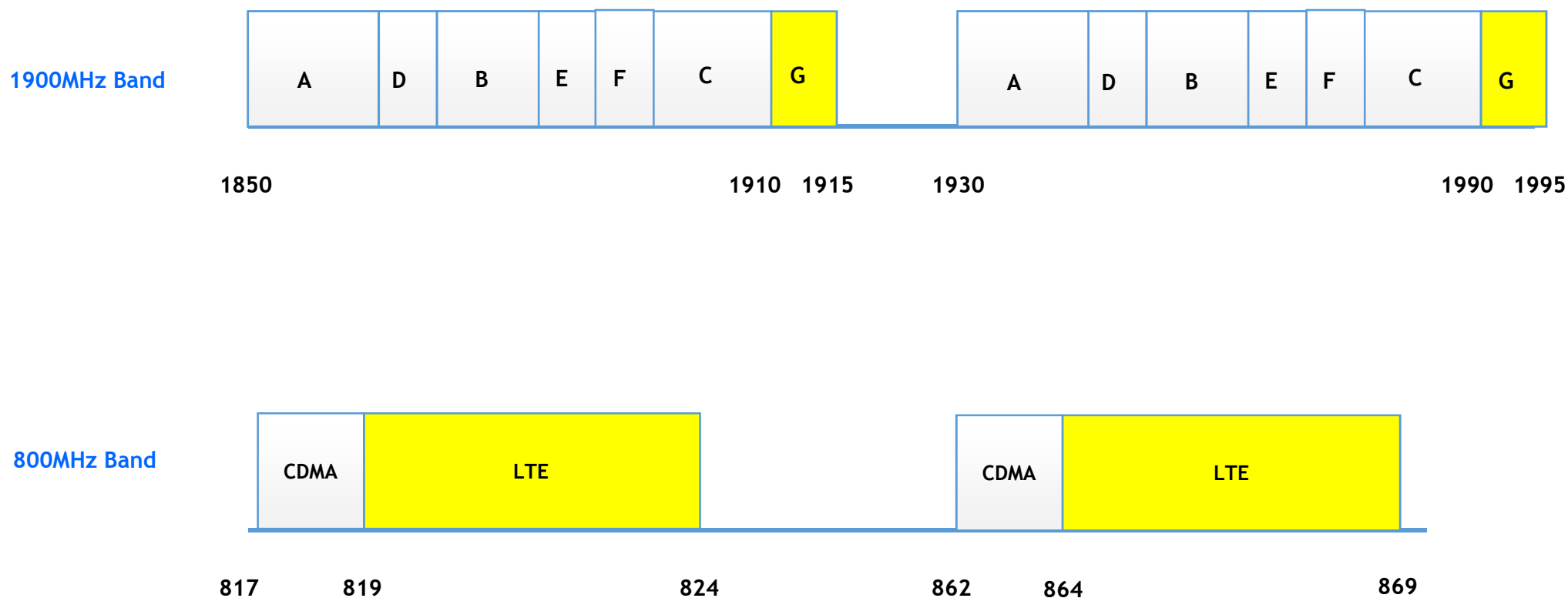
DAU (SMR-IP10-D)	Dimensions
	209(W) X 190(H) X 74(D) [mm] 8.2(W) X 7.4(H) X 2.9(D) [in] 

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]

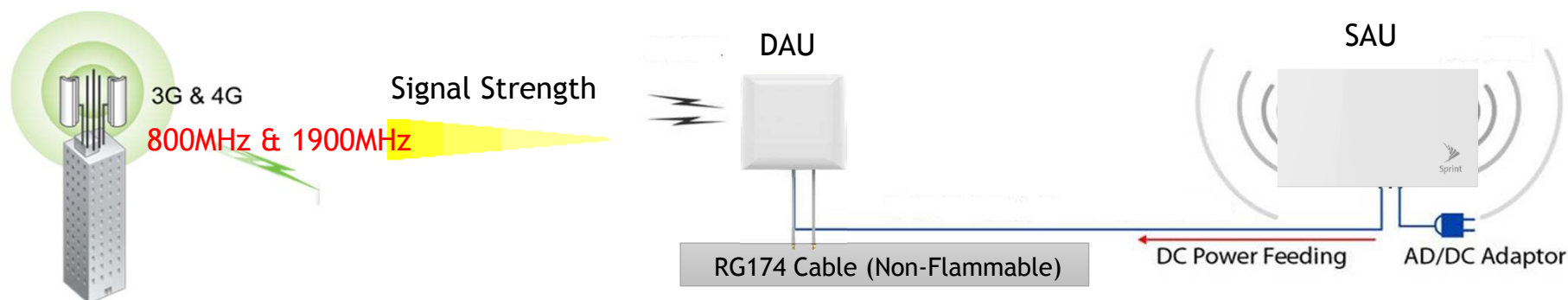
800MHz & 1900MHz Frequency Bands

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

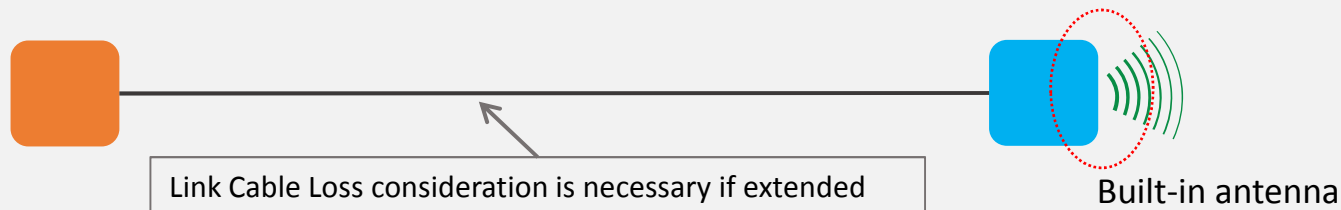


Divider (Splitter)

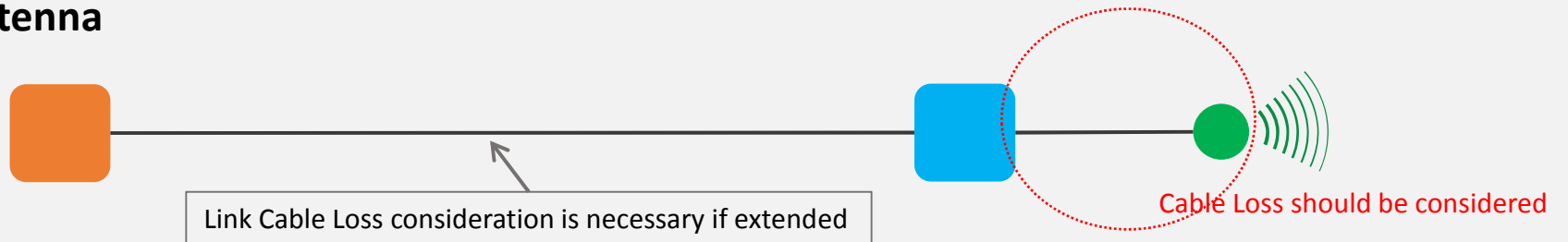


Service Antenna

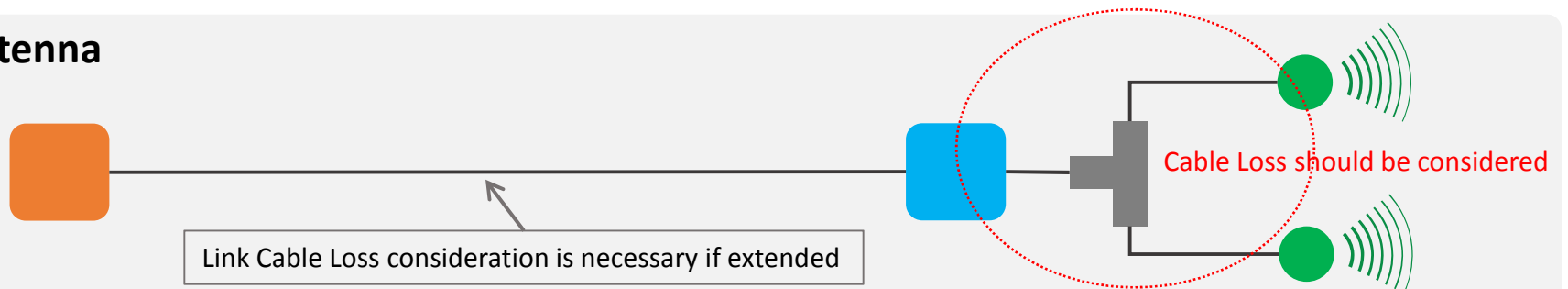
Basic Structure (Recommended)



1 External Antenna



2 External Antenna



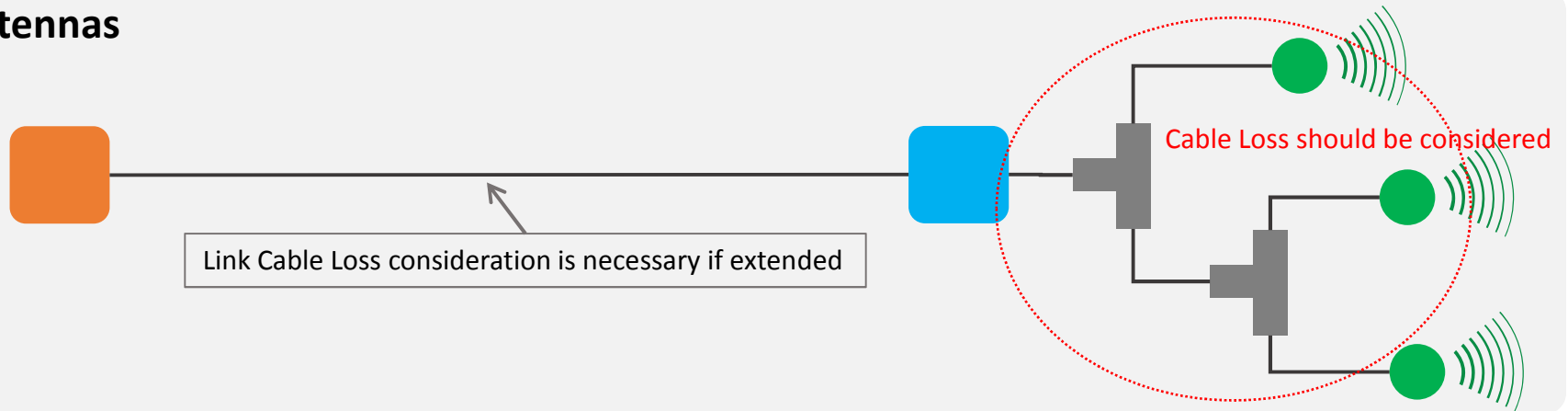
Installation Guideline

Application

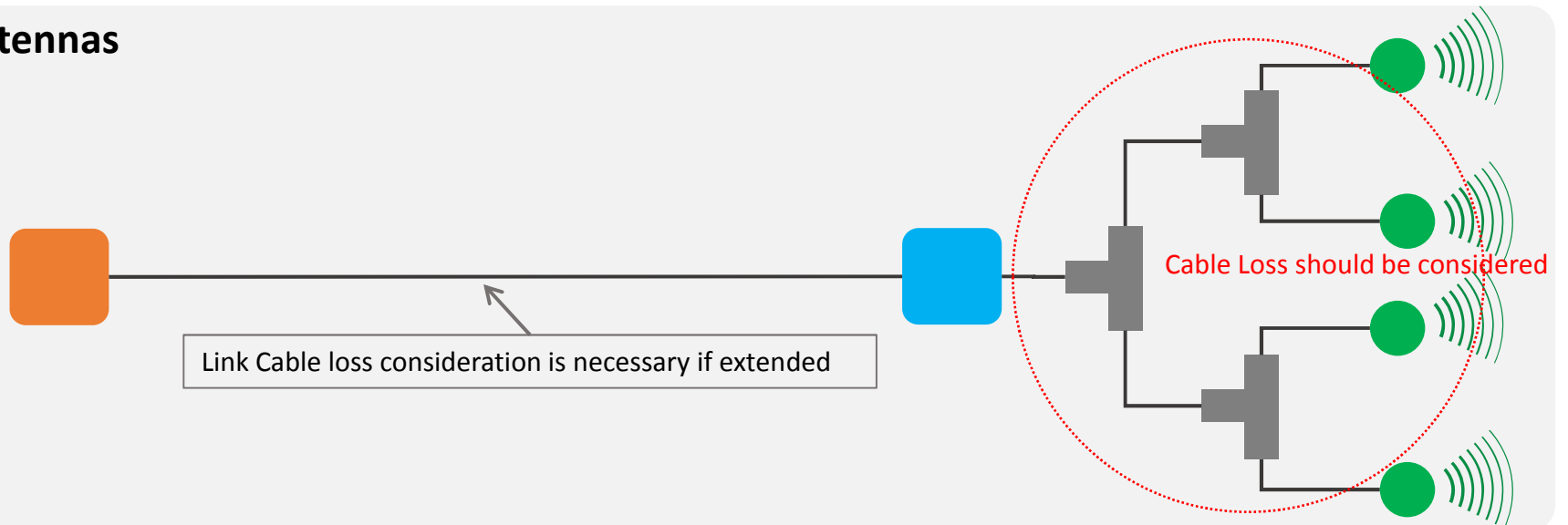


When using 4 dividers, the following architecture will be applicable and the divider shall stay the same.
When using 3 dividers, the longest cable should be connected to the first divider for equalization of the EIRP)

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)
$\geq -75\text{dBm}$	$\leq 15\text{m}$	$\leq 25\text{dB}$
	$\leq 30\text{m}$	$\leq 20\text{dB}$
$\geq -80\text{dBm}$	$\leq 15\text{m}$	$\leq 20\text{dB}$
	$\leq 30\text{m}$	$\leq 15\text{dB}$
$\geq -85\text{dBm}$	$\leq 15\text{m}$	$\leq 20\text{dB}$
	$\leq 30\text{m}$	$\leq 10\text{dB}$
$\geq -90\text{dBm}$	$\leq 15\text{m}$	$\leq 15\text{dB}$
	$\leq 30\text{m}$	$\leq 5\text{dB}$
$\geq -95\text{dBm}$	$\leq 15\text{m}$	$\leq 5\text{dB}$
	$\leq 30\text{m}$	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

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]

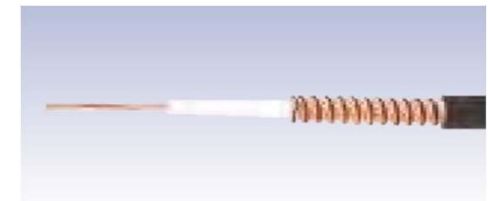
Cable Type	Link Distance	Remark
1/8 inch Coaxial Cable	50m (164ft) ~ 100m (328ft)	Approximately
1/4 inch Coaxial Cable	100m (328ft) ~ 180m (590ft)	Approximately
3/8 inch Coaxial Cable	180m (590ft) ~ 270m (885ft)	Approximately



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	<i>Serving Physical Cell Identity</i>	<i>Serving Physical Cell Identity</i>
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	<i>Serving Physical Cell Identity</i>
RSSI (dBm)	N/A	-95dBm or above
Ec/Io (dB)	N/A	-12dB or above
LTE	800 MHz	1900 MHz
PCI	<i>Serving Physical Cell Identity</i>	<i>Serving Physical Cell Identity</i>
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	<i>Serving Physical Cell Identity</i>	<i>Serving Physical Cell Identity</i>
RSSI (dBm)	-95dBm or less	-95dBm or less
EVDO	800 MHz	1900 MHz
PN	N/A	<i>Serving Physical Cell Identity</i>
RSSI (dBm)	N/A	-95dBm or less
LTE	800 MHz	1900 MHz
PCI	<i>Serving Physical Cell Identity</i>	<i>Serving Physical Cell Identity</i>
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	<i>Serving Physical Cell Identity</i>	<i>Serving Physical Cell Identity</i>
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	<i>Serving Physical Cell Identity</i>
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	<i>Serving Physical Cell Identity</i>	<i>Serving Physical Cell Identity</i>
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

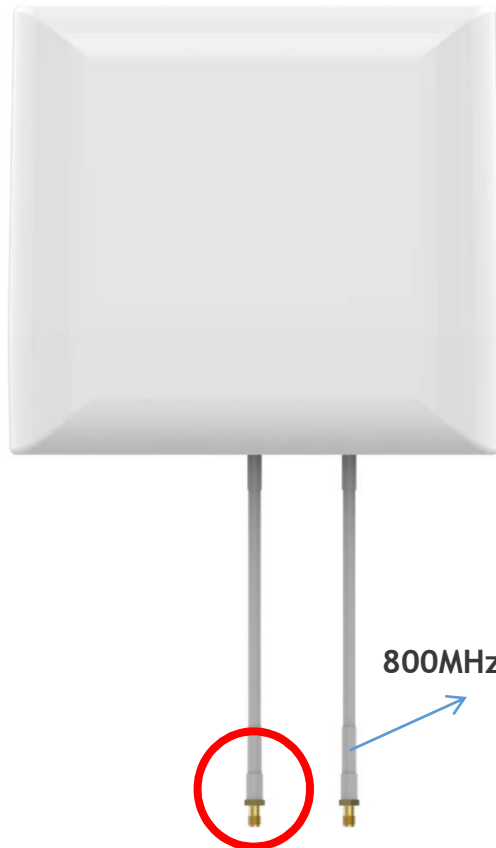
Link Cable Ports



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



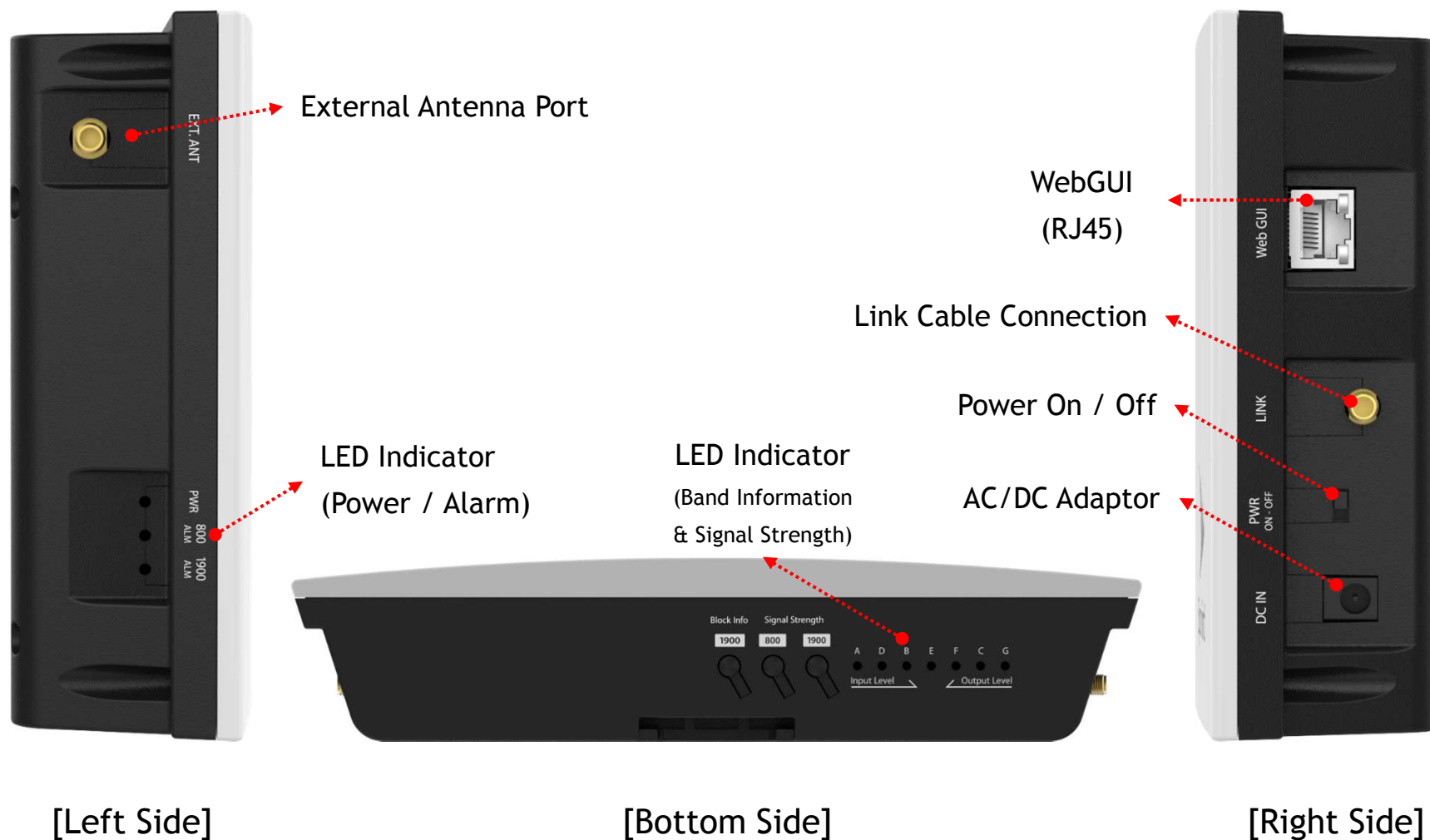
[DAU Bottom Side]

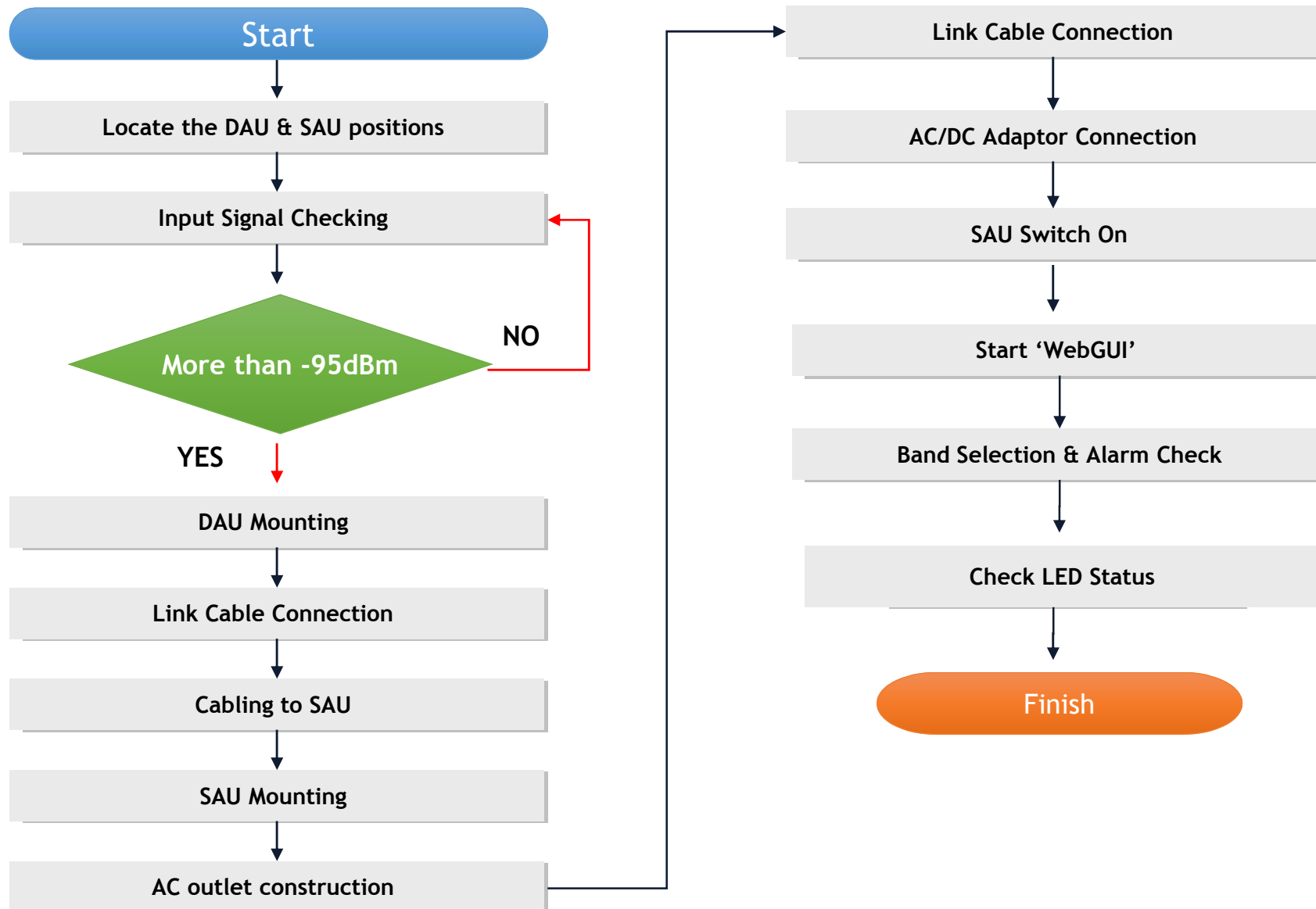
No	Port	Connector
1	Link Cable Port	SMA (F)
2	800MHz Antenna Port (If required)	SMA (F)
2	Both 800MHz and 1900MHz Antenna Port (if extremely required)	SMA (F)

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

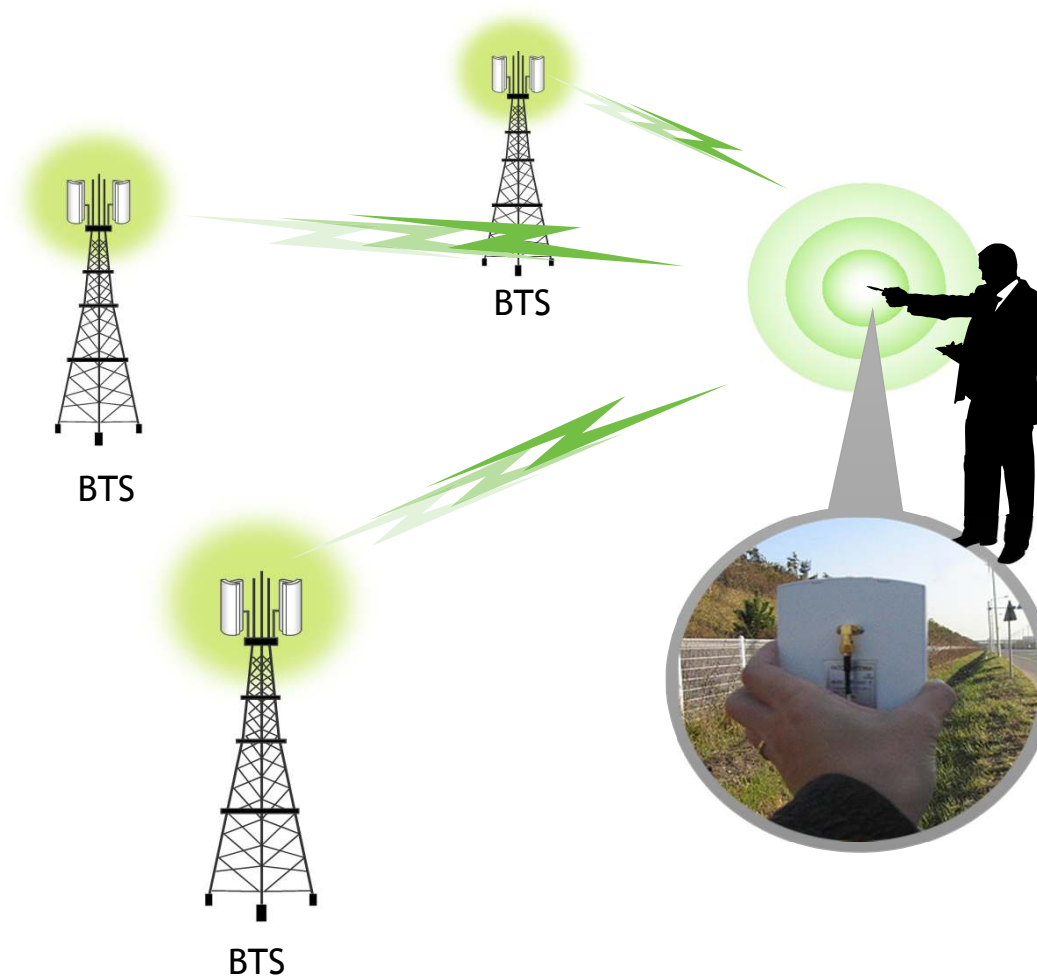




Positioning of DAU

Search for the proper BTS location

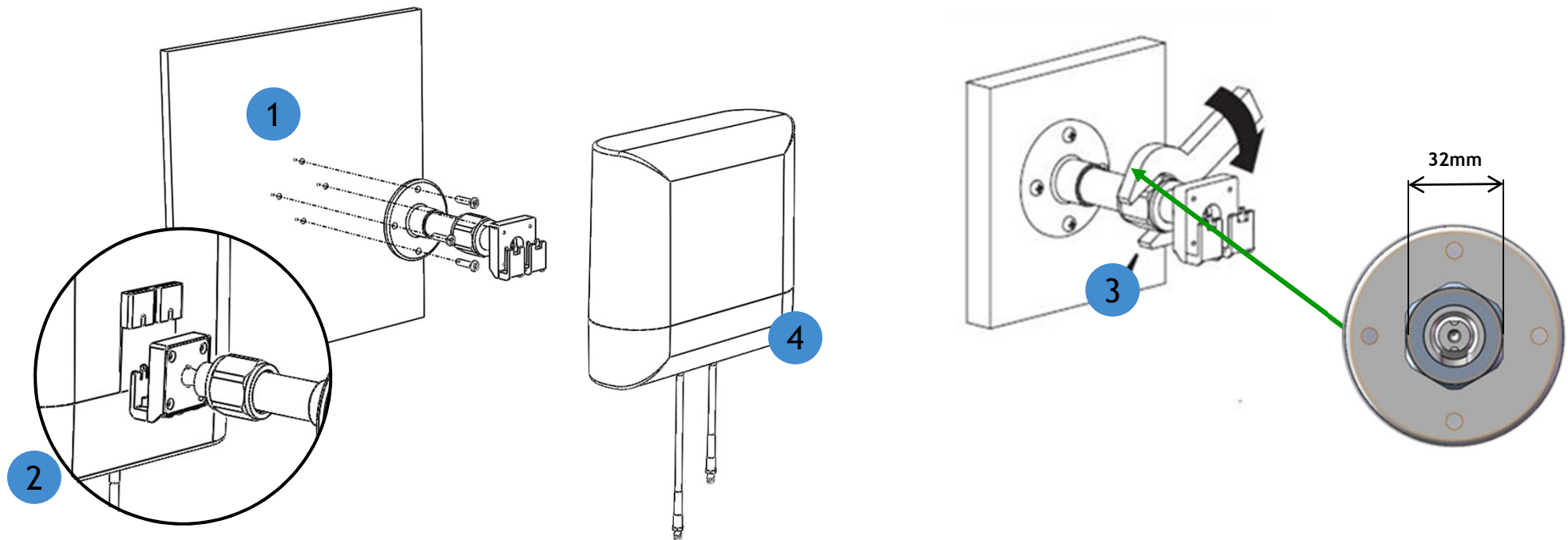
Please refer to 'Measurement Criteria' .



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.

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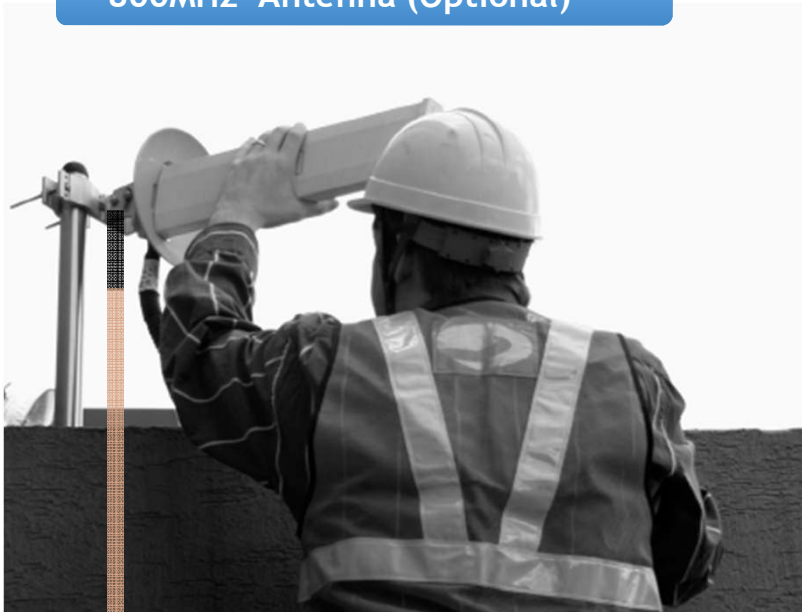
If required

Installed DAU and 800MHz External antenna

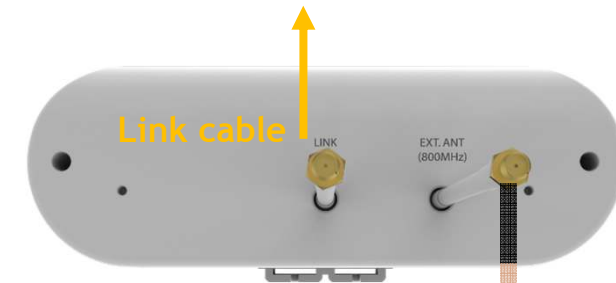
※ Depending on Base Station's location for both 800MHz and 1900Mhz.

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

800MHz Antenna (Optional)



[DAU Bottom]



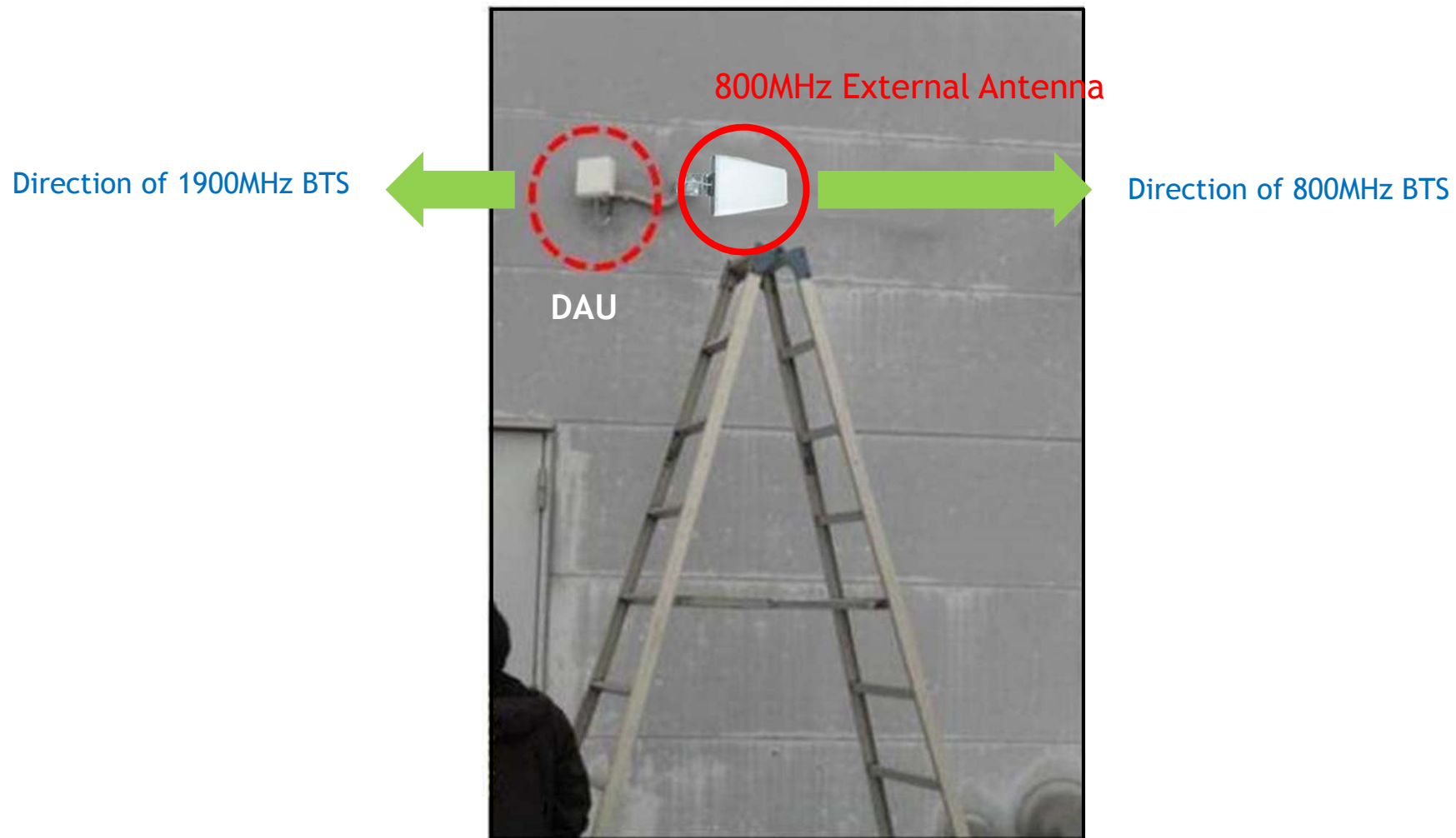
Jumper cable (Optional)

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

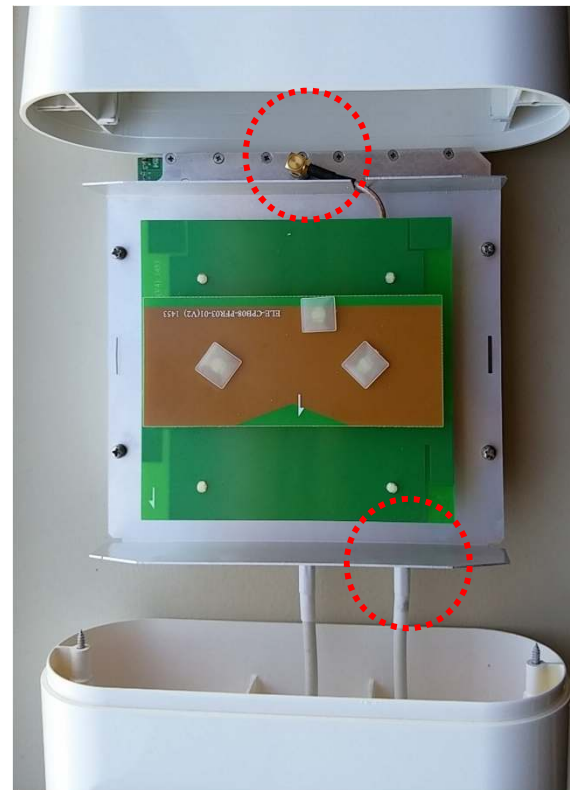
If necessary

Jumper cable connection for adapting both 800MHz and 1900MHz

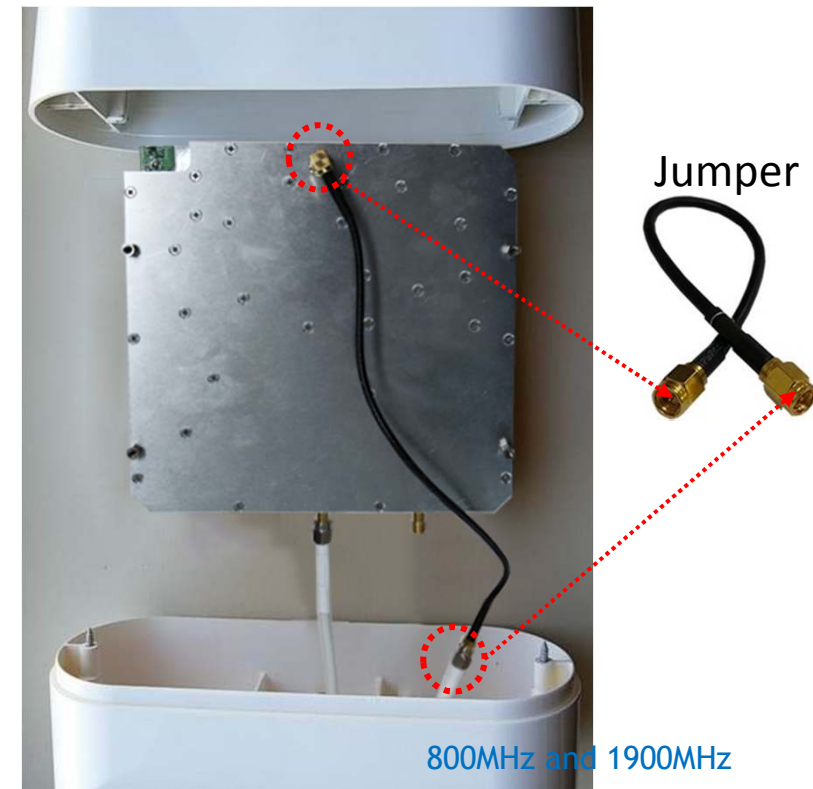
The Dual band antenna port for both 800MHz and 1900MHz should be connected with a jumper cable. Please remove Antenna kit attached on DAU module.



1. Open DAU.



2. Loosen screws



3. Connect jumper cable.

Upgrading Existing Repeater With SMR-IP10

■ Replacement of existing repeater

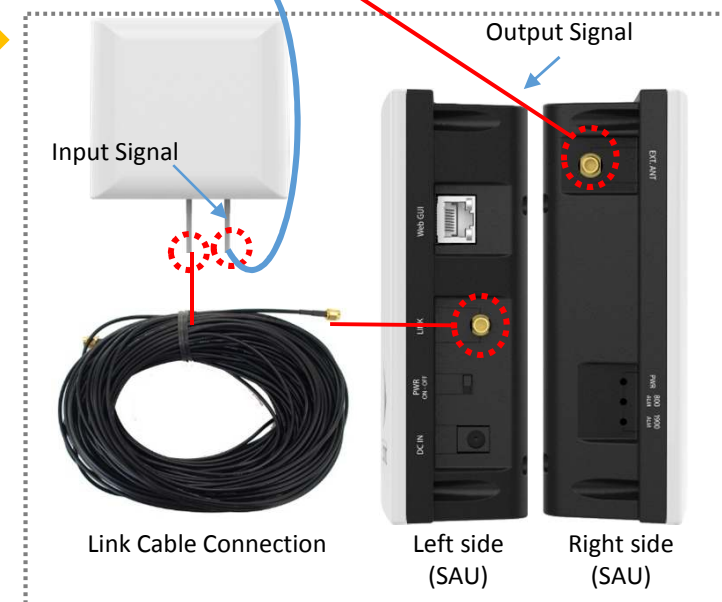
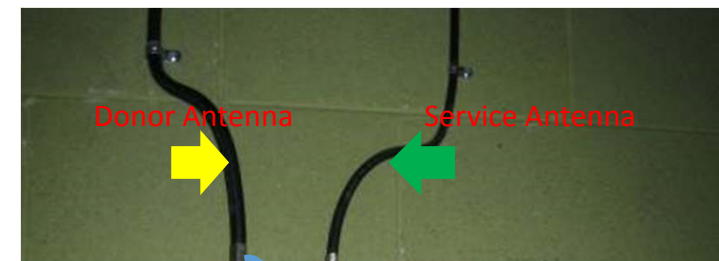
If necessary

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



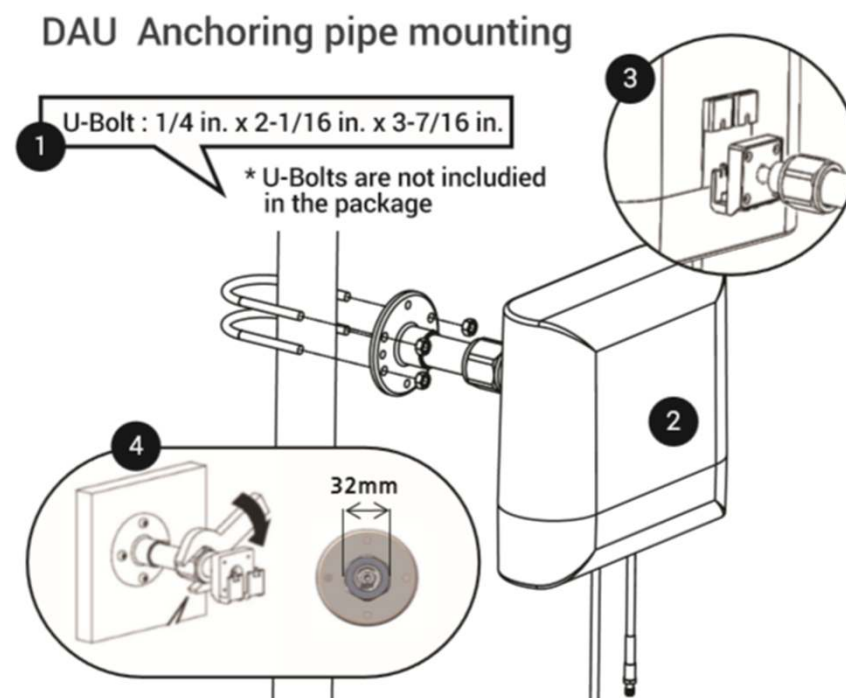
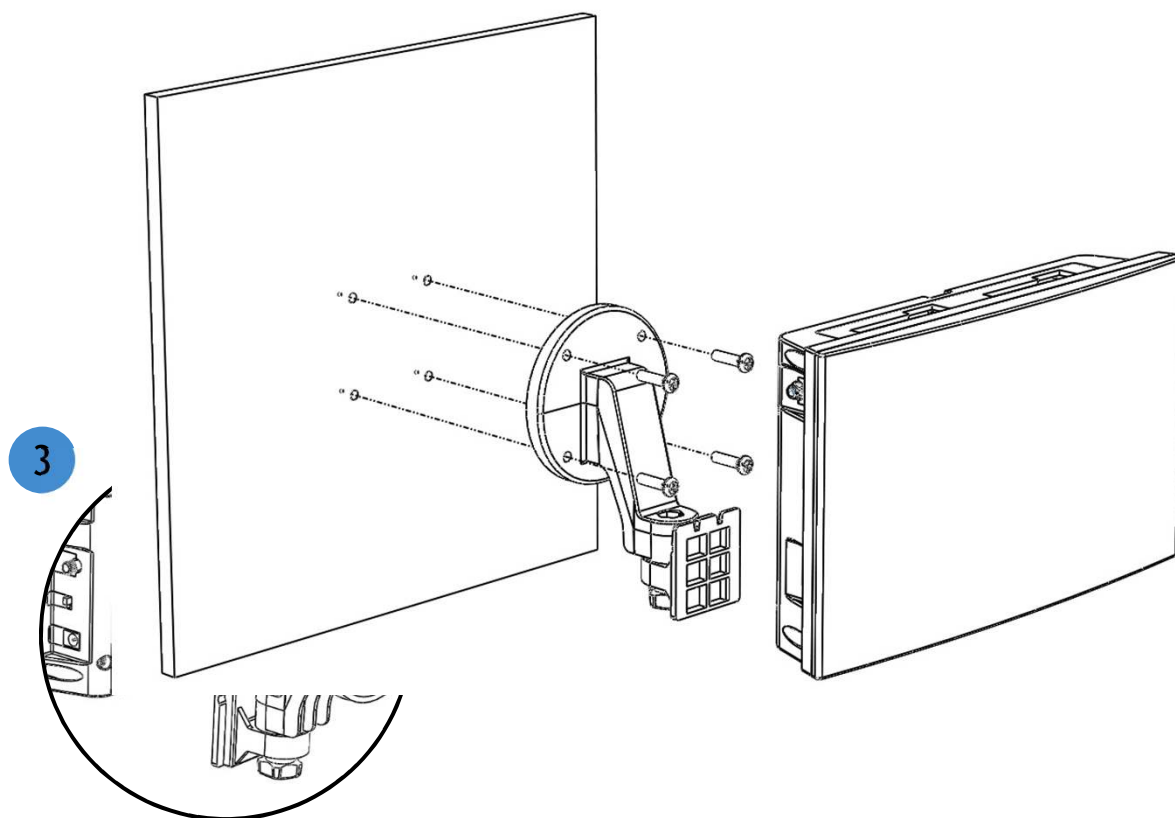
Existing Donor Antenna for both 800MHz and 1900MHz



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.

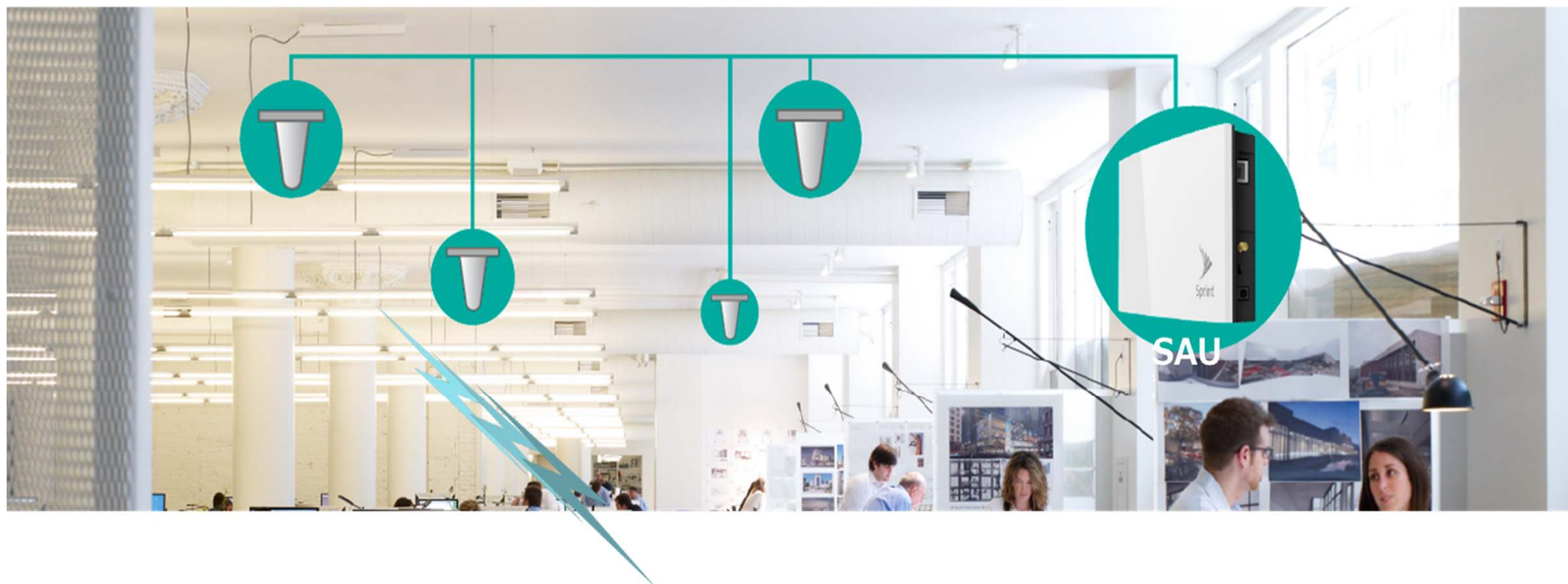


Service and Quality

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Service Quality Measurement

Please refer to 'Measurement Criteria'



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

Power On / Plug & Play



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

1900MHz Band Block Selection

Service Band Information

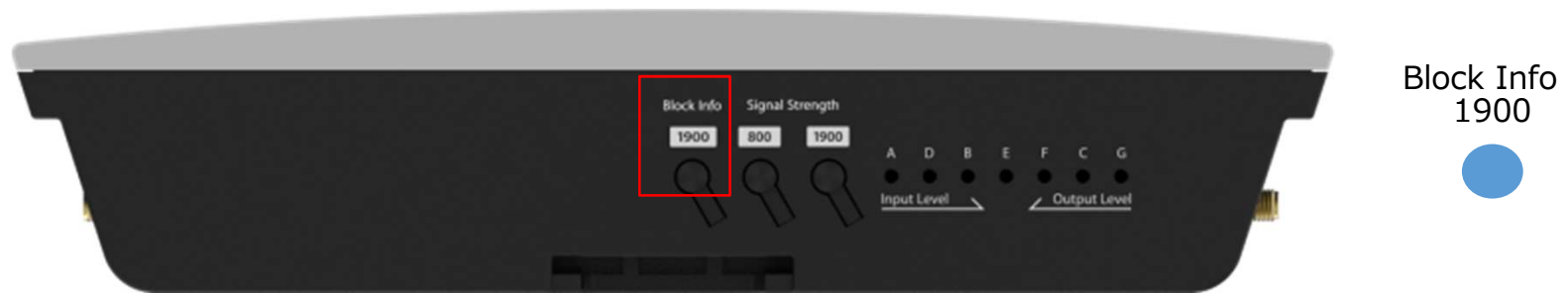


IP: 192.168.1.1

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'.



* 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

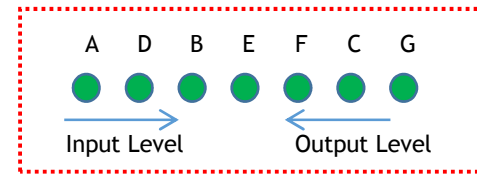
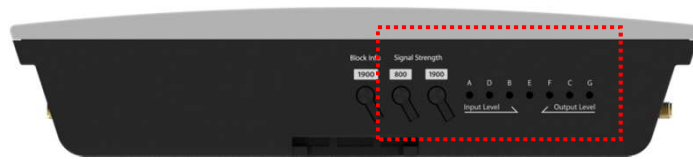
LED Display Info

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

LED Indicator

GS Teletech, Inc.

Signal Strength Indicator

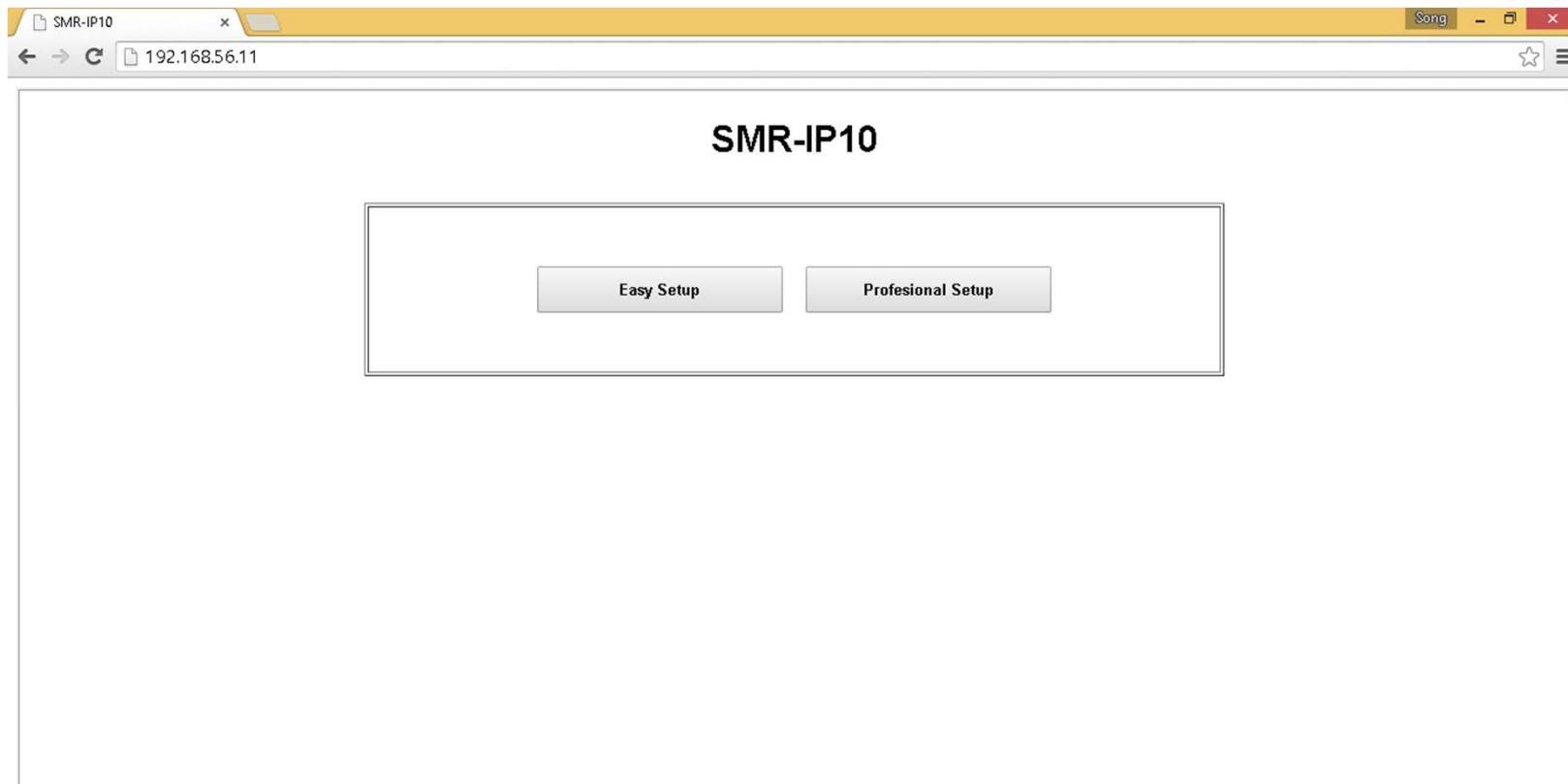


* LED will be off after 30 seconds automatically

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

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.

IP Address: **192.168.1.1**



SMR-IP10 x Song - + x

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

The screenshot shows a web browser window titled "GST SMR" with a single tab. The address bar displays the file path: `file:///C:/Users/skypepolus/Desktop/GS%20Teletech%20Inc/Young%20Ho%20Song/Journal/2015/2015-01-16/SMR-IP10/SMR/login.html`. The main content area features a central gray box with the following elements:

- SMR System** (Large heading)
- Alarm** and **Shutdown** status indicators, each accompanied by a green square.
- Login** (Large heading)
- Configuration fields on the right:
 - Cascade Code:
 - Serial No:
 - SW Version:
 - Lat / Long:

Below the gray box, there is a login section with three fields:

- User Name**
- Password**
- Login** button

RF Status: 1900MHz band.

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

The screenshot shows the SMR-IP10 web interface. The browser address bar displays `192.168.56.11/cgi-bin/1900rf_status.cgi`. The page layout includes a left-hand navigation menu with the following items: # Logout, # Logs, # Communications Configuration, # User Management, # Troubleshooting, # Remote Software Upgrade, # System Reset, # Factory Default Setting, # RF Status (highlighted), # RF Configuration, # Alarm Configuration, # Alarm Logs, # Configuration Transfer, and # Modem Activation.

The main content area is titled "SMR-IP10 System" and "1900 RF Status". It contains several status indicators and input fields:

- Alarm** and **Shutdown** status, both indicated by green squares.
- Cascade Code:** An empty input field.
- Serial No:** An empty input field.
- SW Version:** A text field containing "00.21".
- Lat / Long:** An empty input field.

Below this information is a table showing the status of various RF bands:

A/D/B Band						
A1	A2	A3	D	B1	B2	B3
☐	☒	☒	☒	☐	☐	☐

E/F/C Band				
E	F	C1	C2	C3
☒	☒	☐	☐	☐

G Band	
G	
☒	

At the bottom of the page, there is a summary section titled "1900 RF Status" with a "Configuration" button next to it.

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.

SMR-IP10 System

Alarm ☒ Shutdown ☒

800 RF Configuration

Cascade Code:

Serial No:

SAW Version: 00.21

Lat / Long:

External Antenna

☒

800 Band

Lower 2M CDMA ☐ Lower 2M CDMA + Upper 5M LTE ☒

800 RF Configuration

Isolation Recheck

Downlink Composite Output	dBm	Uplink Composite Output	dBm
Downlink Gain	dB	Uplink Gain	dB
Downlink RSSI	dBm		
Downlink User Attenuation	dB	Uplink User Attenuation	dB

RF Configuration

RF changes can be made on the RF configuration page.

The screenshot shows a web browser window with the address bar displaying `192.168.56.11/cgi-bin/800rf_configuration.cgi`. The page contains several configuration sections:

Downlink Gain	0	dB	Uplink Gain	0	dB
Downlink RSSI	0	dBm			
Downlink User Attenuation	0	dB	Uplink User Attenuation	0	dB
Downlink Amplifier	ON		Uplink Amplifier	ON	
ALC Power Limit	0	dBm	Gain Balance Control	OFF	
Gain Control	USER		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

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		

Apply

Alarm Configuration

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

The screenshot shows the '1900 Alarm Configuration' page for the 'SMR-IP10 System'. The page includes a sidebar menu with options like Logout, Logs, Communications Configuration, User Management, Troubleshooting, Remote Software Upgrade, System Reset, Factory Default Setting, RF Status, RF Configuration, Alarm Configuration (selected), Alarm Logs, Configuration Transfer, and Modem Activation. The main content area displays system information such as Cascade Code, Serial No., SAW Version (00.21), and Lat / Long. Below this, there is a section for 'Report Alarms' with a dropdown set to 'OFF' and a 'Delay Alarm Report' of 5 minutes. A table lists five alarm types: 1900 DL SHUTDOWN, 1900 UL SHUTDOWN, 1900 ISOLATION, 1900 PLL, and 1900 LOW POWER. Each alarm is shown with its state (green), active status (Enabled), SNMP Map (RF Power, VSWR, RSSI), and sent time (Mon Apr 6 10:47:41). An 'Apply' button is located at the bottom of the table.

No	Name	State	Active	SNMP Map	Sent Time
0	1900 DL SHUTDOWN	 	Enabled ▼	RF Power ▼	Mon Apr 6 10:47:41
1	1900 UL SHUTDOWN	 	Enabled ▼	RF Power ▼	Mon Apr 6 10:47:41
2	1900 ISOLATION	 	Enabled ▼	VSWR ▼	Mon Apr 6 10:47:41
3	1900 PLL	 	Enabled ▼	RF Power ▼	Mon Apr 6 10:47:41
4	1900 LOW POWER	 	Enabled ▼	RSSI ▼	Mon Apr 6 10:47:41

Apply

Alarm Logs

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

Number	Name	State	Sent Time
1	Over Temperature@1900 DL Shutdown		1/16/2015 03:37PM CST
2	Over Temperature@1900 UL Shutdown		1/16/2015 03:37PM CST
3	RF Power@1900 A/D/B SAU PLL		1/16/2015 03:37PM CST

Communication Configuration

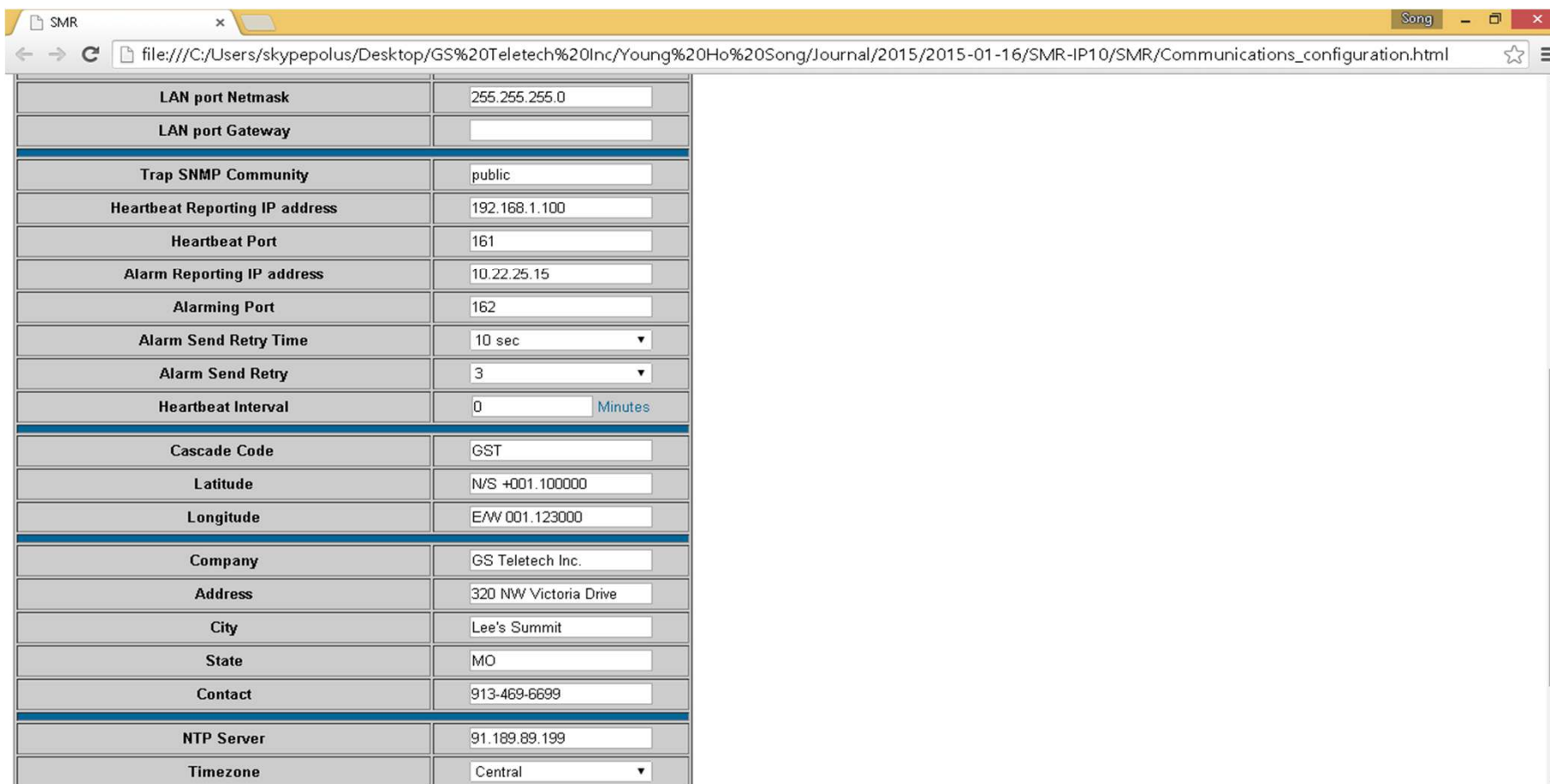
You can configure alarming/remote access on the Communication Configuration page.

# Logout	SMR-IP10 System Alarm ■ Shutdown ■ Communications Configuration	Cascade Code:	
# Logs		Serial No:	
# <u>Communications Configuration</u>		SAW Version:	00.21
# User Management		Lat / Long:	
# Troubleshooting			
# Remote Software Upgrade			
# System Reset			
# Factory Default Setting			
# RF Status			
# RF Configuration			
# Alarm Configuration			
# Alarm Logs			
# Configuration Transfer			
# Modem Activation			

Active LAN IP address	(null)
LAN port MAC address	08:00:27:48:cb:f3
LAN port Obtainan IP address automatically	☐ DHCP ☒ STATIC
LAN port DHCP Server	☒ OFF ☐ ON
LAN port IP address	0.0.0.0
LAN port Netmask	0.0.0.0
LAN port Gateway	0.0.0.0
Trap SNMP Community	

Communication Configuration

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



LAN port Netmask	255.255.255.0
LAN port Gateway	
Trap SNMP Community	public
Heartbeat Reporting IP address	192.168.1.100
Heartbeat Port	161
Alarm Reporting IP address	10.22.25.15
Alarming Port	162
Alarm Send Retry Time	10 sec
Alarm Send Retry	3
Heartbeat Interval	0 Minutes
Cascade Code	GST
Latitude	N/S +001.100000
Longitude	E/W 001.123000
Company	GS Teletech Inc.
Address	320 NW Victoria Drive
City	Lee's Summit
State	MO
Contact	913-469-6699
NTP Server	91.189.89.199
Timezone	Central

Communication Configuration

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

Alarm Reporting IP address	10.22.25.15
Alarming Port	162
Alarm Send Retry Time	10 sec
Alarm Send Retry	3
Heartbeat Interval	0 Minutes
Cascade Code	GST
Latitude	N/S +001.100000
Longitude	E/W 001.123000
Company	GS Teletech Inc.
Address	320 NW Victoria Drive
City	Lee's Summit
State	MO
Contact	913-469-6699
NTP Server	91.189.89.199
Timezone	Central
NTP Reset Interval	0 hour
Current Time	2015 _ 01 / 16 _ 14 : 03 ex)year_month/day_hour:min 2009_02/11_00:00

Apply

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 $\pm$ 2dB	AGC dynamic Range: 40dB
Gain Flatness	DL & UL	$\leq \pm 2$ dB	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: ≥ 2 dBi
	UL	+17dBm/Total	Donor Ant. Gain: ≥ 7 dBi
Shutdown Level	DL / UL	+15dBm $\pm$ within 2dB	Automatically shutdown less than 1 min
System Group Delay	DL / UL	≤ 7 usec	

Technical Specifications : 1900MHz band

Parameter		Specifications	Remark
EVM (Error Vector Magnitude) 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 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

Technical Specifications : 800MHz band

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

Technical Specifications: 800MHz band

Parameter		Specifications	Remark
In/Out VSWR	DL / UL	$< 2 : 1$	
Roll-off	DL / UL	$> 65\text{dBc}$	@ $F(\text{edge}) \pm 1\text{MHz}$
Out-of-band Spurious Emissions	DL / UL	$> 45\text{dBc} @ F_c \pm 885\text{kHz}$	Meet FCC Title 47 CFR Part 15/22/24
		$> 50\text{dBc} @ F_c \pm 1.98\text{MHz}$	
		$< -13\text{dBm} @ F_c \pm 2.25\text{MHz} (\text{RBW} = 1\text{MHz})$	
Noise Figure	UL	$\leq 7\text{dB}$	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. Input signal level should be more than -85dBm (Recommendation) 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. Change position of DAU to improve isolation between DAU and SAU ✓ Isolation value $\leq$ 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. Check connection of Link Cable to both DAU and SAU. Check DC output level at DC jack of AC/DC adaptor by Multi-meter (Testing tool), Its value shall be 19VDC$\pm$1V.
5	Alarm	Link Fail	Check connection of Link cable to both DAU and SAU. Check cable DC Resistance. ✓ Normal DC Resistance: 4.0 Ω ~5.0 Ω
6	Alarm	Shutdown	Check input signal level of DAU site. If Input signal level is stronger than -25dBm (RSSI on WebGUI), then DAU's position. ✓ Input signal level range: -25dBm above 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.

Phone

Toll Free: 1-866-9 GST USA

Phone: 913-469-6699

Write

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Product Information and Technical Assistance

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