GST-IC-ELITE-TNR (Indoor type)

USER MANUAL

GS Teletech Inc.

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[CHANGE RECORD]

DATE	NAMES	DESCRIPTIONS	VERSION	REMARK
January 10th, 2019	Y.J.KIM	Original Draft	1.0	
Jan 28소, 2019	Y. J. KIM	Changed the Only indoor type	1.1	

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1. General

1.1. Purpose

This document introduces features, specifications, structures and operation guideline for the GST-IC-ELITE-TNR LTE & NR

1.2. Copyright

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2. Introduction

2.1. System Overview

GST-IC-ELITE-TNR is designed to improve coverage and capacity of LTE Band 41 and NR Band N41 services in all shadowed and blanked areas of Sprint network.

GST-IC-ELITE-TNR receives and improves weak signals as cancelling the multi-path interference even if there is a lack of isolation between Donor and Service antenna.

This solution does not request any costs for Backhaul installation, so will save OPEX and CAPEX.

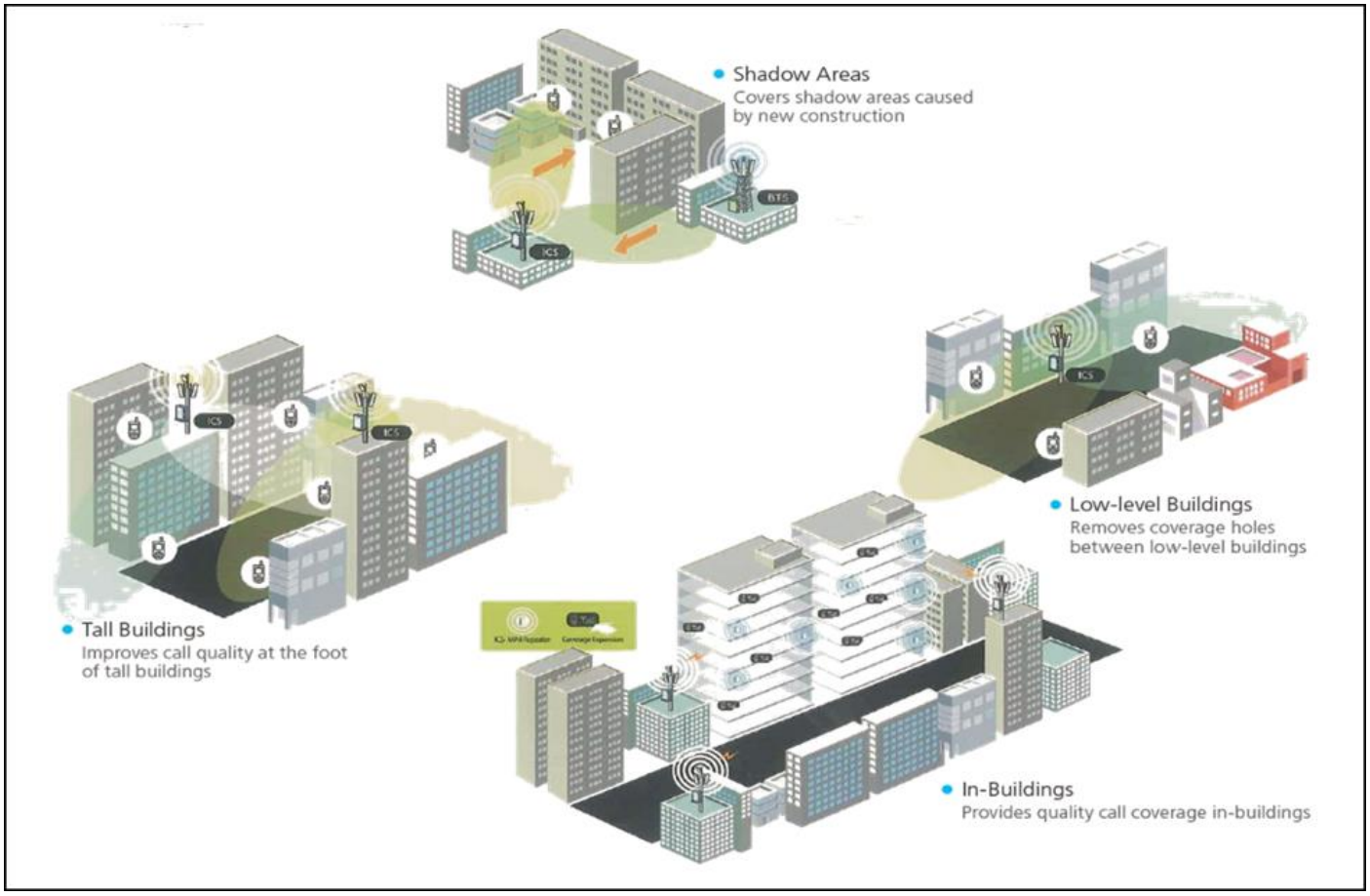

Figure 1. GST-IC-ELITE-TNR Application Configurations

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2.2. Main Features

- Maintain the Quality of Demodulation performance on the Overlay-Cell Region using Delay-Reduction Technology (Less than 4us for LTE & 2.41us for NR)
- Provide the SNMP Solution
- Ensure the Uplink-Sensitivity and Suppress Rising-UL noise floor under high out-power at Downlink using PIMD-Reduction Technology
- Excellent RF Specifications
  - High Gain: more than 95dB
  - Low Noise figure under all system gain condition: Less than 5dB
  - Grate Performance of Interference Cancellation: G=I+10dB
  - High Rejection: More than -50dBc at Band Edge ± 1MHz for LTE BAND
    More than 30dBc at Band Edge ± 1MHz For NR BAND
    More than 50dBc at Band Edge ± 1.5MHz for NR BAND
- Adaptable functions for Operation
  - RS (Pilot) Aware, Smart ALC & ASD, Attenuator for each Band
  - Maximum 60MHz (20MHz *3carrier) for LTE and 10MHz step 60MHz for NR
- Complies with NEMA 4 (equal to IP66) for indoor & Outdoor application
- Apply for Cascade 6 chain installation

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3. System Design

3.1. Perspective View

Fan may be used as an option if A is installed in an enclosed space.

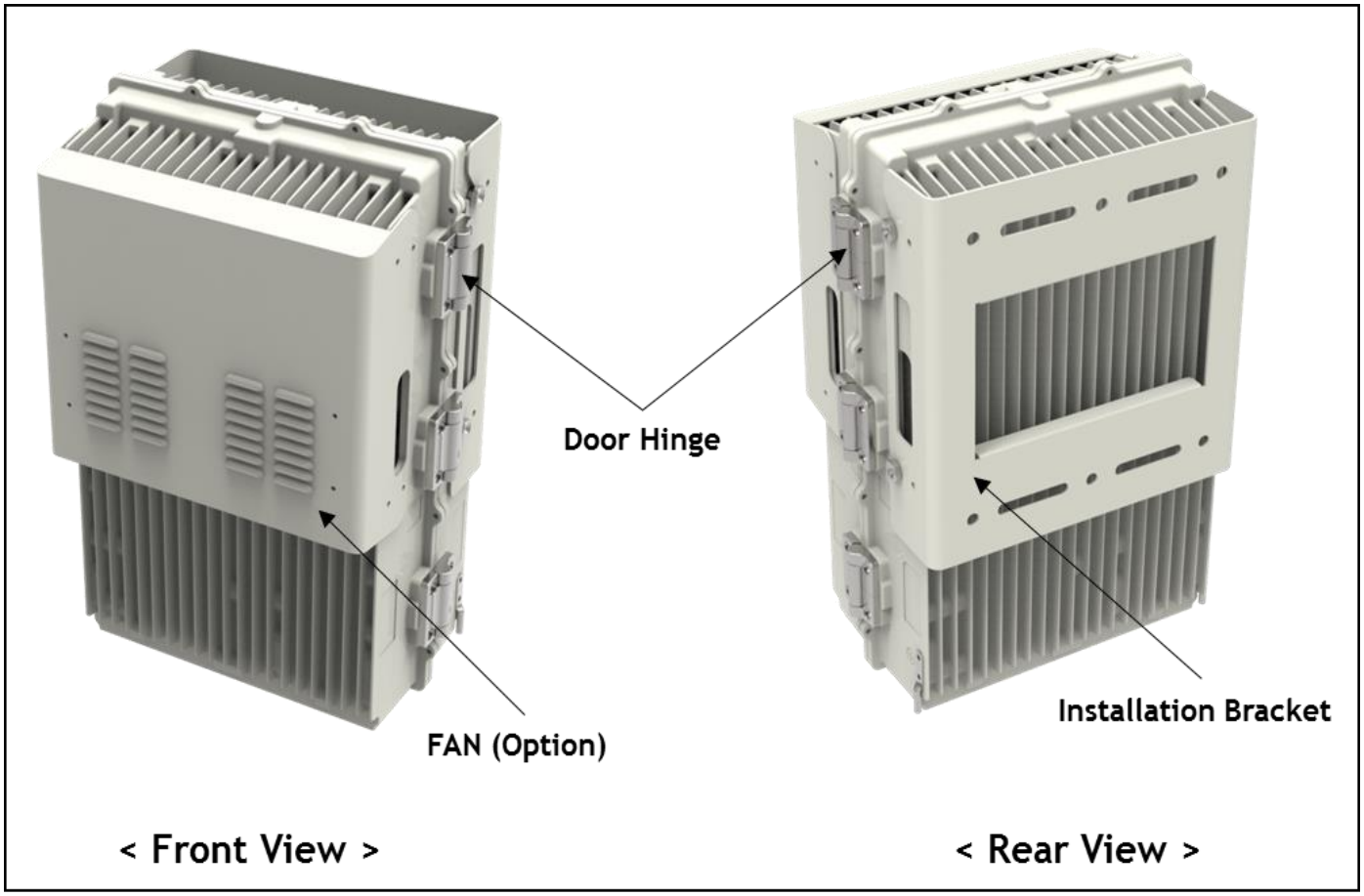

Figure 2. GST-IC-ELITE-TNR Perspective View

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3.2. Exterior View

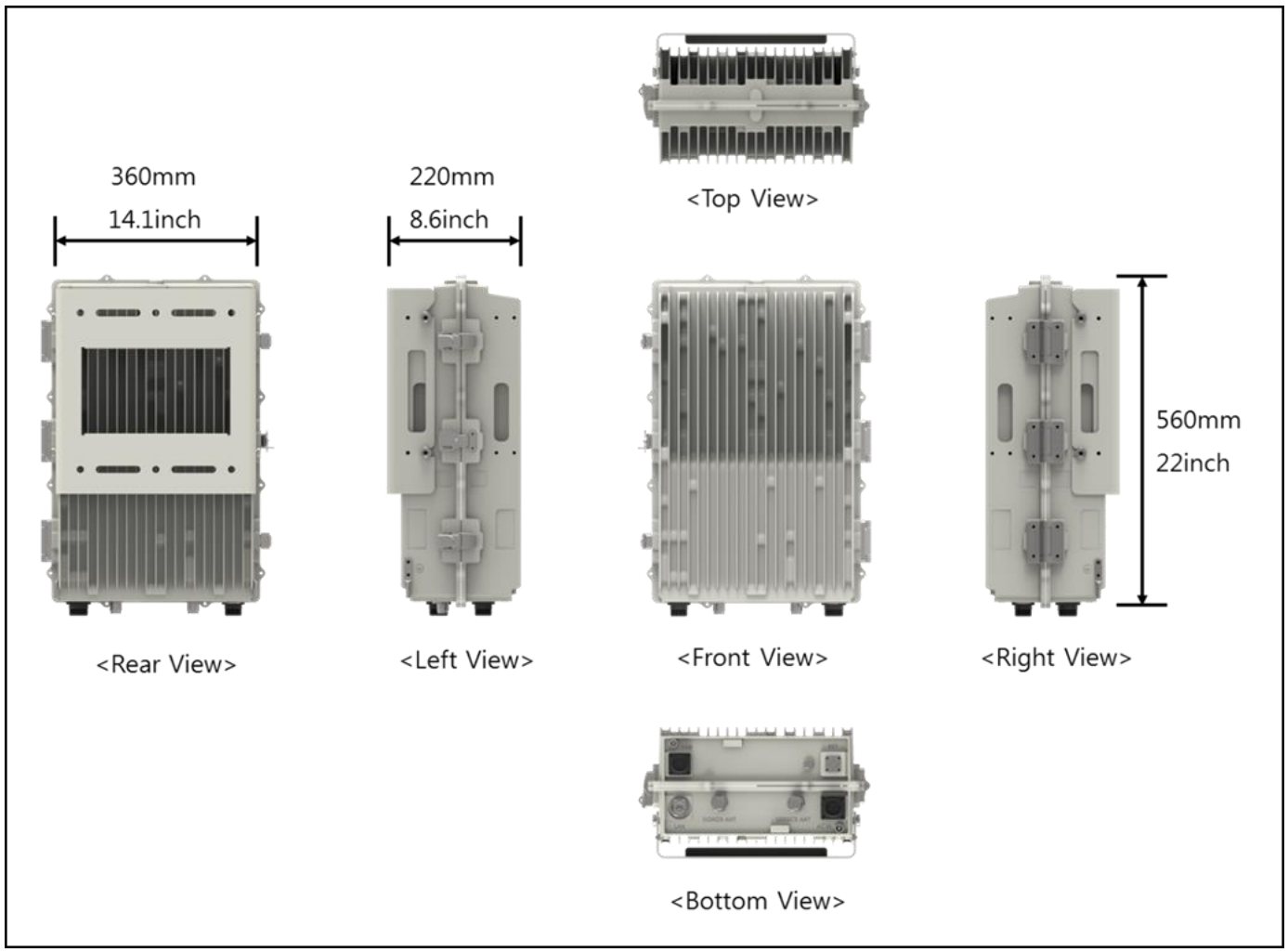

Figure 3. GST-IC-ELITE-TNR Exterior View

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3.3. Interior View (Indoor)

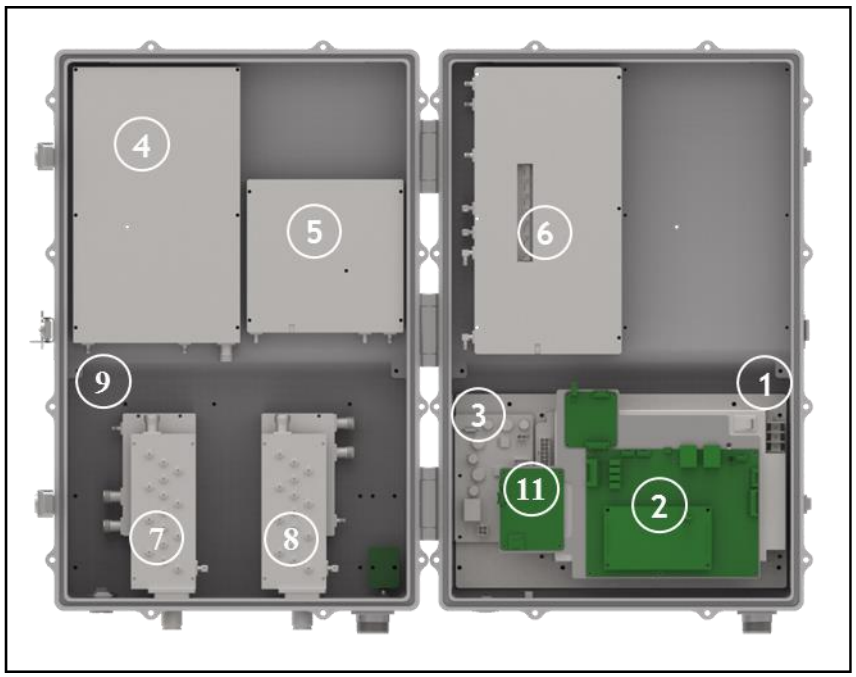

Figure 4. GST-IC-ELITE-TNR Interior View(Indoor)

No	Name	Remark
1	Power Supply Unit	Input: 110Vac~240Vac/ Output (DC):+29V, +6V
2	SNMP Board	For EMS using Wireless Modem
3	Surge Protect Board	RET Surge Protection
4	Power Amplifier for LTE & NR	For generating Downlink High RF Power
5	Power Amplifier for LTE & NR	For generating Uplink High RF Power
6	DFM (Interference Cancellation Module)	Contains RF Up & Down Convertor, Digital Signal Processing and Controller Unit
7	Band Pass Filter for Donor	Filtering for Band41 for Donor interface
8	Band Pass Filter for Service	Filtering for Band41 for Service interface
9	Donor Switching Module	Separate downlink & uplink for Donor
10	Service Switching Module	Separate downlink & uplink for Service
11	EMS Modem	For Status Monitoring and Control from Server

Table 1. GST-IC-ELITE-TNR Unit Configuration

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3.4. External Interface (Indoor & Outdoor)

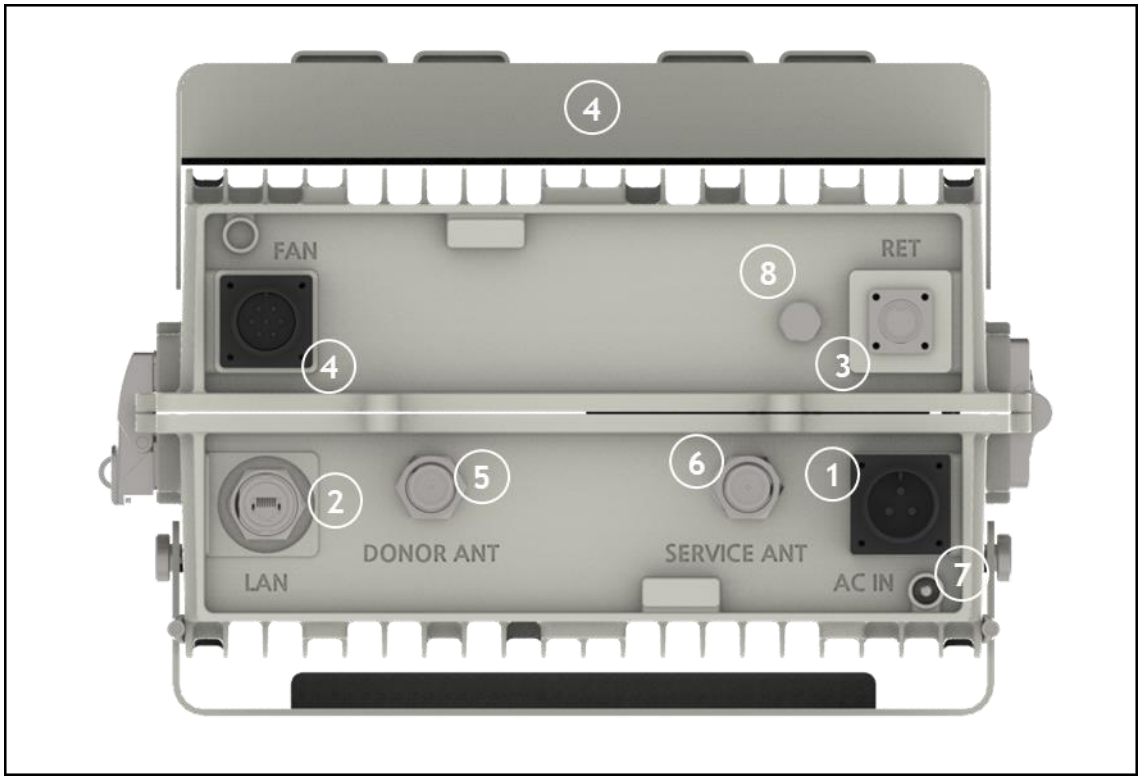

Figure 5. GST-IC-ELITE-TNR External Interface

No	NAMES	DESCRIPTION	SPECIFICATION
1	AC IN	AC Power Input Port	MS22-2-3P
2	RJ-45	Local Maintenance or communication other equipment of GST	Local: RJ-45
3	RET	Remote Antenna Control Port (AISG 2.0)	SU20SPR-8S/ 29V_1.5A max
4	FAN	FAN Power & Alarm Connection	MS20-15-7P
5	Donor ANT	Donor Antenna Connection	4.3-10 Mini- DIN Female
6	Service ANT	Service Antenna Connection	4.3-10 Mini- DIN Female
7	LED	System Total Alarm Indication	General Performance
8	Vent-Core	Maintain Humidity & Temp Inside	IP66

Table 2. GST-IC-ELITE-TNR External Interface Description

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4. System Specification

4.1. RF Performance

Parameter		Downlink	Uplink		Remark
Frequency Range		2496.3 ~ 2690MHz @ 100KHz Step			Indoor
Input Range		-65dBm ~ -35dBm/Service	-65dBm ~ -35dBm/Service		Indoor
Output Power		+30dBm (1W) for LTE +30dBm (1W) for NR	+30dBm (1W) max. LTE & NR Composite		Indoor
Channel Capacity		BW 20MHz * Contiguous 3CH			LTE
		BW60MHz			NR
Gain	Range	65dB ~ 95dB (Max 30dB)			ALC: 30dB
	Adjust Step	0.5dB			
	Accuracy	±1dB			
Ripple		6dB p-p @ each CH			
Roll off		> 50dBc @ Channel OBW ±1MHz			LTE
		> 30dBc @ Channel OBW ±1MHz			NR
		> 50dBc @ Channel OBW ±1.5MHz			
EVM		Max/ Min Input	QPSK	18.5%	LTE
			16QAM	13.5%	
			64QAM	9%	
		Max/ Min Input	QPSK	18.5%	NR
			16QAM	13.5%	
			64QAM	9%	
			256AQAM	4.5%	
Frequency Error		< 0.05ppm			
System Delay		< 4us			LTE
		< 2.41us			NR
Noise Figure		Less than 5dB @ Max Gain			DL
		Less than 5dB @ Max & Min Gain			UL
VSWR		< 1.5 : 1			
ACLR		> 45dBc @±BW, > 45dBc @±2*BW			
Spurious Emission		-13dBm / 1 kHz: 9 kHz < f < 150 kHz			ITU category A
		-13dBm / 10 kHz: 150 kHz < f < 30 MHz			
		-13dBm/100 kHz: 30 MHz < f < 1 GHz			
		-13dBm / 1 MHz: 1 GHz < f < 12.75 GHz			

Table 3. GST-IC-ELITE-TNR RF Performance Description

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4.2. ICS General Performance

No.	Parameter	Condition	Specification
1	Gain Re-Tracking Time after reset	Target Gain ±1dB	< 30 Sec
2	Isolation Sensing Range	-10dB < Gain < 10dB	Accuracy ±2
3	G = I + 10dB	Static	General Operating
4	G = I	10Hz	Fast Fading

Table 4. GST-IC-ELITE-TNR ICS General Performance

4.3. CH Capacity Information

4.3.1. LTE Band 41

- Maximum configurable channel is contiguous 3channel

CH Name	Channel Frequency			BW(MHz)	EARFCN
	Start(MHz)	Center(MHz)	Stop(MHz)		
L06	2619.8	2628.8	2637.8	18	40978
L07	2639.6	2648.6	2657.6	18	41176
L08	2659.4	2668.4	2677.4	18	41374
L13	2623.3	2632.3	2641.3	18	41013
L14	2643.1	2652.1	2661.1	18	41211
L15	2662.9	2671.9	2680.9	18	41409
L20	2626.6	2635.6	2644.6	18	41046
L21	2646.4	2655.4	2664.4	18	41244
L22	2666.2	2675.2	2684.2	18	41442
L27	2629.8	2638.8	2647.8	18	41078
L28	2649.6	2658.6	2667.6	18	41276
L29	2669.4	2678.4	2687.4	18	41474

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CH Name	Channel Frequency			BW(MHz)	EARFCN
	Start(MHz)	Center(MHz)	Stop(MHz)		
L33	2633.1	2642.1	2651.1	18	41111
L34	2652.9	2661.9	2670.9	18	41309
L38	2636.6	2645.6	2654.6	18	41146
L39	2656.4	2665.4	2674.4	18	41344
L53	2631.4	2640.4	2649.4	18	41094
L54	2651.2	2660.2	2669.2	18	41292
L55	2671.0	2680.0	2689.0	18	41490

Table 5. GST-IC-ELITE-TNR Operation Band for LTE Band 41

4.3.2. NR Band N41

BW	Center FRQ Range		NR-ARFCN Range	
	Start(MHz)	Stop(MHz)	Start	Stop
60MHz	2526.3	2660	505260	532000

Table 6. GST-IC-ELITE-TNR Operation Band for NR Band N41

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4.5. Configuration & Mechanical Specification

Parameter	Specification	Remark
Donor/ Service Antenna Filter	Band Pass type for LTE & NR	Time Division
Power Supply	AC Input Voltage: 110~240V (50/60Hz)	
	DC Output Voltage: +29V / +6V	
Operation Temperature	-30°C~+50°C (100%RH)	
Storage Temperature	-40°C~+85°C (5~95%RH)	
Connectors	Antenna: 4.3-10MiniDIN Female	On Bottom side
	Ethernet: RJ-45	
	AC: MS22-2-3P	
	FAN: MS20-15-7P	
	RET: SU20SPR	
Size	22" x 14.1" x 8.6"(560mm x 360mm x 220mm)	Without Bracket
Weigh	Less than 30kg (66lb)	Without Bracket
Power Consumption	Less than 360W	
MTBF	100,000 hours or higher	
Internal Modem	LTE Modem primary	Back up with CDMA Modem
RET	Provide a physical Connection & 29V/1.5Amax	AISG 2.0 Standard
Dust Resistance	Telcordia GR63-CORE	
Vibration Resistance	1G, 10~150Hz, 0.1 Octaves/min	
Grounding	nonferrous metal and anchoring point on bottom sid e	For RF and power cabling
Environmental Spec.	NEMA4	IP 66
Sustained winds.	150mph	
Altitude	AMSL 10,000ft	
Mount Application	Metal or Wooden Poles	8"-20" outside diameter
Pollution degree	PD2	
Overvoltage Category	OVC II	

Table 7. GST-IC-ELITE-TNR Mechanical & Environment conditions

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5. System Block Configuration

5.1. RF Signal Flow (Indoor)

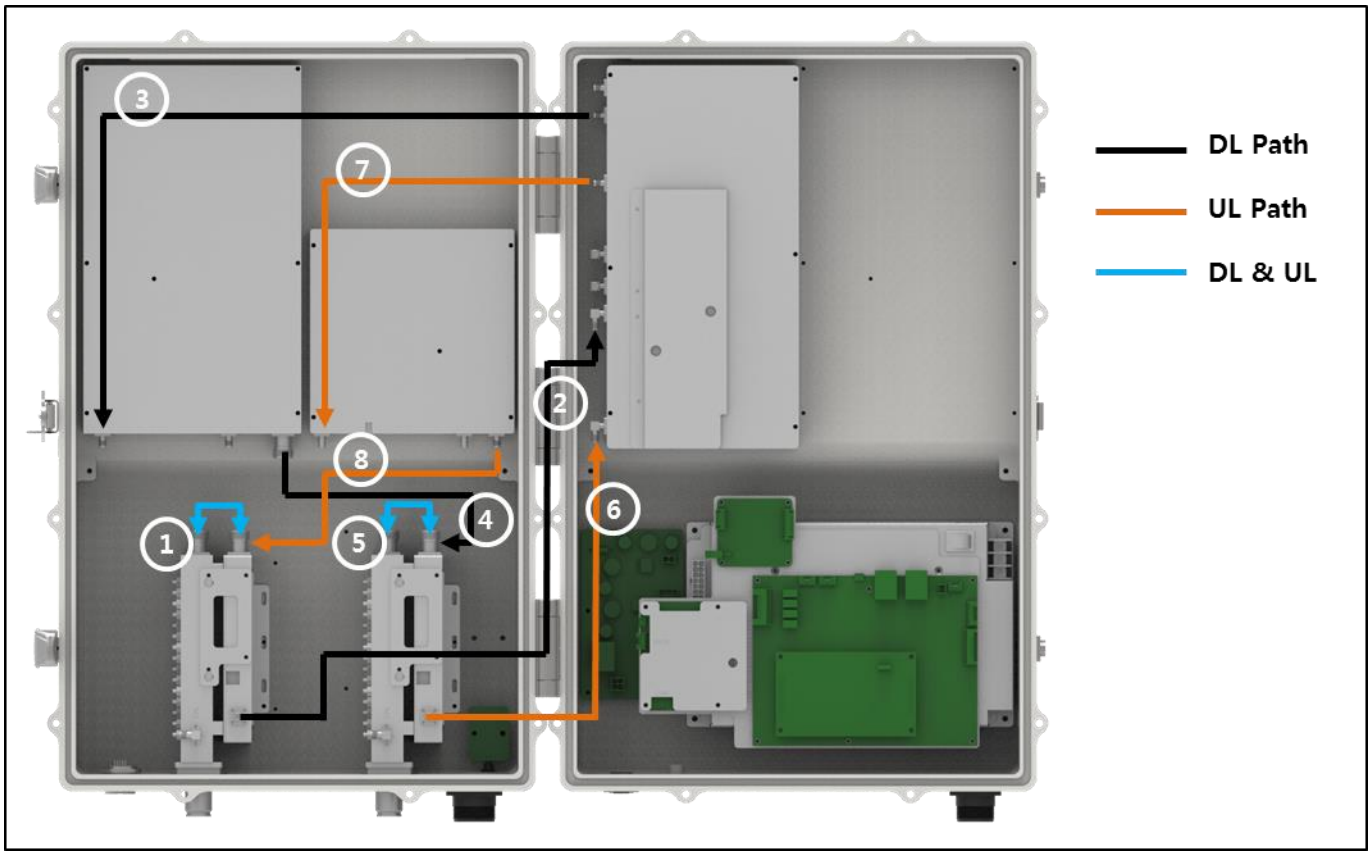

Figure 6. GST-IC-ELITE-TNR RF Signal Flow(Indoor)

No	RF Signal Flow	No	RF Signal Flow
1	DL Input & UL Output	5	DL Output & UL Input
2	Donor Switch -> DL RF Module	6	Service Switch -> UL RF Module
3	DL RF Module -> DL Power AMP	7	UL RF Module -> UL Power AMP
4	DL Power AMP -> Service Switch	8	UL Power AMP -> Donor Switch

Table 8. GST-IC-ELITE-TNR RF Signal Flow(Indoor)

5.2. Data Signal Flow

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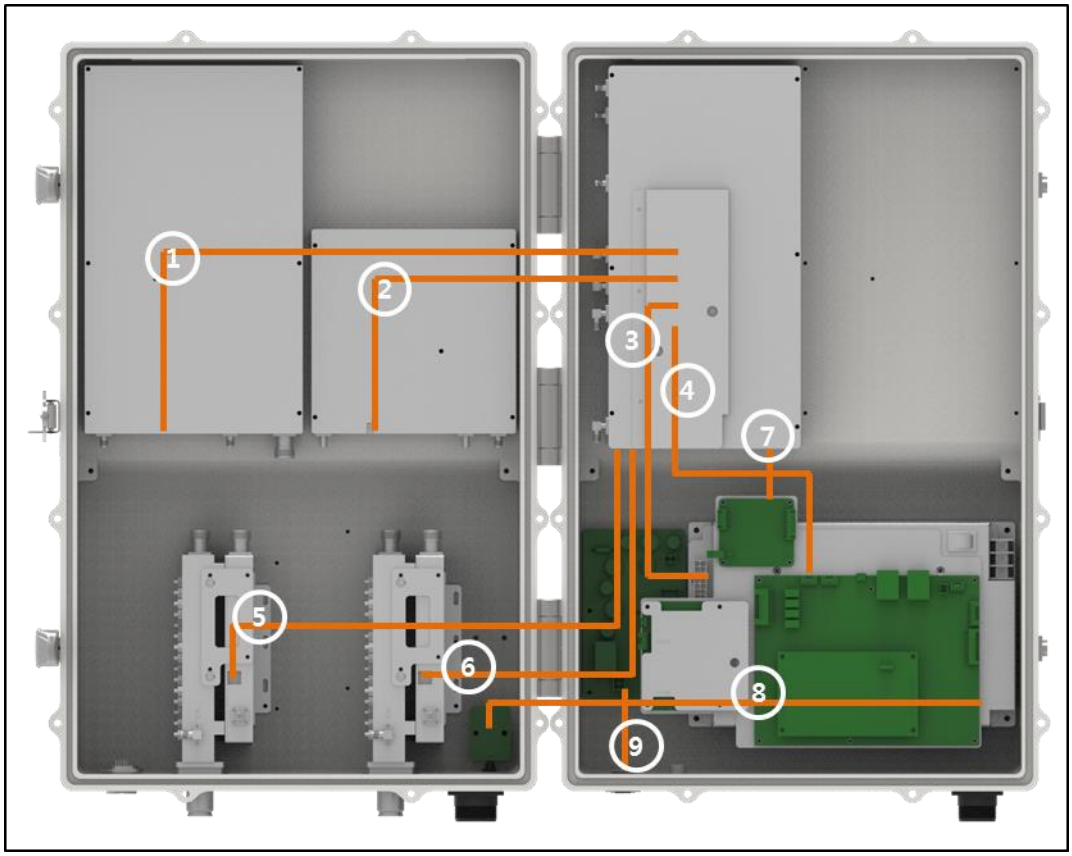

Figure 7. GST-IC-ELITE-TNR Signal and Data Flow(Indoor)

No	Data signal Flow	No	Data signal Flow
1	DL AMP <-> DFM (LvTTL)	6	Service Switch Control <-> DFM
2	UL AMP <-> DFM	7	Fan Control <-> DFM
3	SMPS Alarm <-> DFM	8	LED Board <-> SNMP Board
4	DFM <-> SNMP Board(LvTTL)	9	RET Control Data
5	Donor Switch Control <-> DFM	10	-

Table 9. GST-IC-ELITE-TNR Data Signal Flow(Indoor)

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5.3. Power Supply Flow

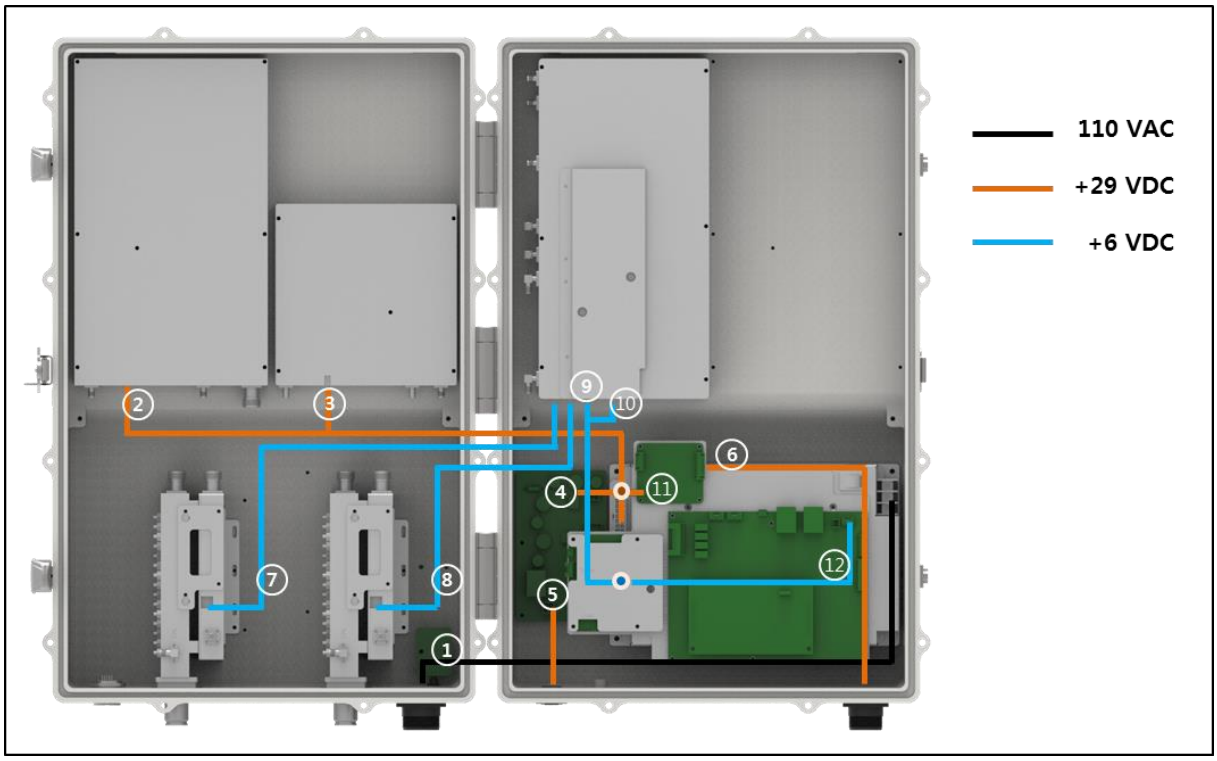

Figure 8. GST-IC-ELITE-TNR Power Supply Flow(Indoor)

No	Power Flow	No	Power Flow
1	AC 110V Input for SMPS	7	Supply 6V for Donor Switch
2	Supply 29V for DL AMP	8	Supply 6V for Service Switch
3	Supply 29V for UL AMP	9	Supply 6V for RF Module
4	Supply 29V for RET Board	10	Supply 6V for DSP Module
5	Supply 29V for RET	11	Supply 29V for FAN Controller
6	Supply 24V for FAN	12	Supply 6V for SNMP Board

Table 10. GST-IC-ELITE-TNR Power Supply Flow(Indoor)

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6. Status/ Control & Alarm Monitoring

6.1. Status Monitoring and Control Parameters

- In case of control parameter, present status but also setting value display on Web-UI.

Parameter		Status	Control	Description
Downlink	RSSI	○		DL Input Power Display
	Output	○		DL Output Power Display
	System Gain	○		DL System Gain Display
	ALC		○	Set the ALC function On/Off
	ALC Low Limit		○	Set the ALC Low Limit Value
	Path On/Off		○	Decide to cut off to LTE or NR
	Attenuation		○	In order to adjust system gain, set the attenuation value
	Isolation (Unit: dB)	○		Display the isolation value between Donor antenna and Service antenna
	Band Selection		○	Select the band that user want to operate
	Final AMP		○	Set the High Power final AMP On/Off
	ASD		○	Set the Auto Shutdown function On/Off
Uplink	RSSI	○		UL Input Power Display
	Output	○		UL Output Power Display
	System Gain	○		UL System Gain Display
	ALC		○	Set the UL ALC function On/Off
	Path On/Off		○	Decide to cut off LTE or NR
	Attenuation		○	In order to adjust system gain, set the attenuation value
	Isolation (Unit: dB)	○		Display the isolation value between Donor antenna and Service antenna
	Gain Balance		○	Select the band that user want to operate & Set the Offset Value
	Final AMP		○	Set the High Power final AMP On/Off
	ASD		○	Set the Auto Shutdown function On/Off
Common	Site ID		○	Write the location Info. that install a repeater

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Parameter		Status	Control	Description
	Donor Site ID		○	Write the Donor Site Info. That install a repeater
	Temp	○		Current Temperature in repeater
	Temp. High Limit		○	Control Temp. Alarm Threshold
	ILC		○	ILC Function On/Off
	ILC Value		○	ILC Level Control
	Alarm Delay		○	Set the delay time that transmit from repeater to Server
	UL AMP		○	UL AMP On Off
	DFM Version	○		Display a DFM Software Version
	FPGA Version	○		Display a DL/UL FPGA Software Version
	DFM Serial Number	○		Display a DFM Serial Number
	TDD Mode		○	T-Sync Detect Mode Control

Table 11. GST-IC-ELITE-TNR Status Monitoring and Control Parameters

6.2. Alarm Monitoring

- All of alarms in Repeater are able to check thru Local Maintenance Port & Remote Site
- Provide to Alarm Mask function in order to ignoring unnecessary alarm

Parameter		Alarm conditions	Recovery
LTE	DL Over Output	Output power exceed a setting value (Band independently)	< Hysteresis 1dB
	DL Low Output	Band Output power < Output power Low limit value	Opposite Condition
	DL Low RSSI	Band RSSI < Input Low limit value	Opposite Condition
	DL VSWR	Return loss < 5dB	Return loss > 7dB
	DL Shutdown	By Over Output Alarm, By PLL Alarm, By Amp H/W Fail By Low Isolation	Alarm Off
	AMP H/W Fail	Power AMP gain is poor AMP Output Power < DSP Output Power -20dB over 30sec	Power AMP Gain OK
	DL Low Isolation	Isolation < 70dB	Opposite Condition

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Parameter		Alarm conditions	Recovery
	UL Low Isolation	Isolation < 70dB	Opposite Condition
	UL Over Output	Output power Exceed a setting value (Band independently)	< Hysteresis 2dB
NR	DL Over Output	Output power exceed a setting value (Band independently)	< Hysteresis 1dB
	DL Low Output	Band Output power < Output power Low limit value	Opposite Condition
	DL Low RSSI	Band RSSI < Input Low limit value	Opposite Condition
	DL VSWR	Return loss < 5dB	Return loss > 7dB
	DL Shutdown	By Over Output Alarm, By PLL Alarm, By Amp H/W Fail By Low Isolation	Alarm Off
	AMP H/W Fail	Power AMP gain is poor AMP Output Power < DSP Output Power -20dB over 30sec	Power AMP Gain OK
	DL Low Isolation	Isolation < 70dB	Opposite Condition
	UL Low Isolation	Isolation < 70dB	Opposite Condition
	UL Over Output	Output power Exceed a setting value (Band independently)	< Hysteresis 2dB
Common	DFM HW Fail	DFM FPGA Fail (Judging from MCU, Except for RESET) DL/ UL Output Shutdown	Alarm & Power Recovery
	DFM Link Fail	Communication Fail between DFM & SNMP	Communication
	T-Sync Alarm	TDD Downlink Signal is not detected over 30sec	Signal is detected over 30sec
	T-Sync Link Fail	No response more than 10times	At once
	Temperature	System: REAL Temp>Setting Value Refer to Final Amp Temperature : Alarm: 85℃~90℃/ Shutdown: > 90℃	System: Opposite Final Amp: < 80℃
	DC Fail	Output voltage below 80%	DC Recovery
	UL VSWR	Return loss < 5dB	Return loss > 7dB
	Total Alarm Display	Only System Outside LED	

Table 12. Monitoring Alarm Parameters

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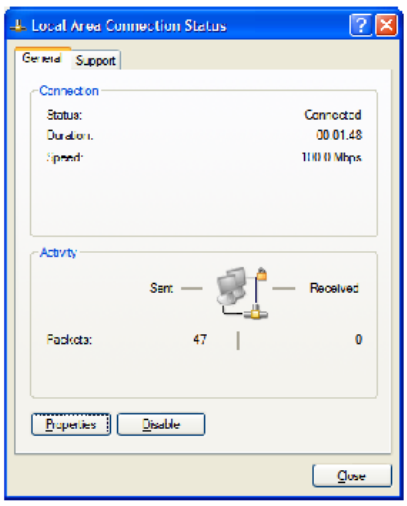
7. Web-UI Overview

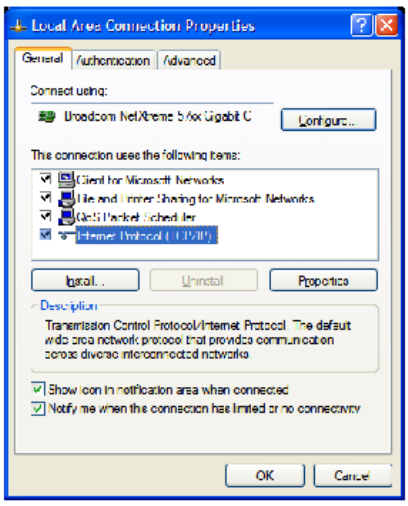
- Provide all functions that can be performed at the local craft port will be available thru the remote interface
- Support the GUI pages that will be addressable via the LTE/ CDMA wireless modem
- Support Remote access that will enable troubleshooting down to a specific location

7.1. Configuration the Laptop to Connect to the Repeater

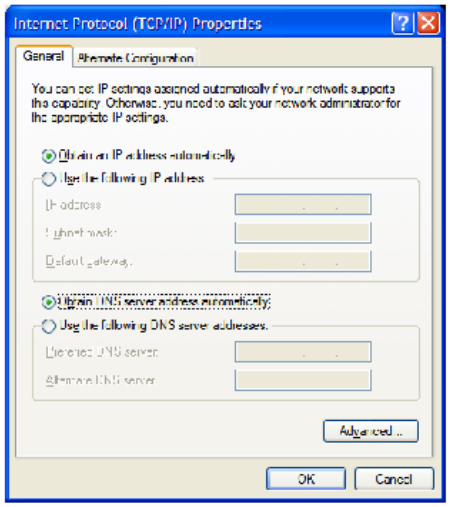
- Connect an Ethernet crossover cable from the LAN port of the repeater's bottom side to your laptop



1. Go to Local Connection
2. Click on "Properties"



3. Highlight "Internet Protocol"
4. Click on "Properties"



5. Choose "Obtain DNS Server address automatically"
6. Clink OK

Figure 9. Laptop Configuration for connecting the Web-UI

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7.2. Login-In Screen

- Web-UI Screen for Log-In
- After Logging, User can be able to operate Web-UI
- Register & Delete a User name/ Password: Refer to 8.6 User Management
- Display Total Alarm & Shutdown Status
- Enter the IP Address "192.168.1.1" into your browser address bar and you will be redirected to the Login page

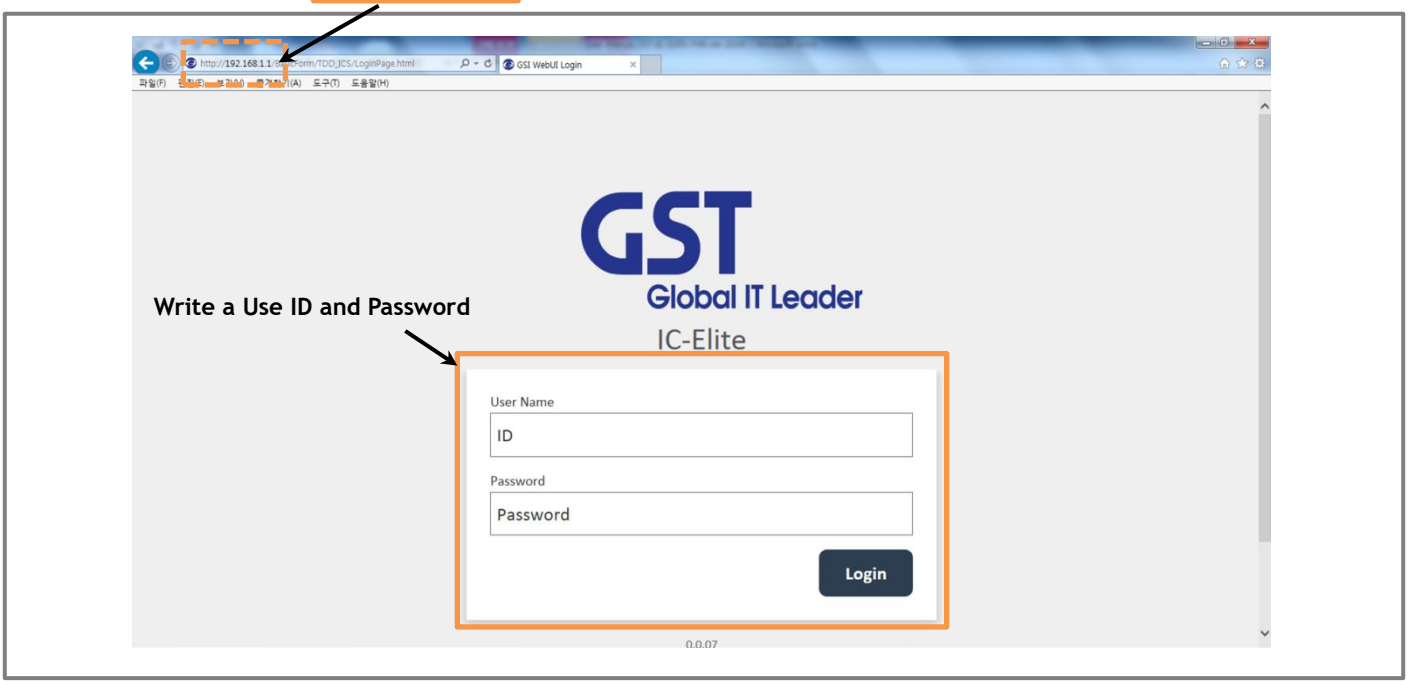

Figure 10. The way to Log-in on the Web Browser Screen

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7.3. RF Status & Control

- Web-UI Screen for display Repeater's RF Status & Control window

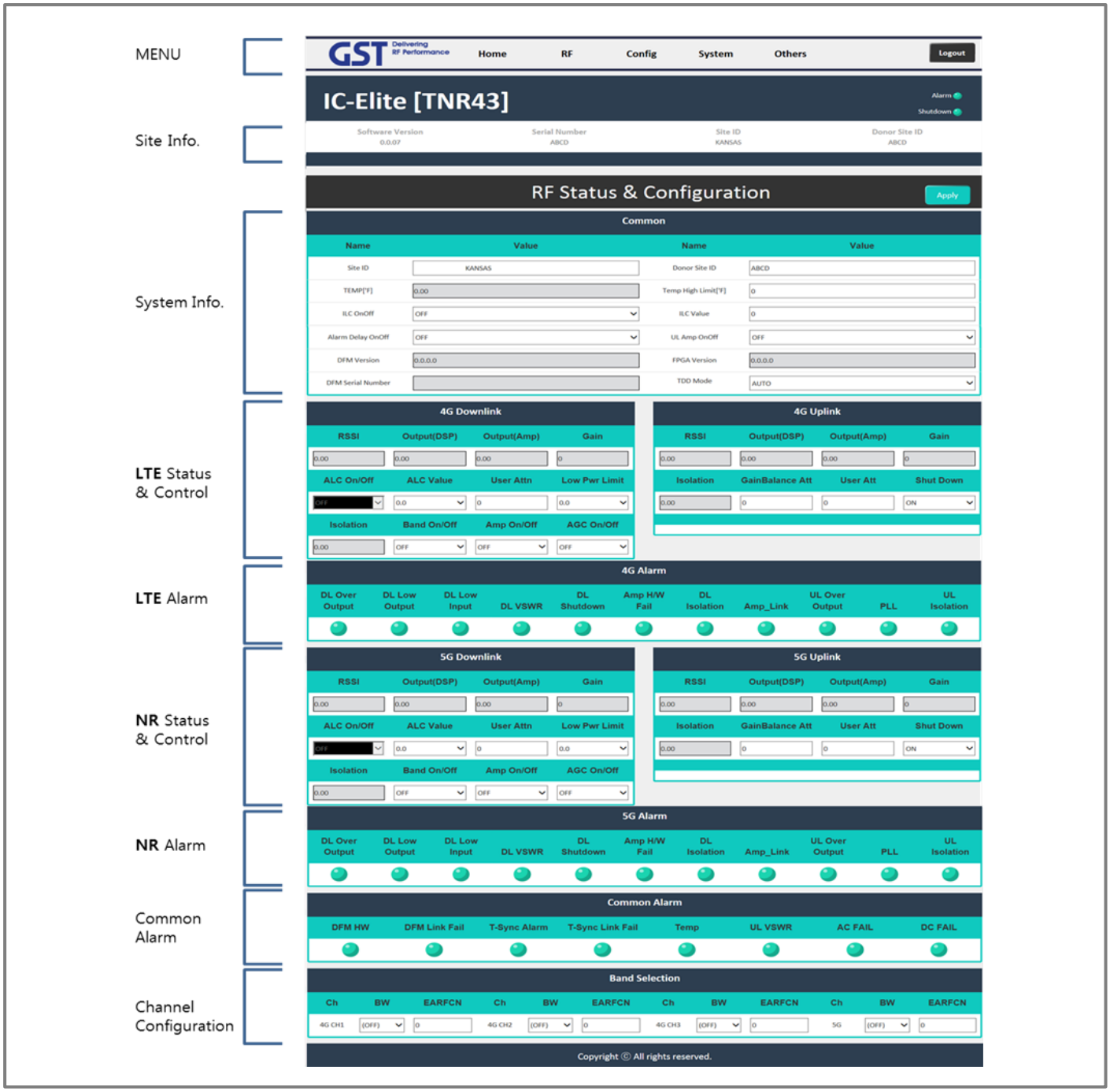

Figure 11. RF Status monitoring & Control

7.4. Alarm Configuration

- Web-UI Screen for Alarm Configurations
- Decide to activate an each alarm
- When "Report Alarm" is OFF, all alarms are disabled. When "Report Alarm" is ON, alarms can be Enable/ disabled individually

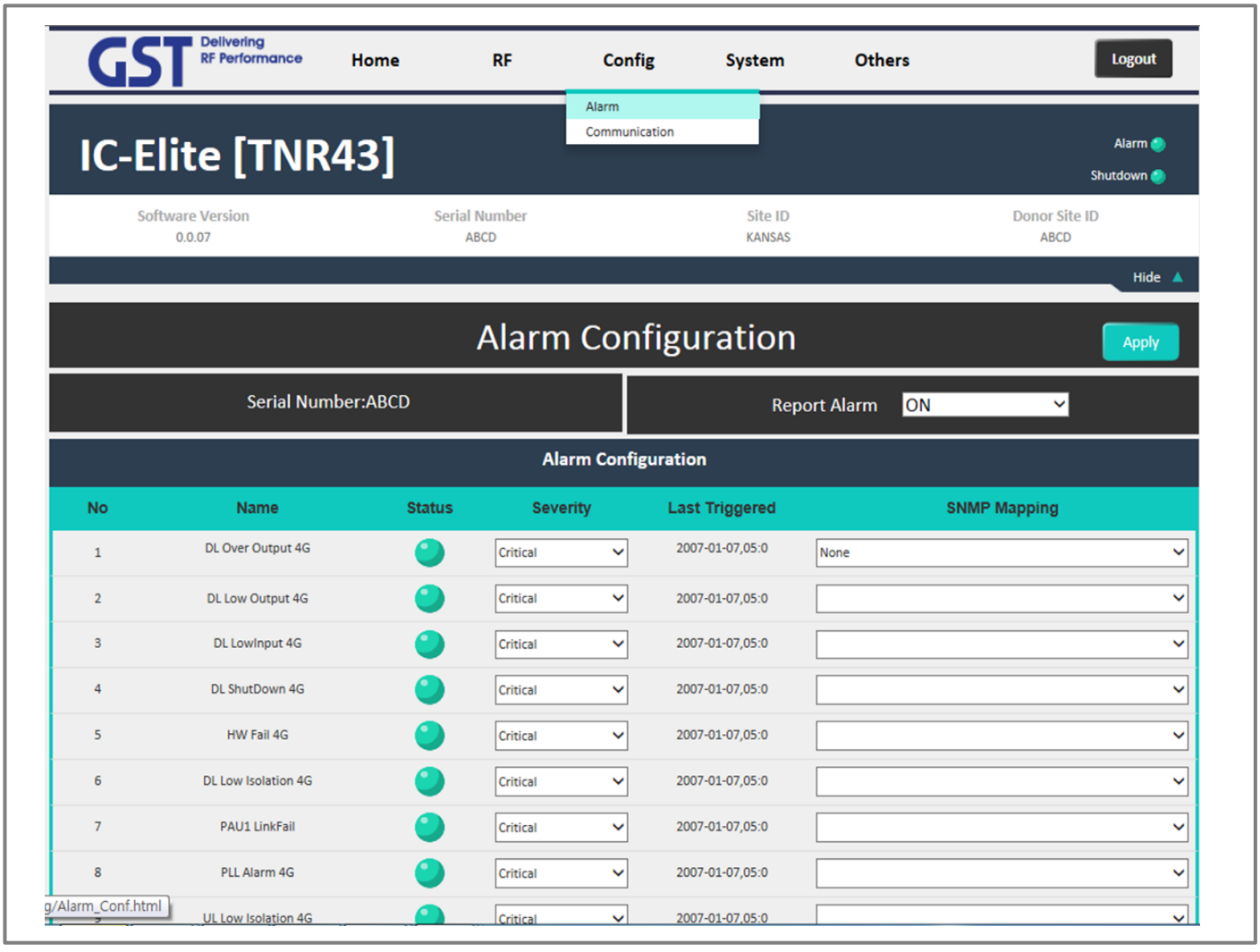

Figure 12. System Alarm Configurations

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7.5. Communication Configuration

- Web-UI Screen for Communication Configurations
- Set the information in order to connect to Sprint Server
- On this page you can change the various values related to IP network. Because the Web-UI is based on the IP network, incorrect configuration may make it impossible to connect to the Web-UI.
- In that case, Contact GSTeletechinc Technical Support for further instructions

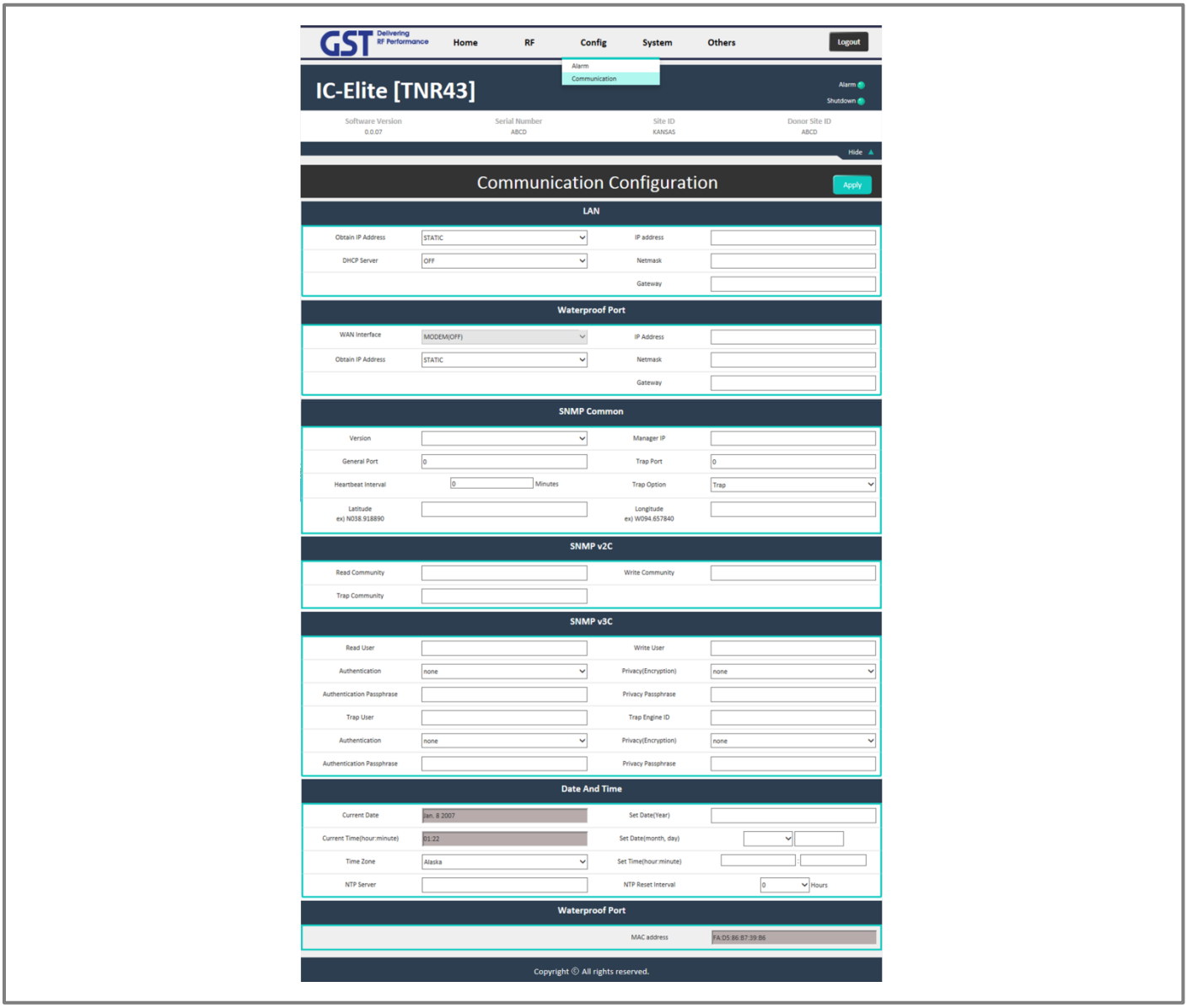

Figure 13. System Information for connecting configurations

7.6. User Management

- Web-UI Screen for Management about user information
- On this page you can create and delete users, change passwords, and assign authorities to individual users
- Read Authority will only allow the user to view information on the menu pages, but cannot make any changes
- Read/ Write Authority means the user can view and change various values
- Super User is very similar to and Administrator account

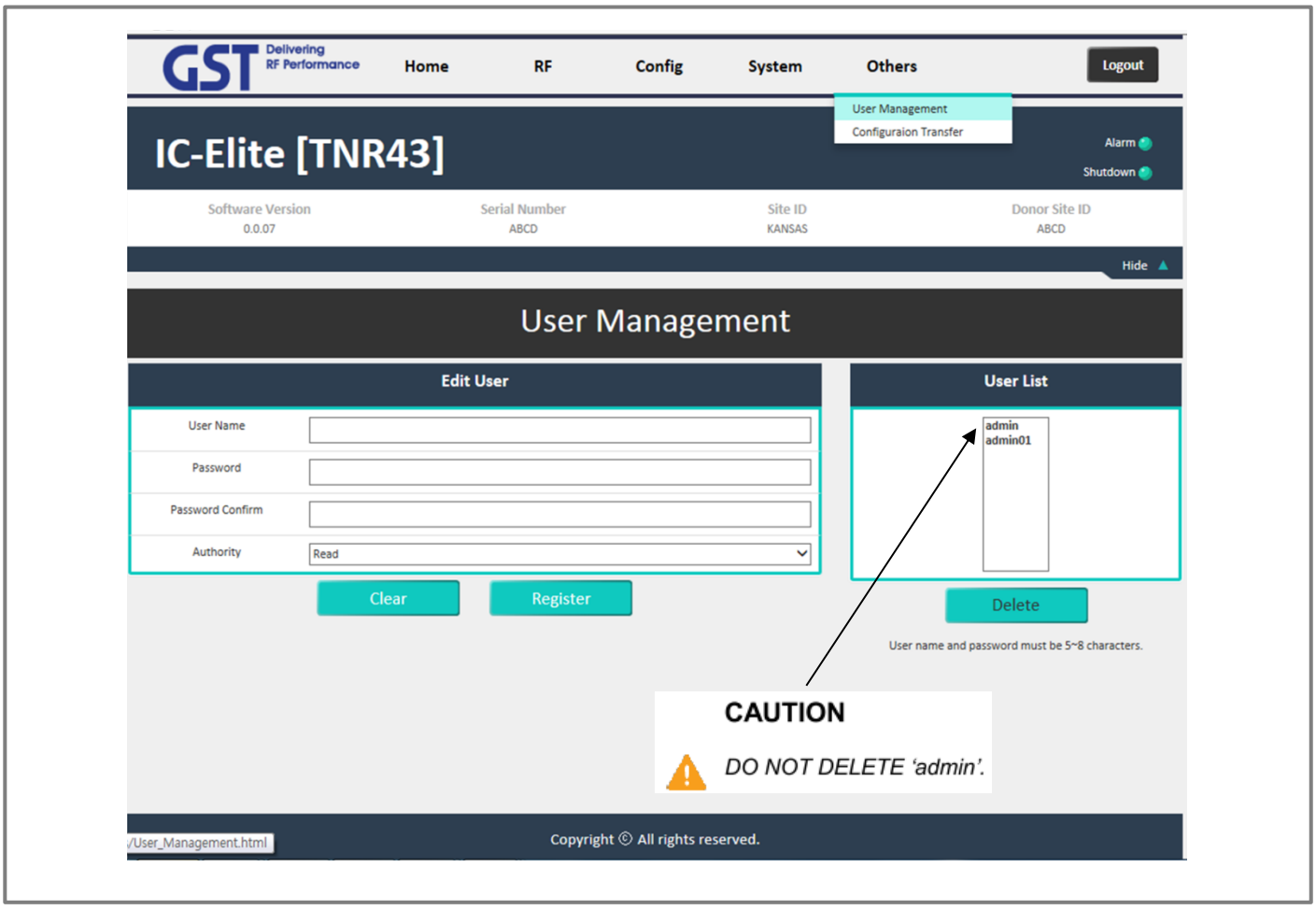

Figure 14. System Information about User Management

7.7. Alarm Log

- Web-UI Screen for finding Alarm log
- You can see the history of reported and reset Alarms. When an alarm is reported, the name and time of the alarm is displayed along with its current status
- **Red** means the alarm is reported, **Green** means the alarm has returned to normal status
- An alarm will only be reported if the alarm condition lasts longer that the set value in the "Delay Alarm Reporting Minutes" field, found on the RF configuration page

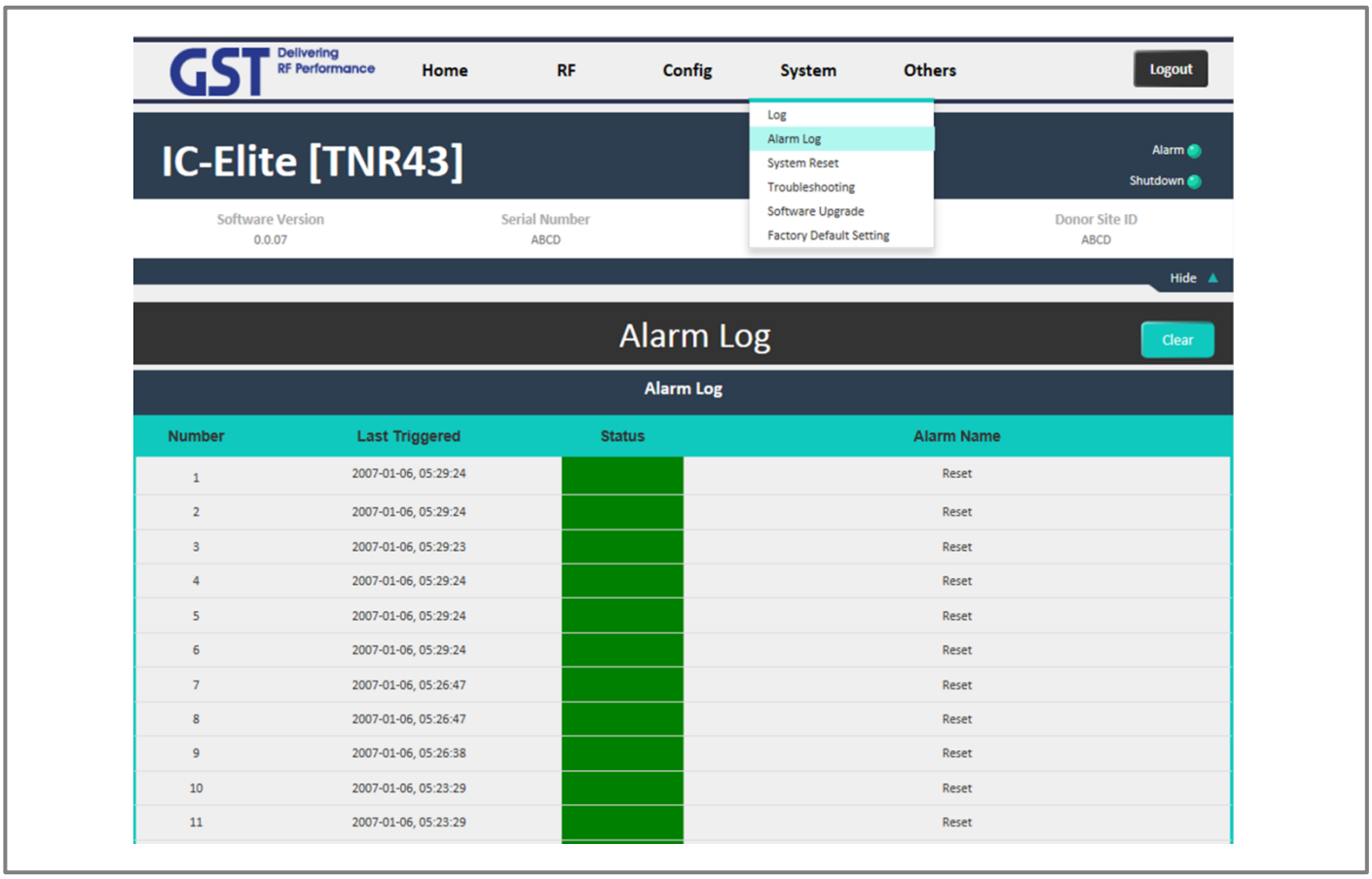

Figure 15. The way to check System Alarm Log

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7.8. Log

- Web-UI Screen for reading a List of operation history
- Logs will maintain a history of up to 30 cycles

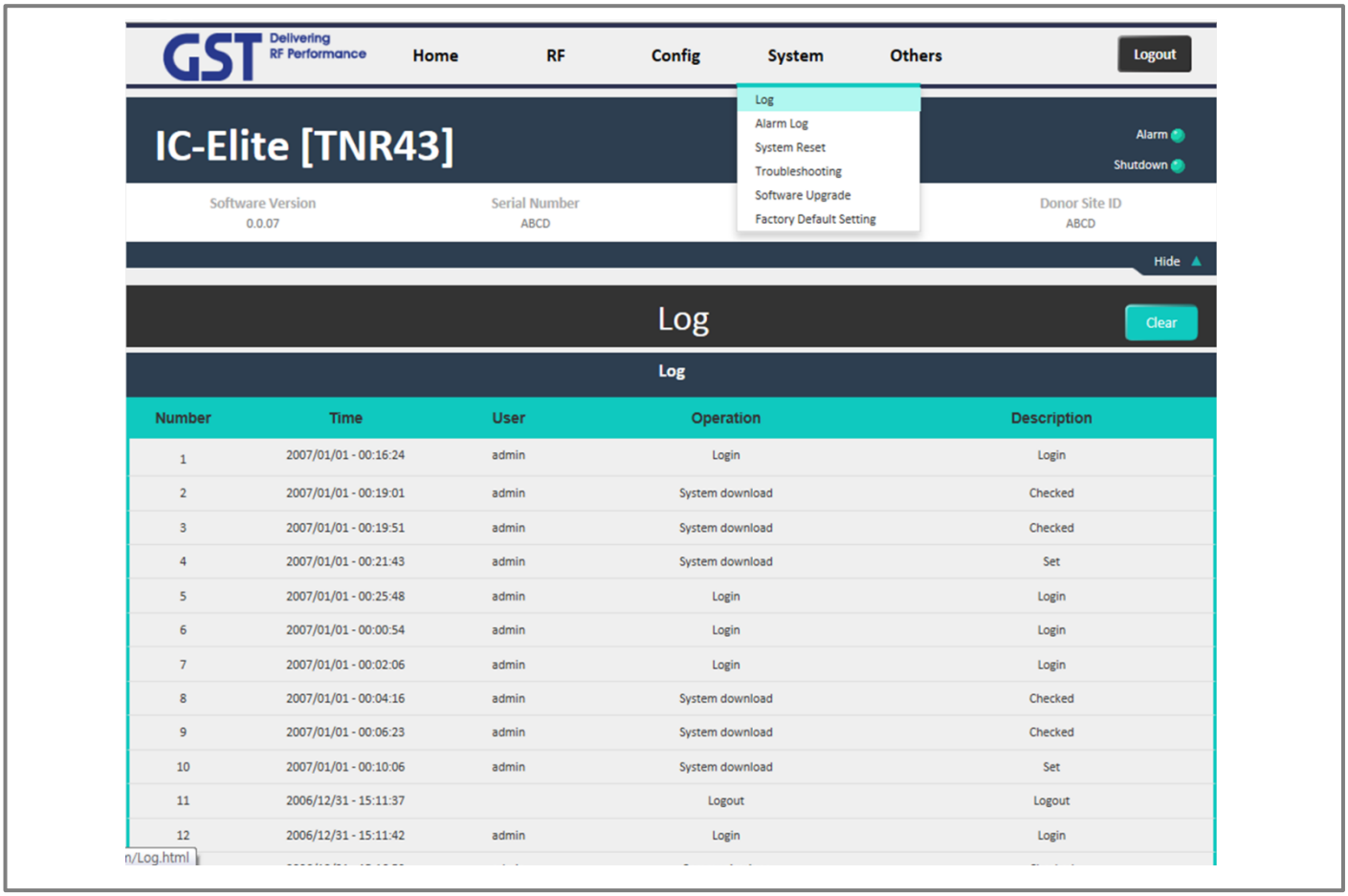

Figure 16. The way to read a Log History

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7.9. Troubleshooting

- Web-UI Screen for informing a contact information in case of occurring Field Troubleshooting

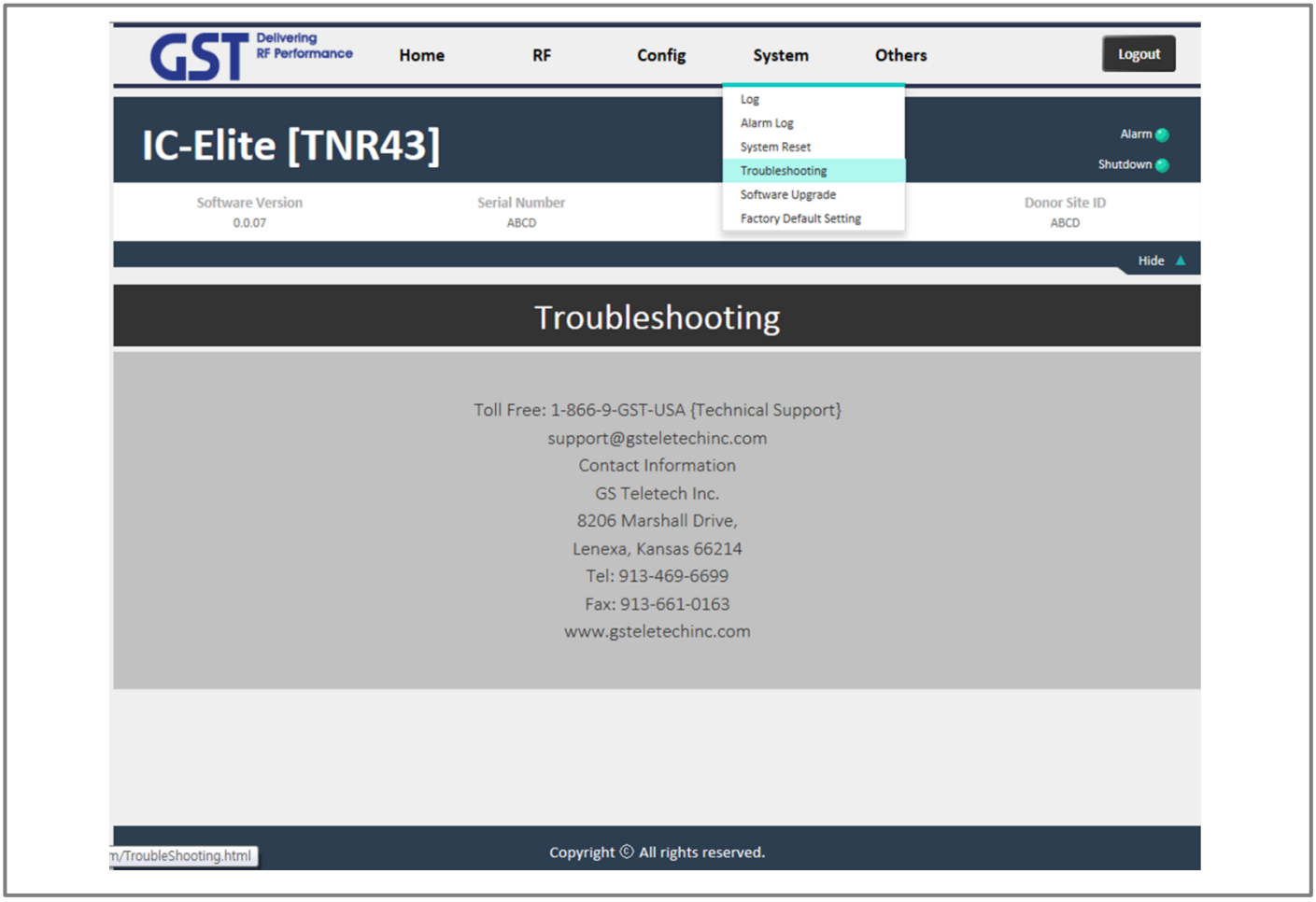

Figure 17. The information of Contact point in case of occurring Field Troubleshooting

7.10. Software Update

- Web-UI Screen for downloading a software
- Procedure
  1) Go to "Remote Software Upgrade" link
  2) Click Browse button to select the upgrade file from the laptop
  3) Choose the file to upgrade. Provided by manufacturer. After you choose the file, You should click "upload" to send the file from your laptop to the Repeater
  4) Once the file name and file size are displayed, click "Upgrade" to start the upgrade installation
  5) Provided file will have the following format:

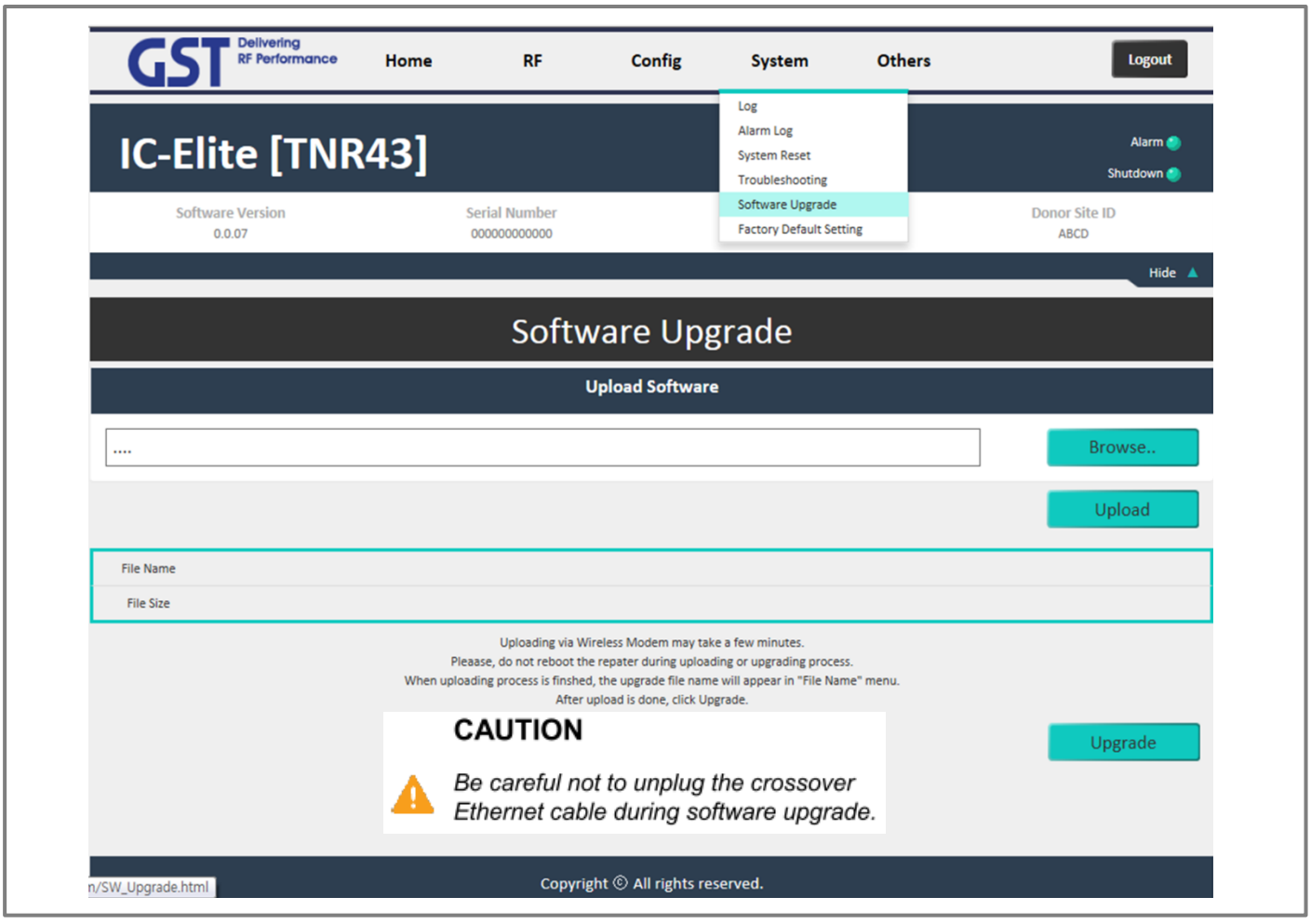

Figure 18. The way to reload new software using the Web-UI

7.11. System Reset

- Web-UI Screen for resetting the system
- Click on the desired reset action
- Clink "Yes" to reset the repeater via a soft-boot. This will not change any of the current settings

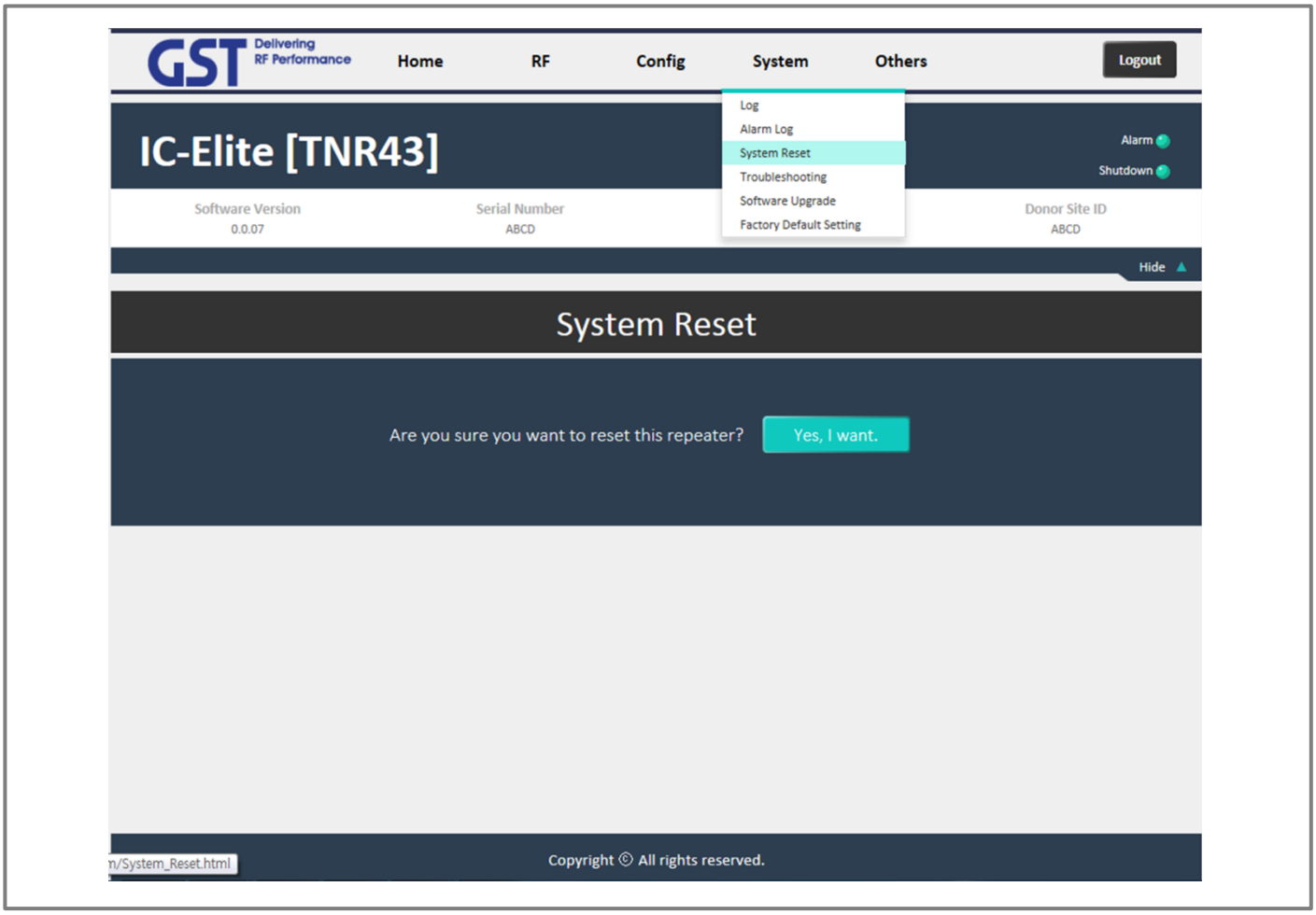

Figure 19. The way to reset the system using the Web-UI

7.12. Factory Default Setting

- Web-UI Screen for Default Setting before operating

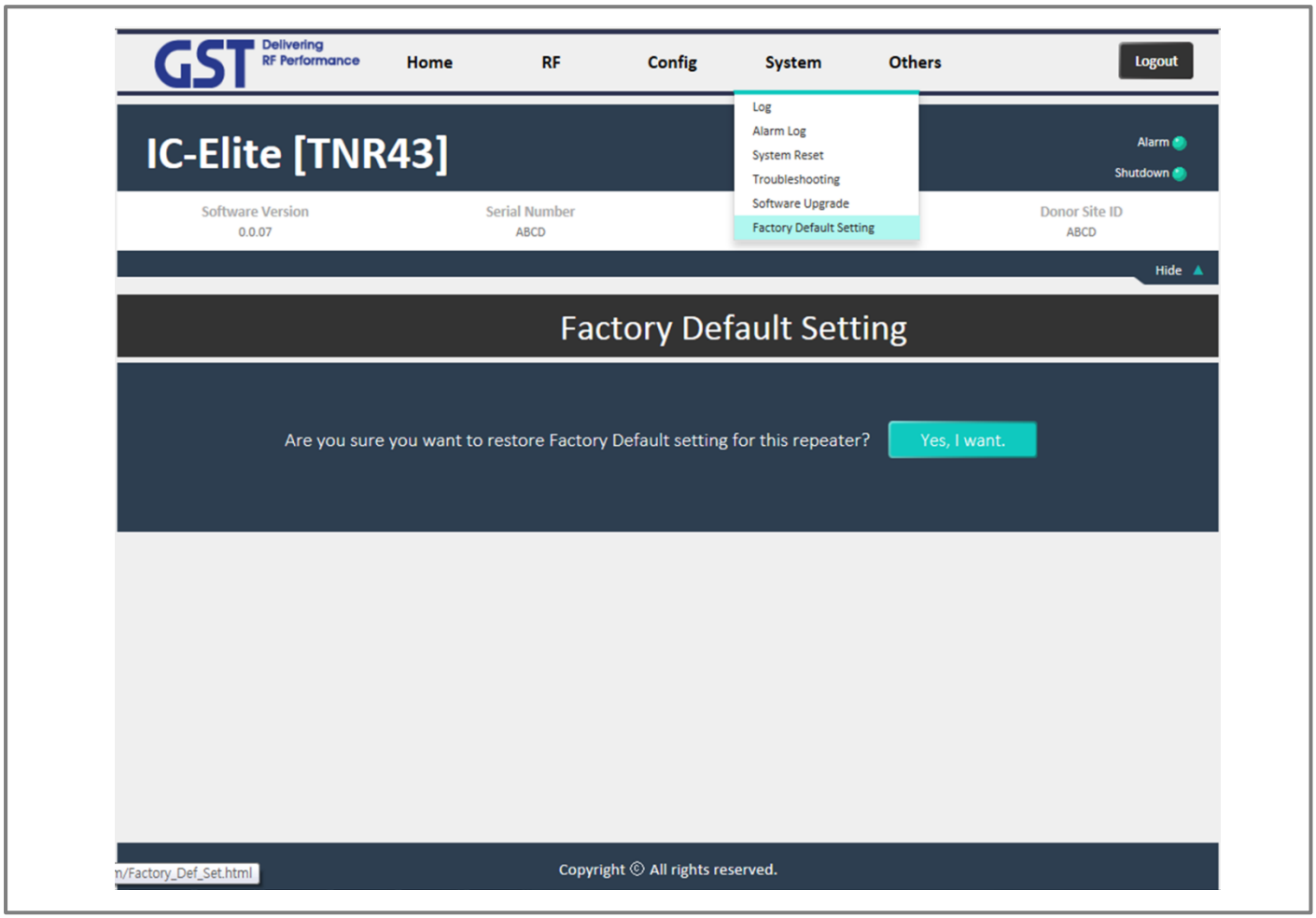

Figure 20. The way to restore Factory Default Setting for repeater

7.13. Configuration Transfer

- Web-UI Screen for mutual information transfer between Repeater and Local Craft

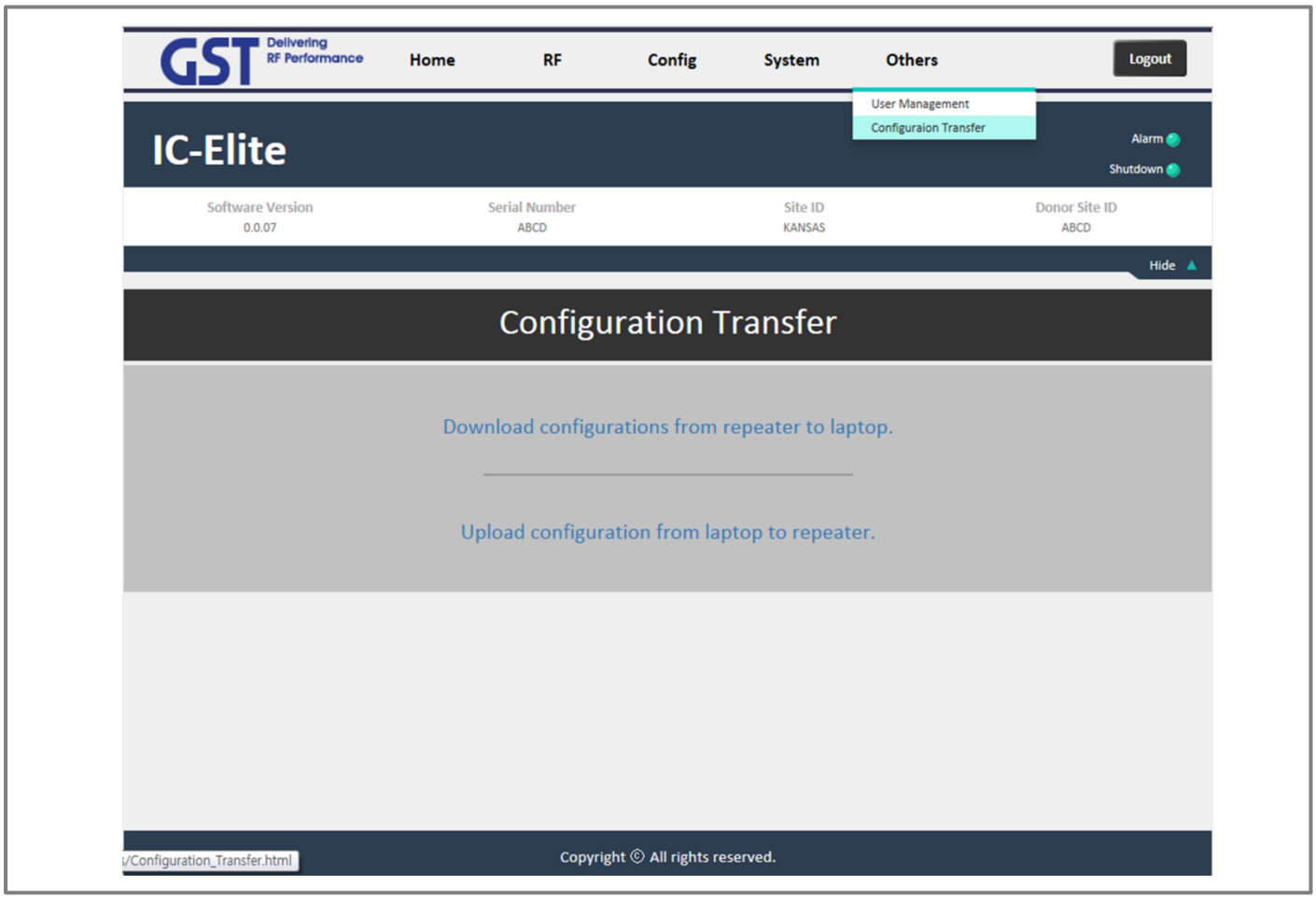

Figure 21. The way to down/ up load configuration between laptop and repeater

8. System Installation

- This chapter describes how to install the repeater and Cabling method
- The needed accessories and tools are list up as below
- More detailed information about installation, refer to the MOP(Manufacturer Operating Process)

#	Contents		Picture	Q'ty
1	Mounting Bracket (wall mount)			1EA
2	AC Power Cable SJT AWG, 6ft			1EA
3	Installation purchase	M6x15mm BOLT, SEMS		4EA
4	Mounting Screw set	LAG SCREW 3/8"x5", SCM440		4EA
		LAG SCREW 3/8"x2", SCM440		4EA
		HEX BOLT 3/8"x2", SCM440		4EA
		HEX NUT 3/8", SCM440		8EA
		Φ10.5mm/Φ21mm PLAIN WASHER		12EA
		Φ10.2mm/Φ18.4mm SPRING WASHER		8EA

Table 13. GST-Ic-ELITE-TNR Installation Accessories

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8.1. Warnings and Hazards

8.1.1. Electric Shock

- Opening the Repeater could result in electrical shock and may cause severe injury
- Operating the Repeater with antennas in very close proximity facing each other could lead to severe damage to the repeater

8.1.2. Exposure to RF

Working with the repeater while in operation, may expose the technician to RF electromagnetic fields that exceed FCC Rules for human expose.

Visit the FCC Website at http://www.fcc.gov/oet/rfsafety to learn more about The effects of exposure to RF electromagnetic fields

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8.2. Cabling

The cabling diagram of the GST-IC-ELITE TNR-Indoor is as follows

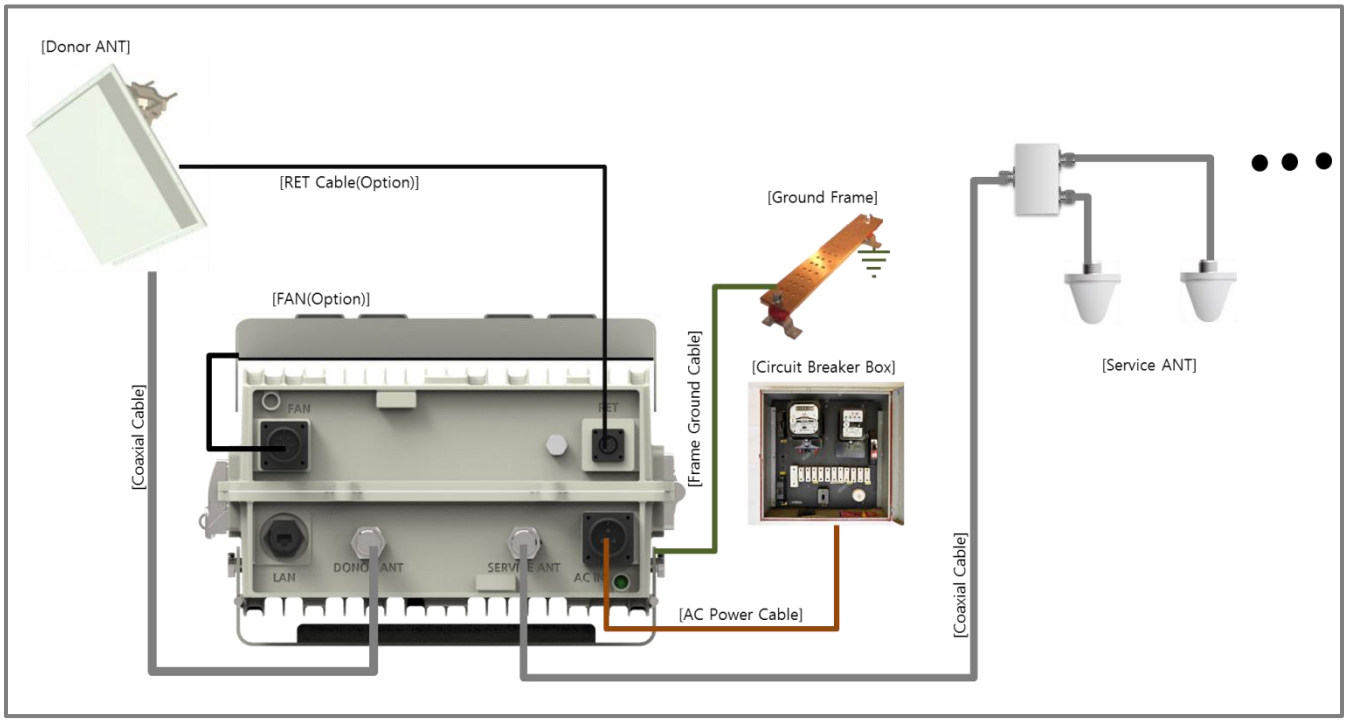

Figure 22. GST-IC-ELITE-TNR-Indoor Cabling Diagram

From	To	Cable
GST-IC-ELITE TNR	MGB	Frame Ground Cable: AWG 6/ 6ft
	Circuit Breaker Box	AC Power Cable: AWG 16/ 6ft
	RF Antennas	RF Antenna Feeder Cable: 1/2 inch Feeder Line
		RET control Cable (option)

Table 14. GST-IC-ELITE-TNR-Indoor Connecting Cable

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No use for the unauthorized device

When installing the system, must check the devices that use is authorized.

This conditions apply antenna, cable and coupling device if necessary.

Circuit Breaker Installation in the Box for Overcurrent Protection

Must install the circuit breaker between the system and main AC source for separating.

Make sure to install the Circuit breaker on the place to operate easily

Circuit Breaker is able to operate up to 20A

and do not exceeds a distance from circuit breaker box to repeater is 5ft

Terminal, Conduit and Cable Size

To install the conduit is according to NAE regulation, and Terminal sixe is according to NEC regulation

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8.3. Installation Guide for Crew

8.3.1. Wall Mount Installation

The procedure for fixing the wall type system is as follows:

1) Wall Mounting Bracket Shape

Figure 23. Mounting Bracket Shape

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2) To mount the system on the wall, first fix the bracket on the wanted position

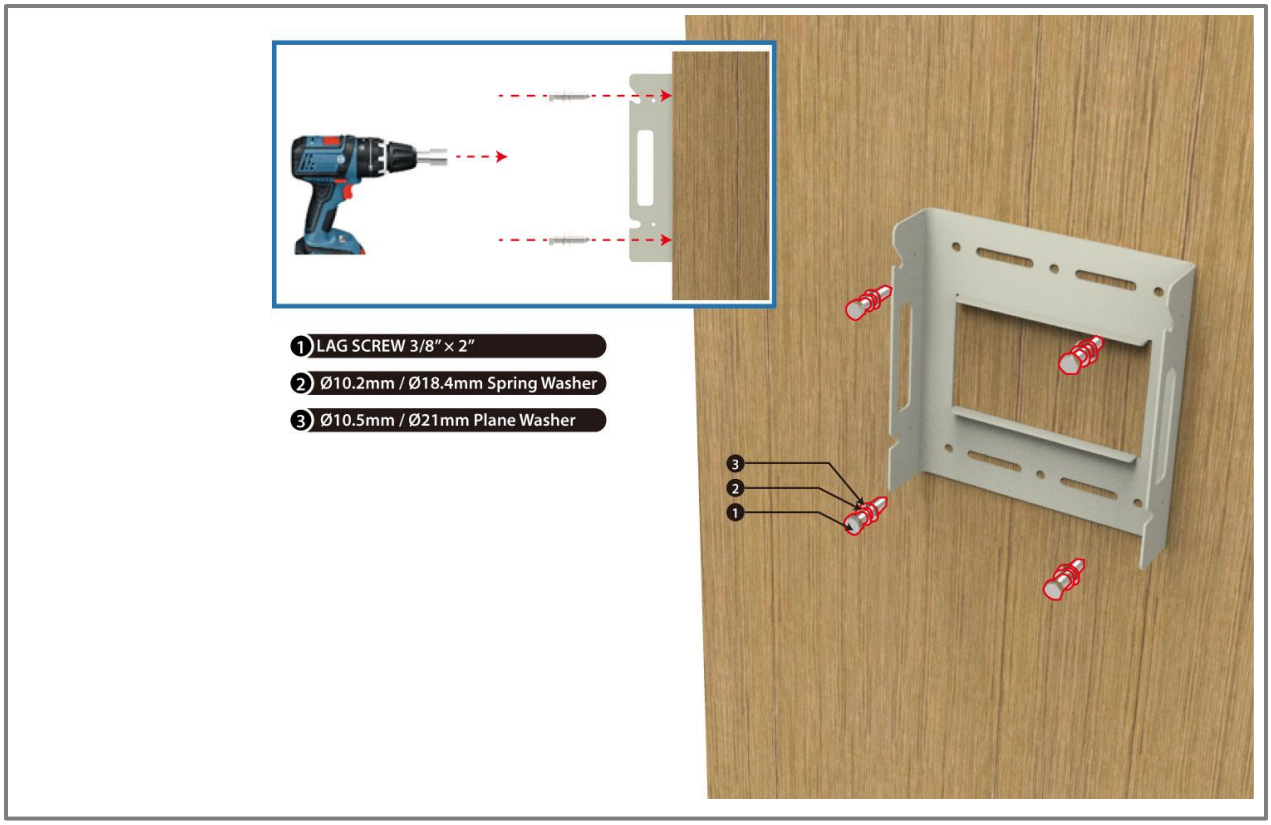

Figure 24. Fixing the Bracket for installing a Wall Mount

CAUTION

Wall Thickness

Wall thickness to fix the system is 1.5 inch over at least.

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3) Hang the system to the hooking position at the top of the mounting bracket

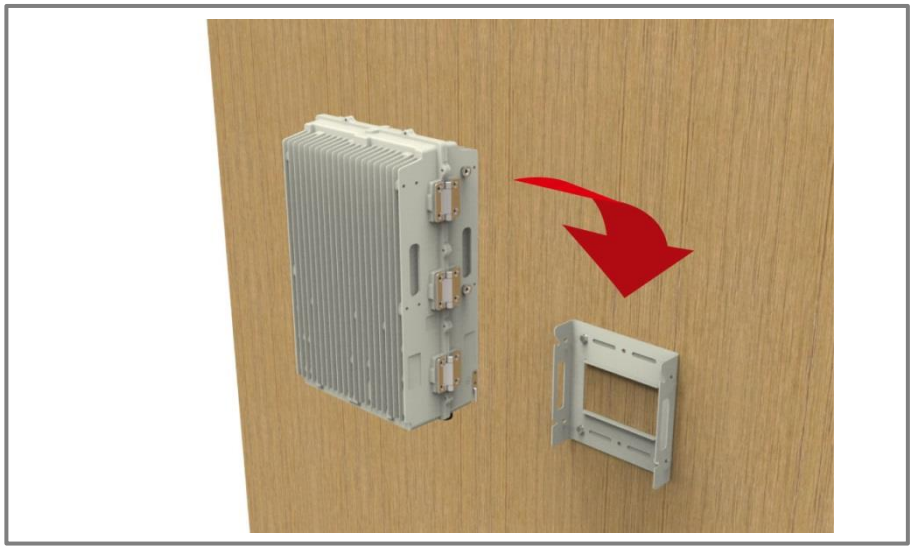

Figure 25. The way to hang the system for Wall Mounting

4) Align the system with the fixing holes of the mounting bracket and fix them firmly

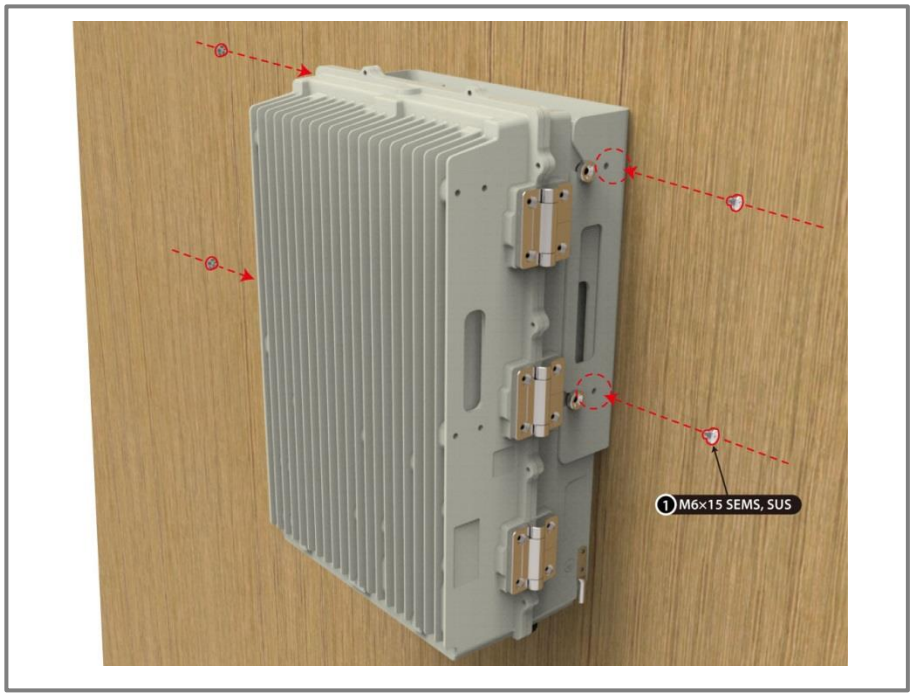

Figure 26. The way to fix firmly the System for Wall Mounting

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8.4. Cable Connection

8.4.1. AC Power cable connection

- Repeater supports a free AC Input voltage from 110V to 220V
- The pin description of AC Port is below. User should connect exact polarity of AC

Port Outlook (Fixed Side)	Port numbering	NAME	Description
MS-3102A-10SL-3P	A	AC_H	AC Hot
	B	AC_N	AC Neutral
	C	F.G	Frame Ground

Table 15. AC Power Connector Configuration

8.4.2. FAN Power Cable Connection (OPTION)

Port Outlook (Fixed Side)	Port numbering	NAME	Description
MS3102A14S-2P	A	RED	+24 VDC
	B	RED	+24 VDC
	C	BLACK	GND
	D	BLACK	GND
	E	YELLOW	FAN Alarm #1
	F	YELLOW	FAN Alarm #2

Table 16. GST-IC-ELIT TNR FAN Power Cable Connection

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8.4.3. RET Cable Connection (Option)

Port Outlook (Fixed Side)	Port numbering	NAME	Description
SU20SPR-8S	3	RS485B	Communication
	4	DGND	Frame Ground
	5	RS485A	Communication
	6	+29 V	1.5A max
	7	DC Return	Retune DC Power
	1, 2, 8	NC	-

Table 17. GST-IC-ELIT TNR RET Cable Connection

8.4.4. Local Maintenance Connection

- Repeater Support a RJ-45 connector for local maintenance

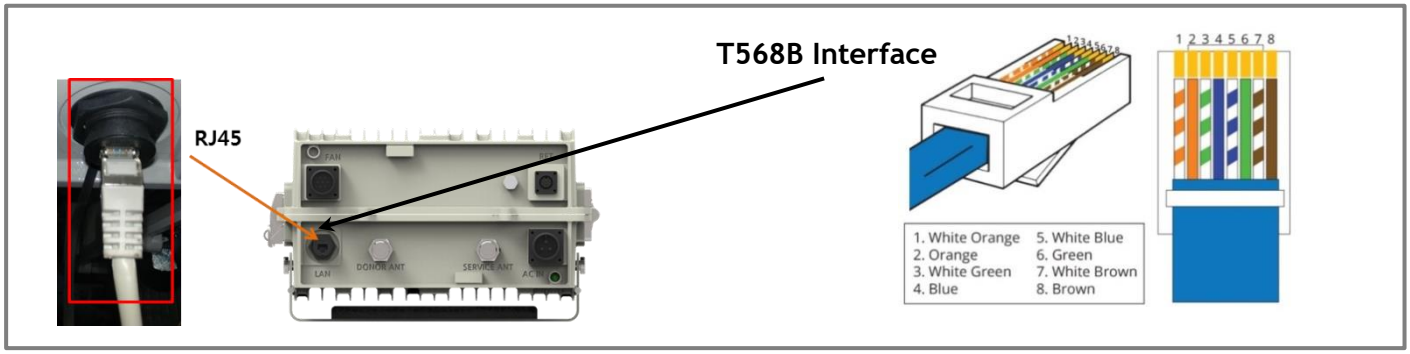

Figure 27. RJ-45 Interface for connecting the Local Maintenance

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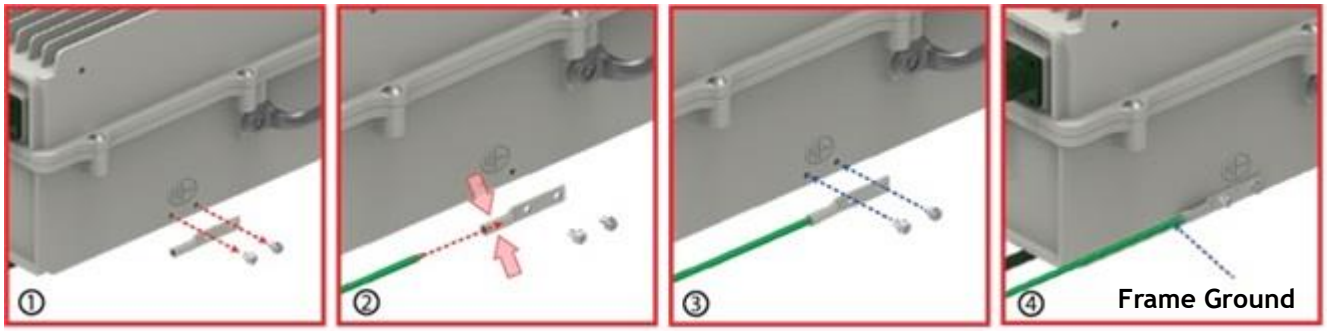
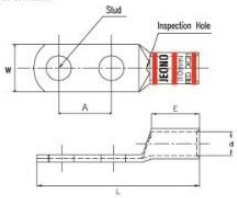
8.4.5. Grounding cable Connection

- JOCT 0202-RL05 Lug supports AWG #6. The way to install the grounding cable is below



TUBULAR CABLE LUGS, TWO-HOLE, STANDARD BARREL AND LONG BARREL
TYPE-CT

- Material : Electrolytic Copper (TPC)
- Surface : Tin Plated
- With Inspection Hole
- Color Coded to Show Proper Die Number and Color 10㎟~630㎟
- To IEC 60228 Class 2 and Class 5
- UL Listed 486A-486B up to 35KV



Part No Explation : JOCO 0201-X X 04 → Stud Size(mm, UNC)
Tongue Form R : Round Type, S : Square Type
Barrel Form *S : Standard Barrel Type, *L : Long Barrel Type

Part Number	Wire Range CODE AWG	Wire Range CODE ㎟	Wire Range FLEX AWG	Wire Range FLEX ㎟	Stud Size	Dimension (mm) W	d	A	E *S	E *L	L *S	L *L	Color Code & Die No	Q'ty / bag
JOCT 0202-XX05	6	16	6	16	M5	12	5.4	16	15	30	52	67	Blue 24 JOCD-6	300
JOCT 0202-XX06					M6									
JOCT 0202-XX08					M8	15.5		19			67	82		
JOCT 0202-XX10					M10									
JOCT 0202-XX12					M12	18		22			70	85		

Figure 28. The way to install the Frame Ground Cable and Lug specifications

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9. FCC Warning Statement

<FCC Warning Statements>
FCC Part 15.105 statement

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.

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 120 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.

licensee consent
Any personnel involved in installation, operation or service of the repeaters must understand and obey the following:
- You MUST REGISTER THIS DEVICE with your wireless provider and have your provider's consent.
- If you are unsure, contact your provider
- The device can be operated for CMRS (Commercial Mobile Radio Service)

Signal booster warning label message

> **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.

-. Use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP and/or indoor-only restrictions is prohibited.

-. Home/ personal use are prohibited

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Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information

Unique Identifier: IC-ELITE TNR33
Responsible Party – U.S. Contact Information

GSTeletech,Inc.
8206 Marshall Drive,
Lenexa, Kansas 66214

Contact point
Charles You
chyu@gsteletechinc.com
Office : 1-913-469-6699
Fax : 1-913-661-0163

FCC Compliance Statement (e.g., products subject to Part 15)
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.

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