PS-ELITE7833

Installation and Operating Manual

Version 1.0

GSInstech Co., Ltd

Revision History

Version	Author	Descriptions	Date	Remarks
1.0	S.M Ko	Draft	6 Nov 2017	

Change List

Version	Change List	Remarks

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Abbreviations

Abbreviation	Term Definition	Remark
AGC	Automatic Gain Control	
ALC	Automatic Level Control	
BTS	Base Transceiver Station	
CW	Continuous Wave (un-modulated signal)	
DAS	Distributed Antenna System	
DFM	Digital Filter Module	
DL	Downlink The path covered from the BTS to the subscribers service area via the repeater	
FW	Firmware	
HPA	High Power Amplifier	
HW	Hardware	
IF	Intermediate Frequency	
LNA	Low Noise Amplifier	
LTE	Long Term Evolution	
MS	Mobile Station	
PSU	Power Supply Unit	
RF	Radio Frequency	
RFU	Radio Frequency Drive Unit	
SW	Software	
UL	Uplink The path covered from the subscribers service area to the BTS via the repeater	
VSWR	Voltage Standing Wave Ratio	

1. FCC and IC Mandatory

1.1 FCC Warning States

1.1.1 FCC Part 15.21

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

1.1.2 FCC Part 15.105

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.

1.1.3 FCC Caution

1) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2) Antennas must be installed in accordance with FCC/ISED requirement.
   With **8 dBi** gain antennas the height of the antenna above average terrain (HAAT) must not exceed XXXX m. For different gain antennas refer to the relevant rules.

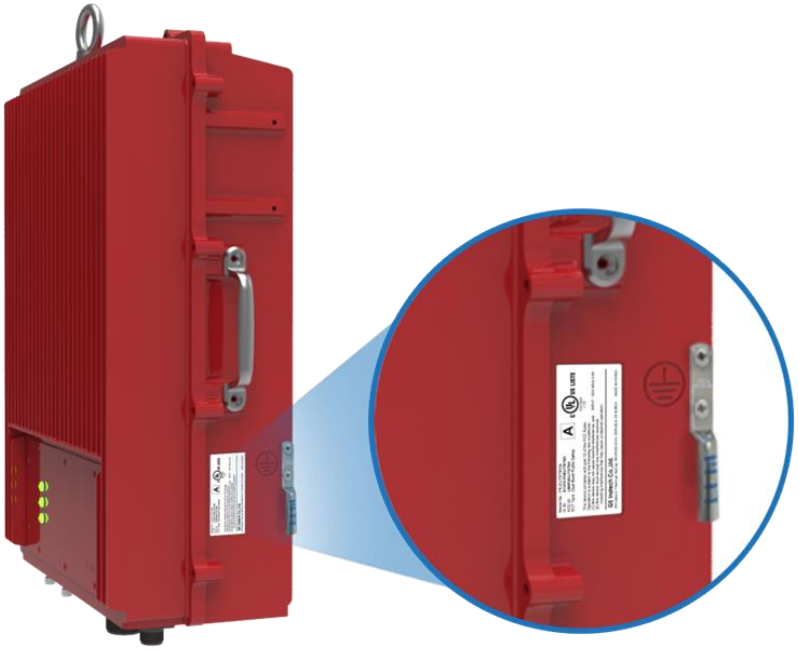
1.1.4 Radiation Exposure Statement

The product complies with the FCC12 portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user's body or set the device to lower output power if such a function is available.

1.1.5 FCC Warning Labels

1) FCC Part 15.19

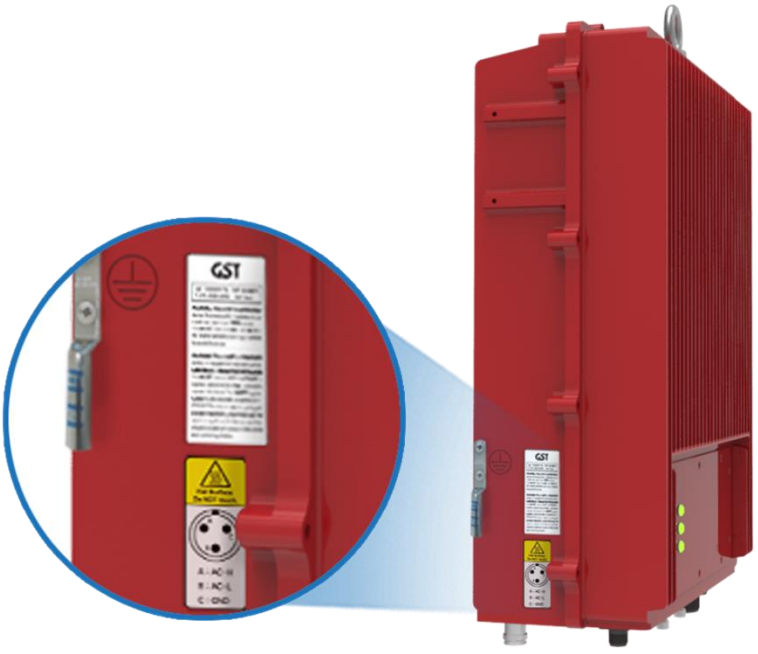
The FCC Certification label has attached right side of PS-ELITE7833. The FCC Certification label contained FCC 15.19 warning statement, Device type (A or B), FCC, ISED and UL ID

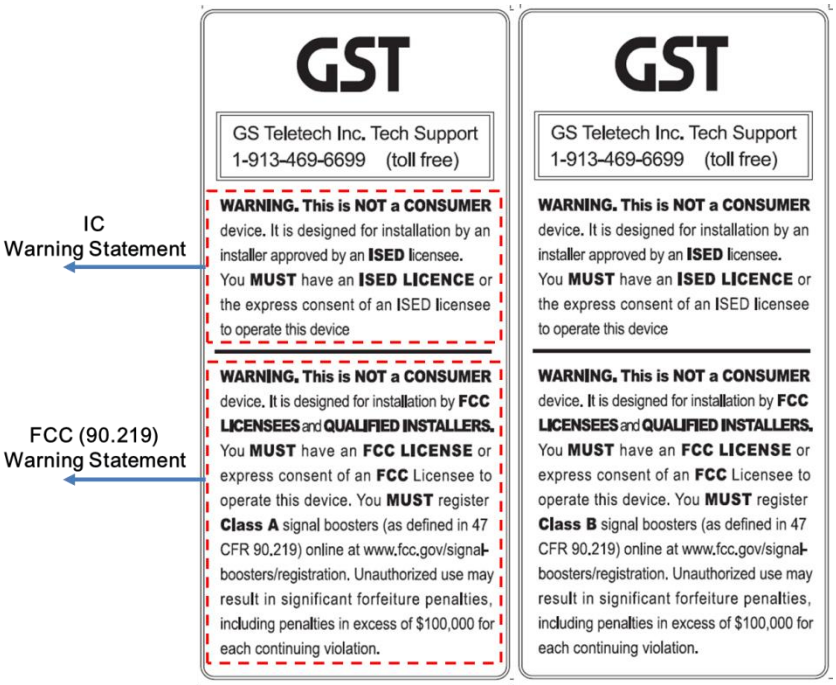


This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

2) FCC Part 90.219

Booster Warming Label is attached left side of Ps-ELITE7833. This label has contains FCC 90.219, IC warning statements and contact phone number for a trouble shooting.




IC
Warning Statement
FCC (90.219)
Warning Statement
GST
GS Teletech Inc. Tech Support
1-913-469-6699 (toll free)
WARNING. This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device
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. You MUST register Class A signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.
GST
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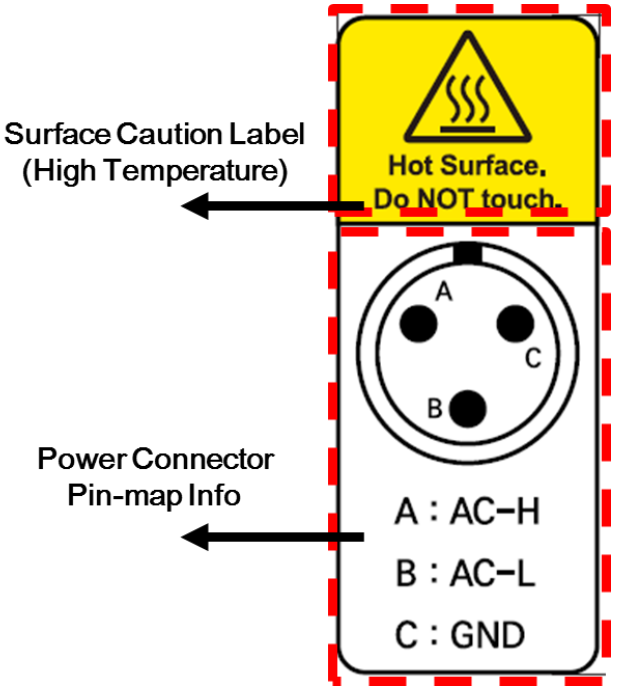
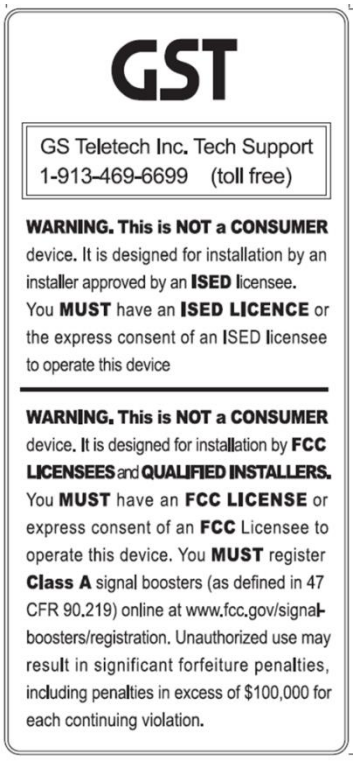
WARNING. This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.


Surface Caution Label
(High Temperature)
Hot Surface.
Do NOT touch.
Power Connector
Pin-map Info
A
C
B
A : AC-H
B : AC-L
C : GND

① Class A (B9A)



"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. You MUST register Class A signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation."

② FCC Part 90.219 Class B (B9B)

"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. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation."

1.2 ISED Warning state

1.2.1 RSS-GEN, Sec. 7.1.2 – (transmitters)

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the Equivalent Isotropically Radiated Power (E.I.R.P.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionneravec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada.
Dans le but de réduire les risques de brouillage radioélectrique à l'intention desautres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotroperayonnée quivalente (p.i.r.e.) ne dépassepas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

1.2.2 RSS-GEN, Sec. 7.1.2 – (detachable antennas)

This radio transmitter (identify the device by certification number, or model number if Category II)has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste,ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

1.2.3 RSS-131 Section 5.3 User Manual

This user manual shall contain the following information on the enhancer:

1) The nominal passband gain (dB);
2) The nominal bandwidth;
3) The rated mean output power;
4) The input and output impedances, and;

Item	Spec.	Remarks
The nominal passband gain	95dB	
The nominal bandwidth	18MHz	
The rated mean output power	+33dBm	
The input and output impedances	50Ω	

5) Caution

"The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device."

1.2.4 RF Radiation Exposure

This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of at least 100 cm with 15dBi antenna gain between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. RF exposure will be addressed at time of installation and the use of higher gain antennas require larger separation distances.

L'antenne du donneur a une antenne 15dBi gain.Antenna doit être installé pour maintenir en tout temps un minimum de distance d'au moins 100 cm entre la source de rayonnement (antenne) et toute personne physique.
Cet appareil ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou émetteur.

1.2.5 ISED warning label

1) Booster Warming Label is attached left side of Ps-ELITE7833. This label has contains FCC 90.219, IC warning statements and contact phone number for a trouble shooting.

WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device.

IC
Warning Statement

FCC (90.219)
Warning Statement

GST

GS Teletech Inc. Tech Support
1-913-469-6699 (toll free)

WARNING. This is NOT a CONSUMER device. It is designed for installation by an installer approved by an **ISED** licensee. You **MUST** have an **ISED LICENCE** or the express consent of an ISED licensee to operate this device

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. You **MUST** register **Class A** signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

GST

GS Teletech Inc. Tech Support
1-913-469-6699 (toll free)

WARNING. This is NOT a CONSUMER device. It is designed for installation by an installer approved by an **ISED** licensee. You **MUST** have an **ISED LICENCE** or the express consent of an ISED licensee to operate this device

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. You **MUST** register **Class B** signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

1.3 Prohibitions

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

- Preclude indications that Home/ personal use are prohibited.

2. General Information

This document is primarily written for those who are new to PS-LITE78A/B system and wish to tune up the equipment. The document is applicable to below products from GSINSTECH. Model number: PS-ELITE78A/B

2.1 Repeater Information (FCC & ISED ID)

Certification	Type	ID	Remarks
FCC	B9A	U88PSELITE78A	
	B9B	U88PSELITE78B	
ISED	B9A	8137A- PSELITE78A	
	B9B	8137A- PSELITE78B	

2.2 Purpose

PS-ELITE7833 Bi-Directional Amplifier (BDA) is a repeater, which has been designed to improve signals in blanket/shadow areas inside of buildings to transmit Provider's variety frequencies. User may choose filtering configuration according to the specific site circumstances.

2.3 Repeater Advantages

- It provides selectable RF power levels for any wireless technology / band.
- It has individual monitoring multiple technology.
- FPGA digital filtering provides optimized RF performance.
- It allows modification of technology via customer interface.
- It is easily installed.
- Frequency is easy to add / delete / change.
- It has scalable single and multi-service design.
- Customer data service is improved by FirstNet
- It meets all users' technological requirements.

2.4 Highlights

- Dual band support 700MHz and 800MHz band by WEB UI
- Simultaneous Filter Supporting 1 Wide Band and 32 Non-Contiguous Narrow Bands
- Each band supports up to 32 channels
- 2W output power for each band
- Fan-less

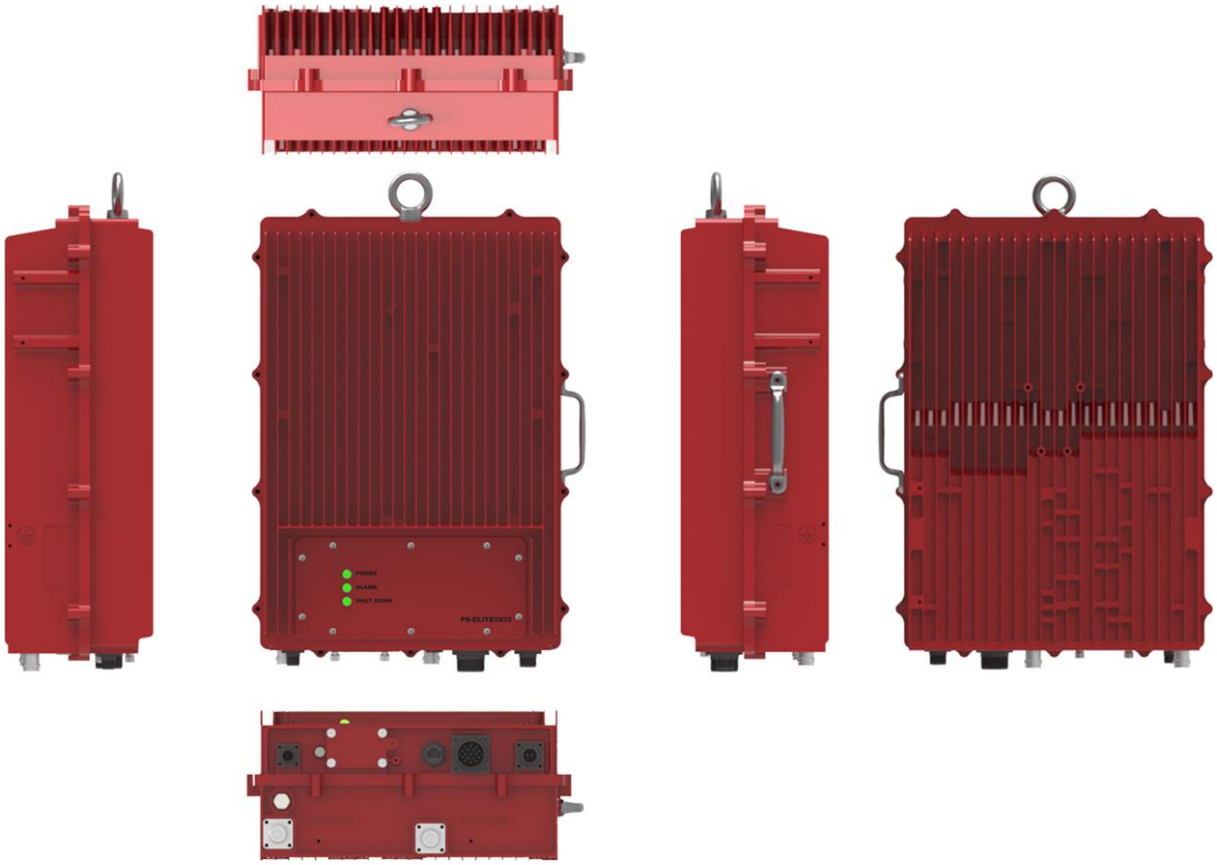
- Significant Filter Roll-off performance

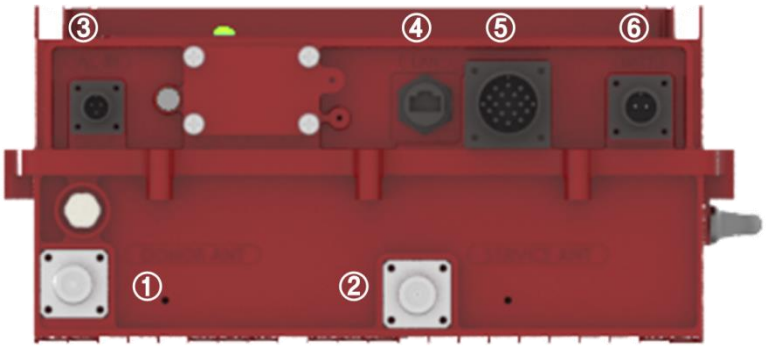
- Wide: 60dBc@Filter Bandwidth Edge ± 1MHz

- Narrow: 60dBc@Filter Bandwidth Edge ± 6.25KHz (or Filter BW / 2))

- Supports Phase 3 Dry Contact
- External Alarm Function supporting dry contacts 8
- Digital/programmable utilizing FPGA
- Auto shutdown with alarm upon oscillation detection
- Web based GUI for intelligent configuration, SNMP supported
- NFPA compliant dry contact alarms, NEMA 4x enclosure

2.5 Exterior

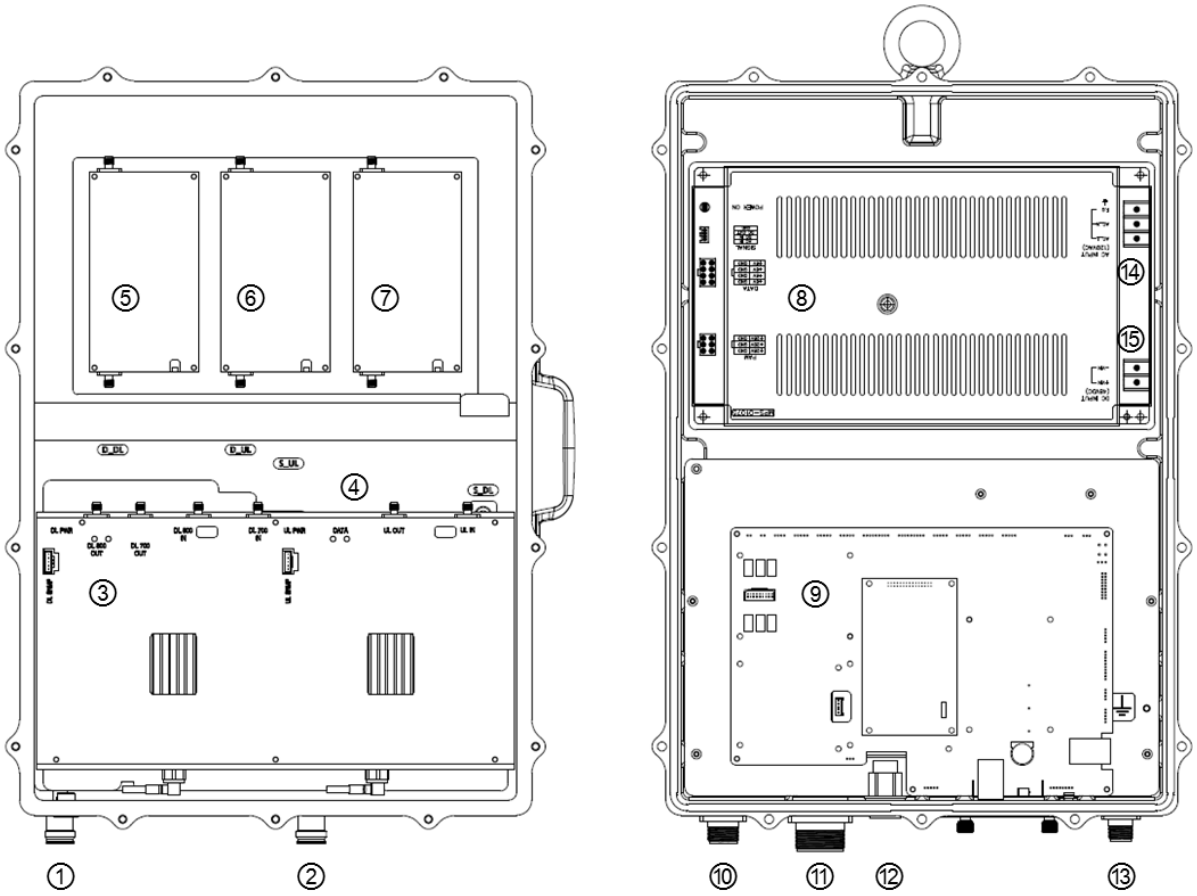




① Donor Antenna Port
② Service Antenna Port
③ AC 110V Input Port
④ Ethernet Port
⑤ External Alarm Box link Port
⑥ Battery Backup Unit link Port
(Only -48V DC Input)

2.6 Interior

PS-ELITE7833 consists of the following modules:



No.	Item	Remarks	No.	Item	Remarks
1	Donor Antenna Port		9	Control Board	
2	Service Antenna Port		10	Battery Backup Input	
3	Integrated Module	Top : RFU Bottom : DFM	11	Ext. Alarm Connector	-48V DC
4	Duplex Cavity Filter		12	Network / UI Port	Waterproof
5	DL 700 HPA		13	AC Input Connector	110V AC Only
6	DL 800 HPA		14	AC Input Terminal	
7	UL Integrated HPA		15	Battery Input Terminal	
8	PSU				

1) Donor and Service antenna Port

All antenna ports use a 4.3-10 Din connector. If user wants to use an N-type cable, user must use a separate adapter. (Not included)

2) Integrated Module

The integration module consists of RFU and DFM.

The RFU is assembled at the bottom of the integrated module, and performs amplification, filtering, and gain control on the signal that passes through the duplexer.

The DFM is assembled on top of the integration module. DFM performs band select, band width adjustment and power detection according to user setting.

3) Duplexer

Separation of input and output signals and isolation between paths

4) DL 700 /800 HPA Module

DL 700 HPA and DL 800 HPA are made up of different modules.

It amplifies the filtered and band selected signals via RFU and DFM, and maintains the output of the system.

5) UL Integrated HPA Module

The UL HPA provides 700M and 800M bands as one integrated module. It amplifies the filtered and band selected signals via RFU and DFM, and maintains the output of the system.

6) PSU

The PSU supply power to the system.

The PSU receives 110V AC power and supplies + 28V DC and + 6V DC to the system. In the event of an AC power failure, the system can be powered by receiving a -48V DC power through the battery. The battery voltage input to the PSU should be -48V. If + 48V is used, the electrodes must be reversed when connecting the battery. If the required battery voltage is not used or the electrode is not suitable, the PSU may be damaged or not functioning normally.

The Company shall not be held liable for the problems caused by this.

7) Control Board

The control board performs functions such as system control, communication. And alarm information share through the external alarm connector.

System control and communication functions are available via the Web UI and SNMP via the system RJ - 45 Port, Alarm Information Sharing is Ext. It can be connected to the External Alarm Panel via the Alarm Connector for use.

8) Battery Backup Port

The system can use the battery backup system. In this case, the battery output should be -48V DC and the use of other voltage batteries are not permitted. If user wants to use the + 48V DC battery, cross the system's electrode and battery electrode when connect the battery to the system connector.

User can't be held responsible for any problems that arise from not following these recommendations

9) Ext. Alarm Connector

Ext. Alarm Connector is a port used to share alarm information generated by the system with external alarm panel. Alarm information is shared through dry contact. Mapping between Alarm and Connect can be confirmed by the following table.

10) Network / UI Port

The system supports Web UI or SNMP function through Ethernet to improve accessibility of external network and user. To this end, the user can connect a cable to the RJ-45 connector. All connectors and cables used should be waterproof.

11) AC Input Connector

The voltage input to the system is 110V AC and the voltage input such as 220V AC is not approved. No liability or compensation shall be required by the Company for problems caused by not permitted input AC voltage.

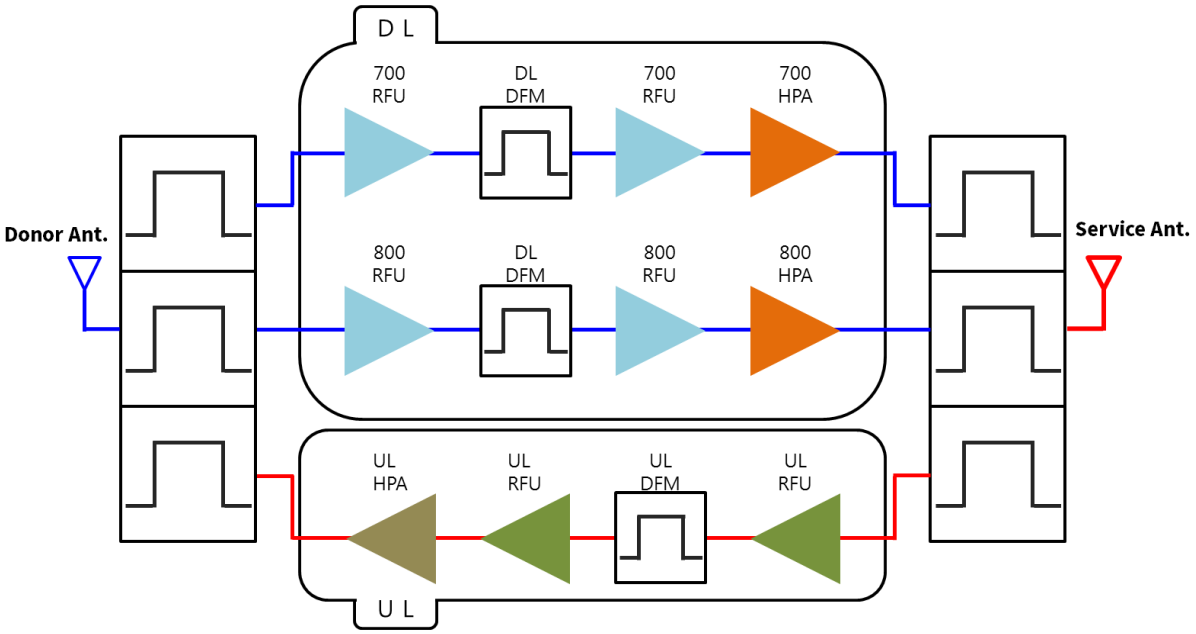
3. Specifications

3.1 US Frequency Allocation

3.1.1 US frequency

Item		Specification	Remark
Down Link Frequency	700 (PSBB)	758MHz ~ 768MHz	LTE
	700 (PSNB)	769MHz ~ 775MHz	P25
	800 (PSNB)	851MHz ~ 861MHz	P25
Up Link Frequency	700 (PSBB)	788MHz ~ 798MHz	LTE
	700 (PSNB)	799MHz ~ 805MHz	P25
	800 (PSNB)	806MHz ~ 816MHz	P25

3.1.2 US Block Diagram



[MHz]

Service	Donor Antenna		RFU		DFM		HPA		Remarks
	Start	Stop	Start	Stop	Start	Stop	Start	Stop	
DL 700	758	775	758	775	758	775	758	775	
DL 800	851	861	851	861	851	861	851	861	
UL	788	816	788	816	788	816	788	816	

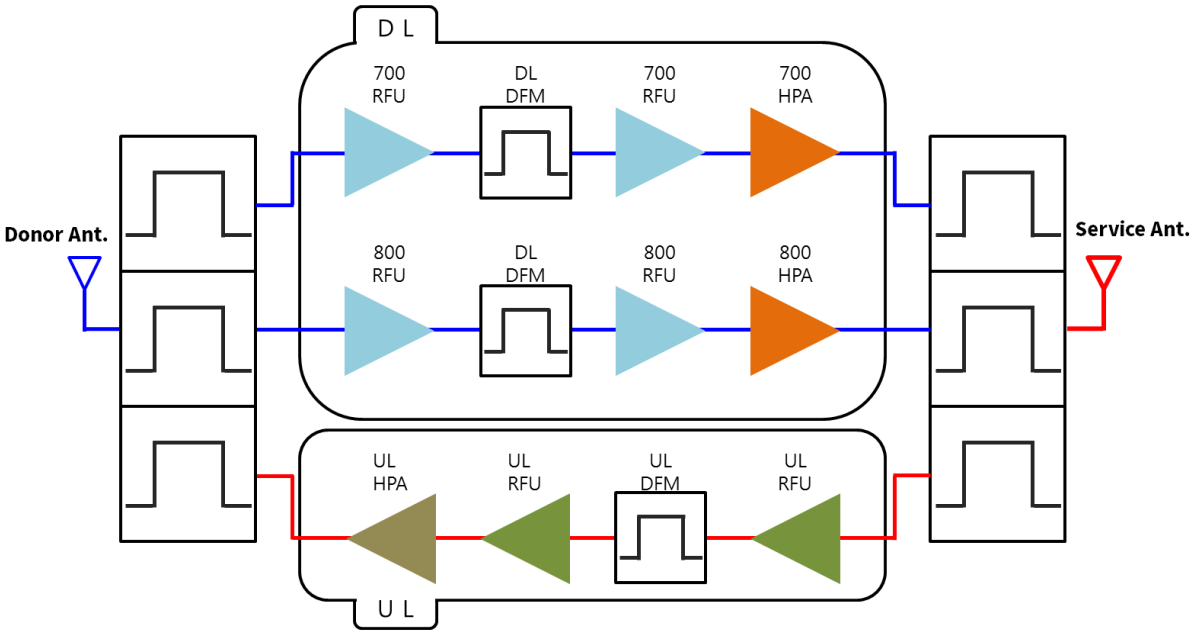
3.1.3 US Service Plan

1) The LTE network integrates Upper D band and FirstNet to have max. 10MHz Service BW.
2) The P25 Network has a Guard Band of 768-769MHz and 775-776MHz.

3.2 Canada frequency

Item		Specification	Remark
Down Link Frequency	700 (PSBB)	LTE Not Support	
	700 (PSNB)	768MHz ~ 776MHz	P25
	800 (PSNB)	851MHz ~ 869MHz	P25
Up Link Frequency	700 (PSBB)	LTE Not Support	
	700 (PSNB)	798MHz ~ 806MHz	P25
	800 (PSNB)	806MHz ~ 824MHz	P25

3.2.1 Canada Block Diagram

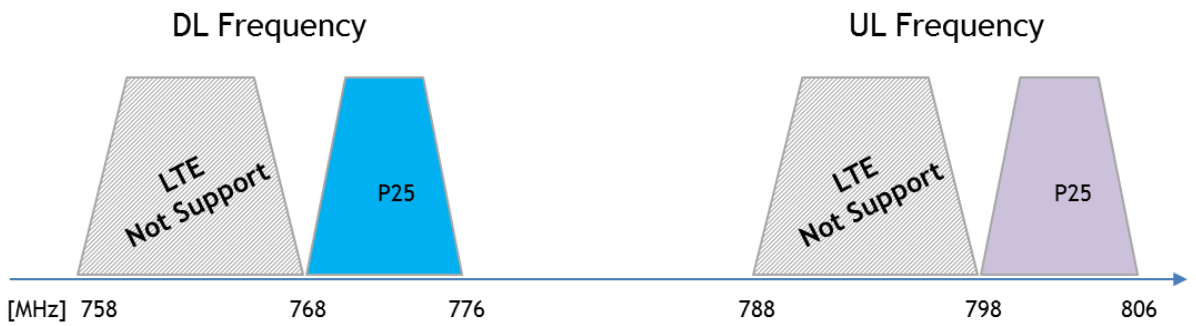


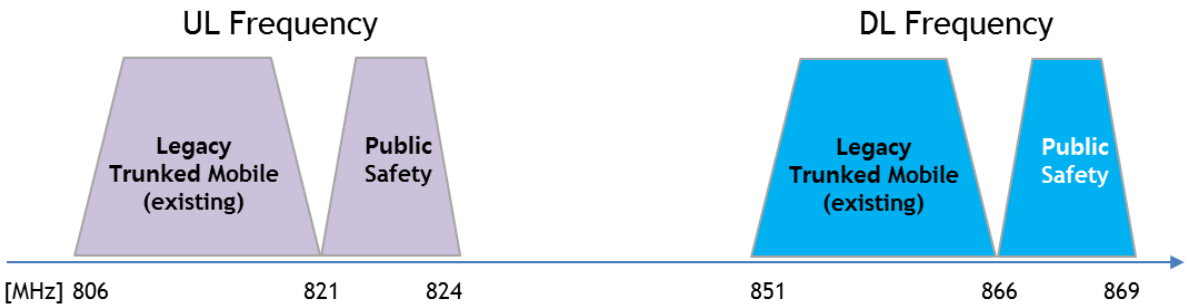
[MHz]

Service	Donor Antenna		RFU		DFM		HPA		Remarks
	Start	Stop	Start	Stop	Start	Stop	Start	Stop	
DL 700	768	776	768	776	768	776	768	776	
DL 800	851	869	851	869	851	869	851	869	
UL	798	824	798	824	798	824	798	824	

3.2.2 Canada Service Plan

1) Canada currently does not support LTE in the Public Services network.
2) Canadian 700MHz Public Safety band does not use Guard Band.




UL Frequency
DL Frequency
Legacy Trunked Mobile (existing)
Public Safety
Legacy Trunked Mobile (existing)
Public Safety
[MHz] 806
821
824
851
866
869

3.3 Common Specifications

Item		Specification	Remark
Select Bandwidth	PSBB – LTE	5 / 10MHz	2 Non-contiguous
	PSNB – B9A	6.25 / 12.5 / 25 / 50 / 75KHz	32 Non-contiguous
	PSWB – B9B	100 / 125 / 150 / 175 / 200 / 225 / 250KHz	
Output Power	LTE (PSBB)	+30dBm / 1W	+33dBm / Total
	700 (PSNB)	+30dBm / 1W (@total)	
	800 (PSNB)	+33dBm / 2W (@total)	
Max RF Input Power without		-17dBm	@ Over Drive
Max RF Input Power without		+10dBm	@ Damage
Gain	Range	50dB ~ 95dB	ALC: 45dB
	Adjust Step	±1.0dB	
	Adjust Accuracy	±1.0dB	
Propagation Delay	LTE	< 6us	
	PSNB	< 230us	
Single Tone		Power Change < +2/-4dB	Input CW: -40dBm
Input Inter-modulation		AGC, ALC Output power Change < 10dB @ ±1.25M edge	Input CW: -40dBm
Adjacent Channel Power	LTE	> 45dBc @ ± 5M > 50dBc @ ± 10M	
	PSNB	> 55dBc @ Ch Offset 25kHz	
		> 55dBc @ Ch Offset 50kHz	
Flatness		< 3dB	
Return Loss / VSWR		< -14dB / < 1.5 : 1	
Noise Figure		< 5dB @ Max gain	Uplink Only
EVM		≤ 8% (E-TM3.1 / DL : 64QAM, UL 16 : QAM)	LTE Only
Roll Offs	LTE	>60dBc @ ±1MHz	outside pass-band
	PSNB	>60dBc @ ±6.25KHz or >60dBc @ ± ½ Bandwidth	
Characteristic Impedance		50Ω	

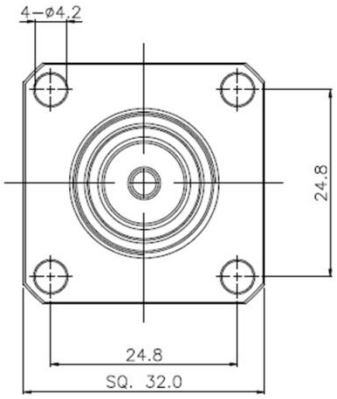
3.4 Mechanical Spec.

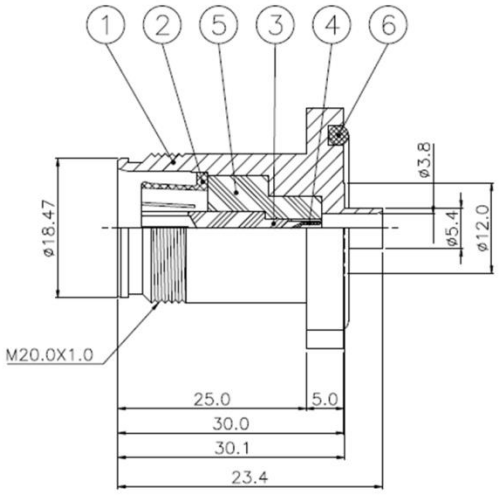
Item		Specification	Remark
RF Connector		DIN (**4.3-10**) Type Female	
AC Power Connector		MS3102A 10SL-3P	
AC Power Cord		MS3106A-10SL-3S	
Battery Backup Connector		MS3102A-14S-9P	
External Alarm Connector		MS3102A-22-14P	
External Interface		RJ-45 / USB A Type	Waterproof
Alarm Interface		Dry Contact	20Pin
AC Supply		110VAC ~ 120VAC, 60Hz 2.0A	±10%
DC Supply		-48V	
Out Dimension		13.2(W) * 18.9(H) * 6.4(D)	Inches
Net Weight		50	Lbs.
Material	Module	Aluminum alloy	
	Cabinet	Aluminum alloy for casting	
Operation Temperature		-40°F to +140°F (-40°C to +60°C)	Convection cooling
Humidity		5% ~ 95%	Non-Condensing
Environmental Spec.		NEMA4(x)	IP66
MTBF		100,000	hour

4. Port and Connectors

4.1 RF Connector

PS-ELITE7833 adopts a Mini-DIN 4.3/10 connector. If the user wants to use an N type cable or connector, they need an adapter



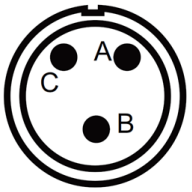


① Body
② Jack Body
③ Pin (A)
④ Pin (B)
⑤ Insulator
⑥ O Ring

4.2 AC Power Connector

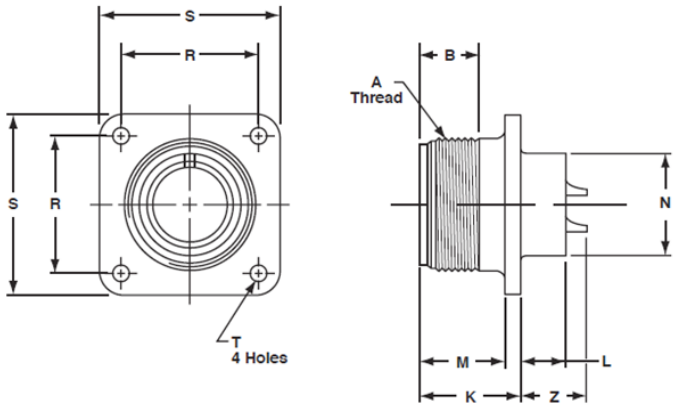
PS-ELITE 7833 use only 110V voltage. If the user uses other un-recommend input voltages, PS-EILITE7833 may be broken.

The AC Power Connector of the PS-ELITE 7833 uses MS3100A-10-10P and the user shall use a cable equipped with a cable 3106 A-10-10-3 connector to terminate the power.



A : AC.L
B : AC.N
C : F.G

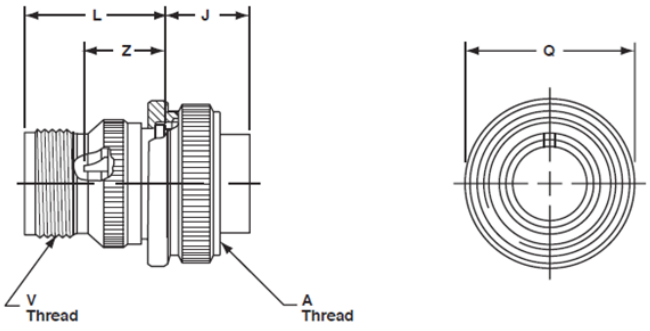
MS/Standard
MS3102A-10SL-3P
box mounting receptacle



Shell Size	A Thread Class 2A	B Min Full Thread	K +.020 –.010	L +.000 –.010	M +.010 –.000	N Dia. +.010 –.000	R ±.005	S ±.031	T Dia. +.004 –.002	Z +.050 –.060
10SL	.6250-24NEF	.391	.672	.297	.562	.625	.719	1.000	.120	.422

* Increase Z dimension by .312 for size "0" contact only.
** Increase Z dimension by .062 for size "0" contact only.
*** Available irproprietary version only.
† +.020 –.030
†† ±.020

MS/Standard
MS3106A-10SL-3S
straight plug



Shell Size	A Thread Class 2B	J ±.005	L ±.030	Q Dia. Max.	V Thread Class 2A	Z ±.045
10SL	.6250-24NEF	.531	.937	.946	.6250-24NEF	.562

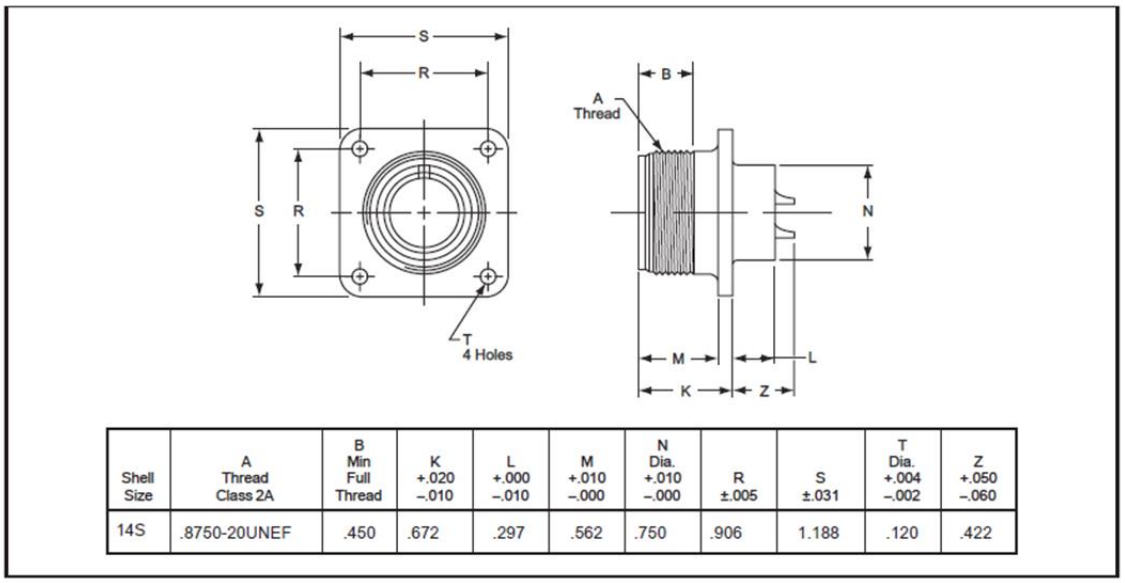
* Increase Z dimension by .312 for size "0" contact only.
** Increase Z dimension by .062 for size "0" contact only.
*** Available in proprietary version only.
† +.020 –.030

4.3 DC Battery Power Connector

PS-ELITE 7833 use a -48V battery only. If the user uses other nonstandard input voltages, PS-EILITE7833 may be broken or damaged. If the user want to use a +48V battery, it is acceptable to cross the input electrode.

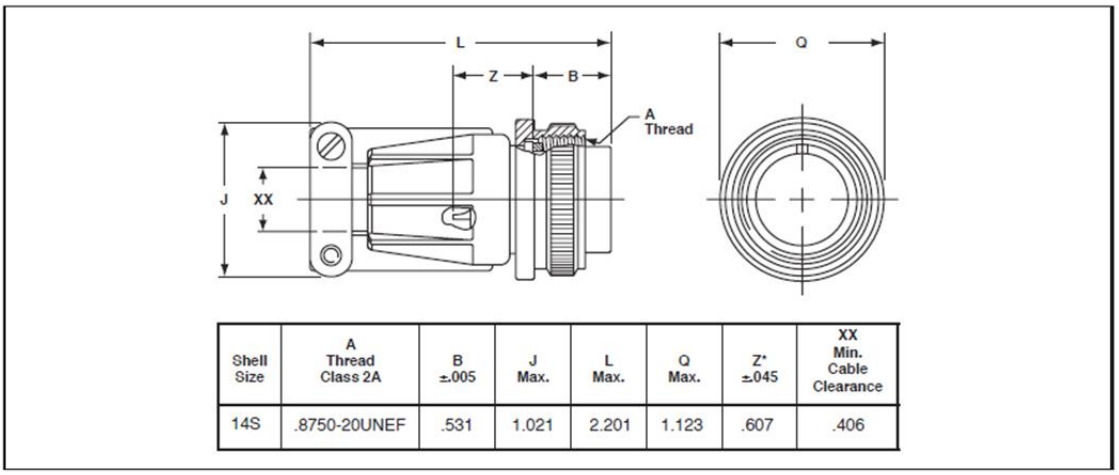
Pin No.	Pin Name		Cable Color	Remarks
1	Alarm1		Black	
2	+48		Red	

MS/Standard
MS3102A-14S-9P
box mounting receptacle



Shell Size	A Thread Class 2A	B Min Full Thread	K +.020 −.010	L +.000 −.010	M +.010 −.000	N Dia. +.010 −.000	R ±.005	S ±.031	T Dia. +.004 −.002	Z +.050 −.060
14S	.8750-20UNEF	.450	.672	.297	.562	.750	.906	1.188	.120	.422

MS/Standard
MS3106E-14S-9S
straight plug



Shell Size	A Thread Class 2A	B ±.005	J Max.	L Max.	Q Max.	Z* ±.045	XX Min. Cable Clearance
14S	.8750-20UNEF	.531	1.021	2.201	1.123	.607	.406

4.4 External Alarm Port (Dry-Contact)

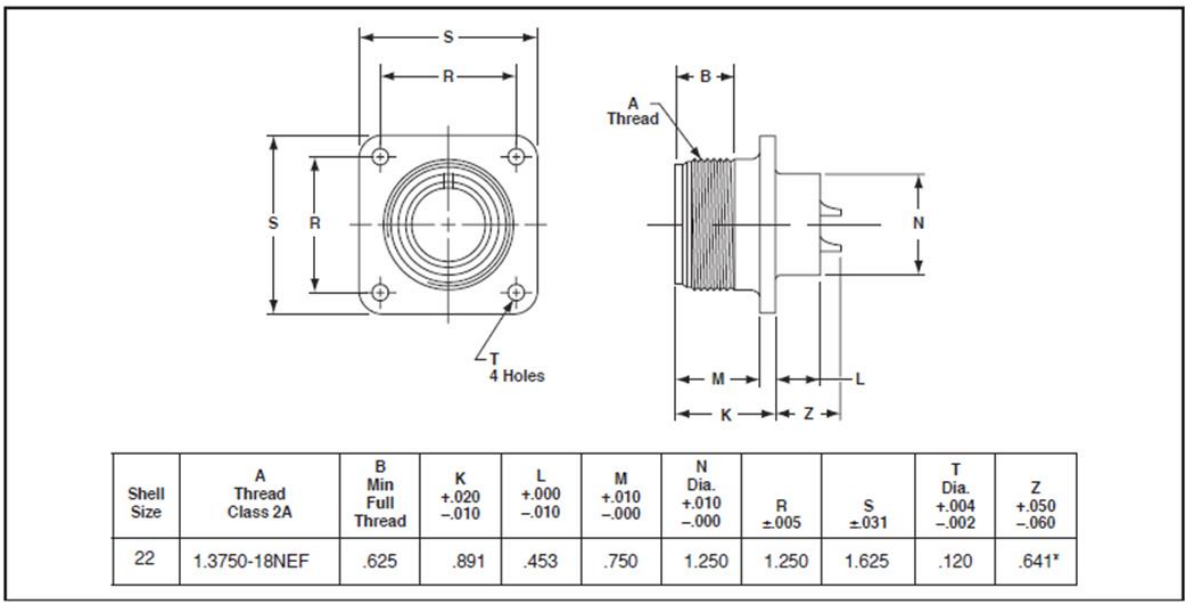
PS-ELITE7833 supports the External Alarm Box. The external alarm box is connected via the External Alarm Connector. The External Alarm Box of PS-ELITE 7833 is configured using the Dry Contact.

The connection between the External Alarm Port and the External Alarm Box is made using the UL2464 # 24 10ft cable supplied with the system.

1) PS-ELITE support external Alarm Box

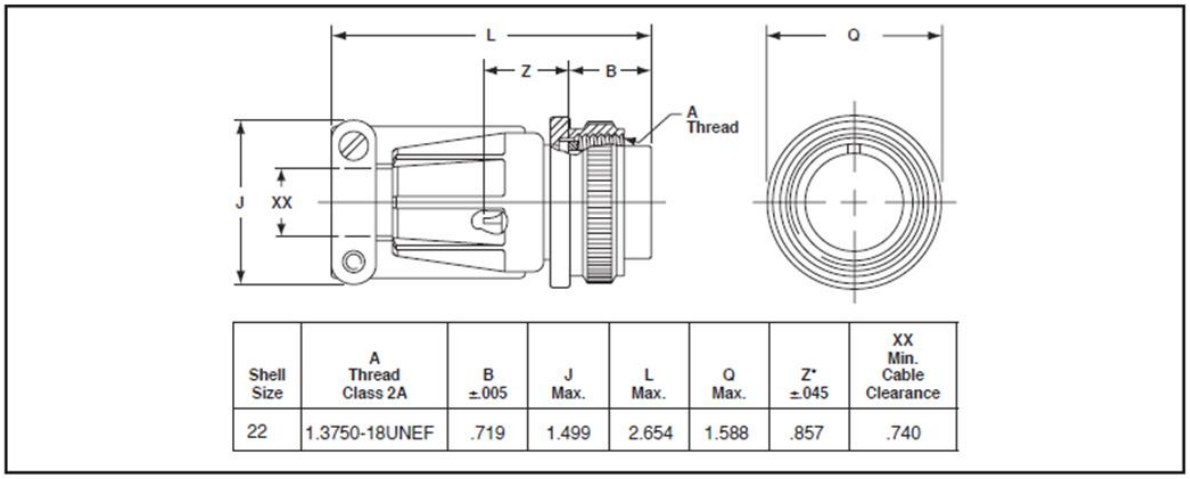
Pin No.	Alarm No.	Alarm Name	Pin Name	Cable Color	Remarks
1	Alarm1	AC Power	NC1	Black	
2			COM1	Brown	
3			NO1	Red	
4	Alarm2	System	NC2	Orange	
5			COM2	Yellow	
6			NO2	Green	
7	Alarm3	BDA	NC3	Blue	
8			COM3	Violet	
9			NO3	Gray	
10	Alarm4	Battery Charger	NC4	White	
11			COM4	Black & White	
12			NO4	Brown & White	
13	Alarm5	Battery Capacity	NC5	Red & White	
14			COM5	Orange & White	
15			NO5	Yellow & White	
16	Alarm6	Antenna	NC6	Green & White	
17			COM6	Blue& White	
18			NO6	Violet & White	
19	Reserved			Gray & White	
20	NC				

MS/Standard
MS3102A -22-14P
box mounting receptacle



Shell Size	A Thread Class 2A	B Min Full Thread	K +.020 −.010	L +.000 −.010	M +.010 −.000	N Dia. +.010 −.000	R ±.005	S ±.031	T Dia. +.004 −.002	Z +.050 −.060
22	1.3750-18NEF	.625	.891	.453	.750	1.250	1.250	1.625	.120	.641*

MS/Standard
MS3106E-22-14S
straight plug

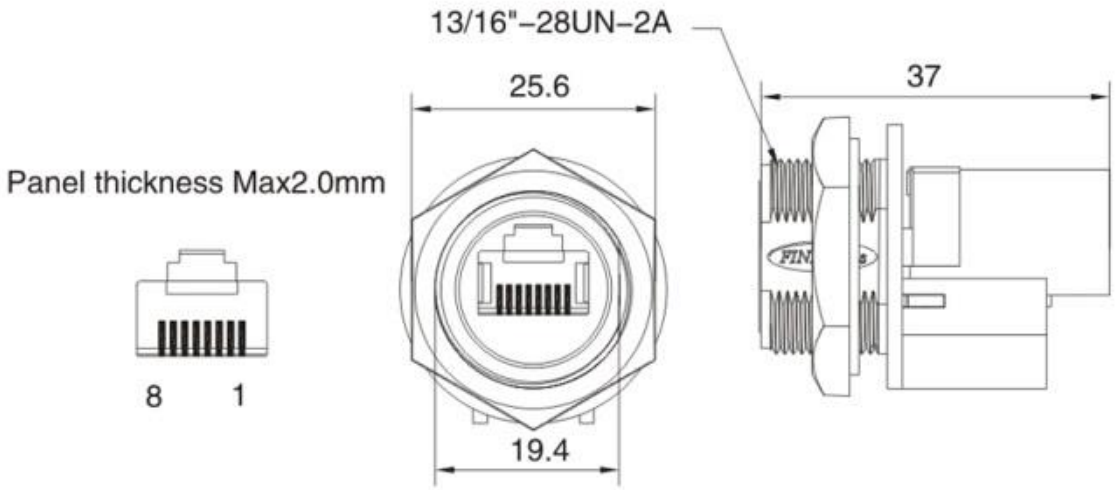


Shell Size	A Thread Class 2A	B ±.005	J Max.	L Max.	Q Max.	Z* ±.045	XX Min. Cable Clearance
22	1.3750-18UNEF	.719	1.499	2.654	1.588	.857	.740

4.5 Ethernet Port

PS-ELITE 7833 can be connected to the parent network via Ethernet, and the user can use the WEB UI to control and monitor the relays in remote or local locations. PS-ELITE 7833 use a waterproof Ethernet port to prevent the external environment from being affected. (NEMA 4x Compliance)

For complete waterproofing, the user shall use a water-proof RJ-45 cable.



5. LED and Alarm Information

5.1 LED

LED	Status	Remarks
Green	Good Condition, The system operates normally.	
Yellow Blink	Minor alarm, but there is no problem with operating it	
Yellow	Critical alarm, system may not function properly	
Red	Unable to operate properly	

5.2 LED indicate for alarm

Name	RUN	ALARM	SHUTDOWN
Power On	Green		
Boot Complete	Green	Green	Green
Normal Condition	Green	Green	Green
Low RSSI	Green	Yellow Blink	Green
Low Isolation	Green	Yellow Blink	Green
Communication failure	Green	Yellow	Yellow
Over Power	Green	Yellow	Yellow
AC Fail	Green	Yellow	Yellow
DC Fail	Yellow	Yellow	Yellow
RESET	Yellow	Red	Red
Shut Down	Red	Red	Red

6. Installation

6.1 Installation

6.1.1 Antenna

The antenna used in the PS-ELITE7833 must be certified or an antenna with equivalent specifications.

The company shall not bear any liability for any problems arising from the use of an uncertified antenna.

6.1.2 Isolation

If the system wants to operate in the max gain state, the system requires sufficient isolation between the donor and service antennas.

The system recommends isolation be higher than 15dB above the gain of the system.

If isolation is not sufficiently ensured, the AOC function operates to reduce the gain to a level suitable for the ensured isolation.

6.1.3 Equipment Needed for Repeater Setup

Parameter	Item	Quantity	Remark
Major Component	PS-ELITE7833 Repeater	1 EA	Provided by GST
Additional Components	Wall Mounting Bracket	1 EA	Provided by GSI
	CD (Contains User Manual V.1.0 and Installation Guide V.1.0)	1 EA	
	AC Power Cable 6ft (1.8m)	1 EA	
	External Alarm Cable 10t (3.05m)	1 EA	
Antenna	Donor ANT	1 EA	Not Included
	Service ANT	1 EA	
RF Cable	Antenna connection Cable	TBD	Not Included
Testing and Measuring Equipment	Spectrum Analyzer	1 EA	Not Included

6.1.4 Check points before turning on the Repeater

1) System Power Check

AC electrical power to the repeater should be 110V, input electricity only after power verification.

2) Input RF Signal Range

Optimal input RSSI into the repeater is -62dBm ~ -17dBm for 700MHz/800MHz. User should verify input condition of Donor ANT. If the input RSSI exceeds -17dBm, impose the using external attenuators should be used.

3) Isolation check between DONOR/SERVEICE ANT

The system must need that 110dB (Gain+15dB) isolation is secured to use 95 dB of the maximum profit of the system. User should check its condition before installation.

6.1.5 Open for Service

1) Check points before open:

① Verification of system installation status :

- Electricity, In/Out antennas, cable connection, and equipment mount status.

② Verification of system accessories :

- User should check all necessary accessories.

③ Check receipt signal level :

- Installer should check whether environmental conditions are in accordance with system specification to ensure that system operation will be optimized.

2) Check points after open:

① Check external LED

- RUN: Green light ON (Off: All LED off)
- ALARM: Green light in normal status, Red light in alarming
- SHUT DOWN: Green light in normal status, Red light in Shutdown status

6.2 Ground

The PS-ELITE7833 is designed to operate at 110VAC @ 1.5A maximum current and must always be operated with the ground wire properly connected.

7. Web UI

7.1 Setting up the Repeater

7.1.1 Quick UI/Configuration

Use the following steps to commission the Repeater after all the cabling and antennas are fixed in place and the Repeater is supplied with proper electrical power. The repeater will need a good quality stable Downlink RSSI input level in the range of -85dBm to -62dBm.

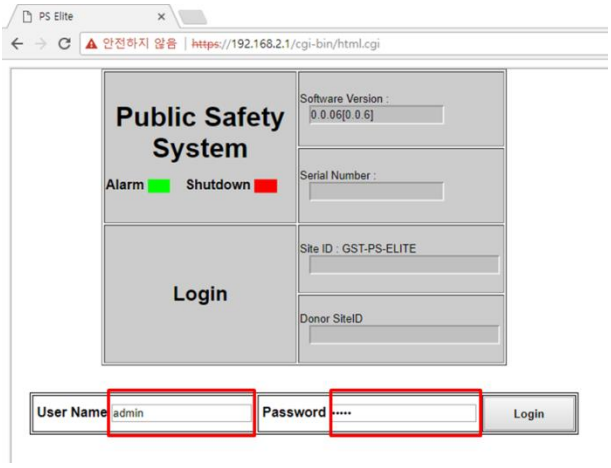
1) Connect your laptop to the repeater with a Crossover Ethernet cable.
2) Verify that your laptop has all wireless connections off and is Obtaining an IP address automatically, or is using a proper fixed IP address such as: Use the following IP address: 192.168.2.1 with a Subnet Mask of 255.255.255.0
3) Open Internet Explorer and go to: 192.168.2.1
4) User name: admin
5) Password: admin

7.1.2 Quick Setup

1) Go to the RF Configuration page.
2) Before the Amplifier (HPA) can be turned on, set the Uplink and Downlink attenuation (ATT) to the maximum value and click Apply.
3) Select the correct Band Block and set the ALC Downlink and Uplink Limits to the desired level and click Apply. (To adjust the Output Power, change the ALC Downlink and Uplink Limits to the desired levels).
4) To check the Repeater's status, click on the Status page.
5) To change the Repeater's gain/attenuation, adjust the Uplink and Downlink attenuation in equal amounts not more than 5dB at a time and click Apply.

7.2 User Interface Configuration

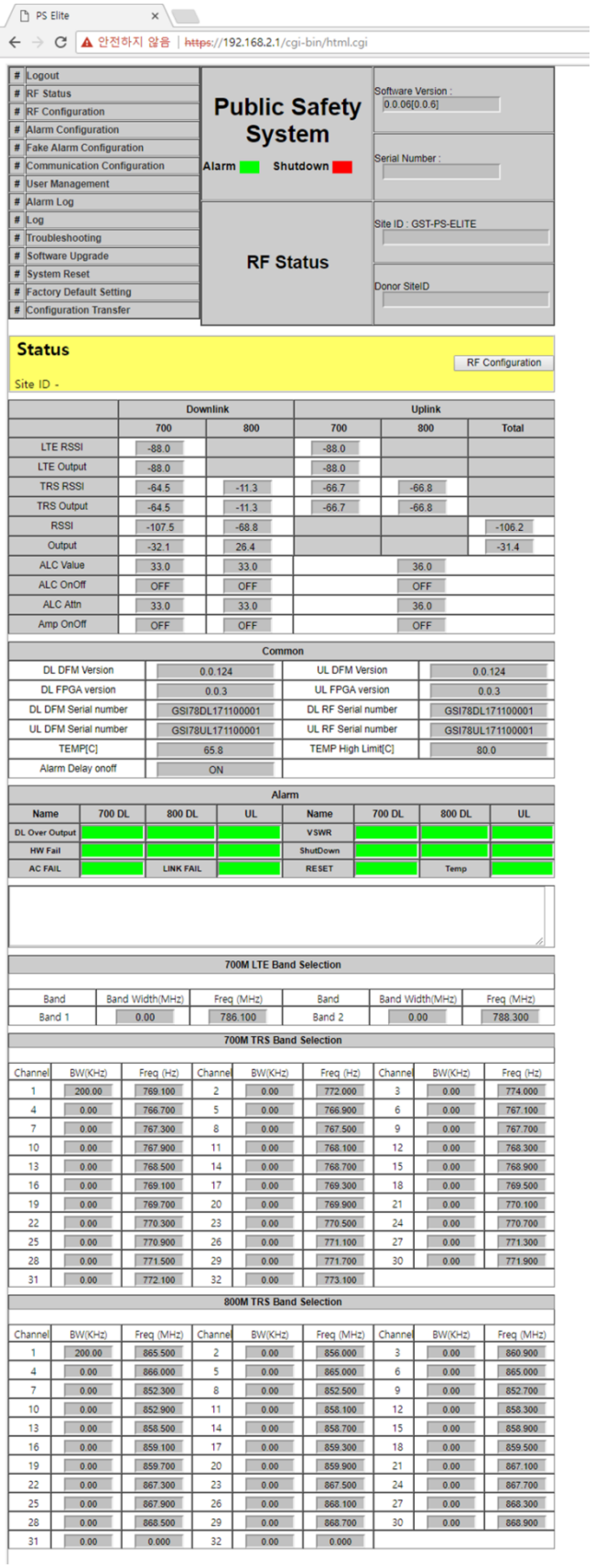
7.2.1 Page Login



1) Enter “https://192.168.2.1” in the address window and press Enter.
2) Enter the user name "admin" and the password "admin" on the connected site and click Login button to move to the Main Window.

7.2.2 RF Status

1) Can check the current repeater status and setting the repeater system.
2) Items
   - Check of RSSI / Output Level
   - Repeater Firmware Version and Serial Number
   - Repeater internal temperature
   - Alarm Status
   - Band Select (Frequency, Band width)



PS Elite

안전하지 않음 | https://192.168.2.1/cgi-bin/html.cgi

- # Logout
- # RF Status
- # RF Configuration
- # Alarm Configuration
- # Fake Alarm Configuration
- # Communication Configuration
- # User Management
- # Alarm Log
- # Log
- # Troubleshooting
- # Software Upgrade
- # System Reset
- # Factory Default Setting
- # Configuration Transfer

Public Safety System

Alarm Shutdown

Software Version : 0.0.06[0.0.6]

Serial Number :

RF Status

Site ID : GST-PS-ELITE

Donor SiteID

Status

RF Configuration

Site ID -

	Downlink		Uplink		
	700	800	700	800	Total
LTE RSSI	-88.0		-88.0		
LTE Output	-88.0		-88.0		
TRS RSSI	-64.5	-11.3	-66.7	-66.8	
TRS Output	-64.5	-11.3	-66.7	-66.8	
RSSI	-107.5	-68.8			-106.2
Output	-32.1	26.4			-31.4
ALC Value	33.0	33.0	36.0		
ALC OnOff	OFF	OFF	OFF		
ALC Attn	33.0	33.0	36.0		
Amp OnOff	OFF	OFF	OFF		

Common			
DL DFM Version	0.0.124	UL DFM Version	0.0.124
DL FPGA version	0.0.3	UL FPGA version	0.0.3
DL DFM Serial number	GSI78DL171100001	DL RF Serial number	GSI78DL171100001
UL DFM Serial number	GSI78UL171100001	UL RF Serial number	GSI78UL171100001
TEMP[C]	65.8	TEMP High Limit[C]	80.0
Alarm Delay onoff	ON		

Alarm							
Name	700 DL	800 DL	UL	Name	700 DL	800 DL	UL
DL Over Output				VSWR			
HW Fail				ShutDown			
AC FAIL		LINK FAIL		RESET		Temp	

700M LTE Band Selection

Band	Band Width(MHz)	Freq (MHz)	Band	Band Width(MHz)	Freq (MHz)
Band 1	0.00	786.100	Band 2	0.00	788.300

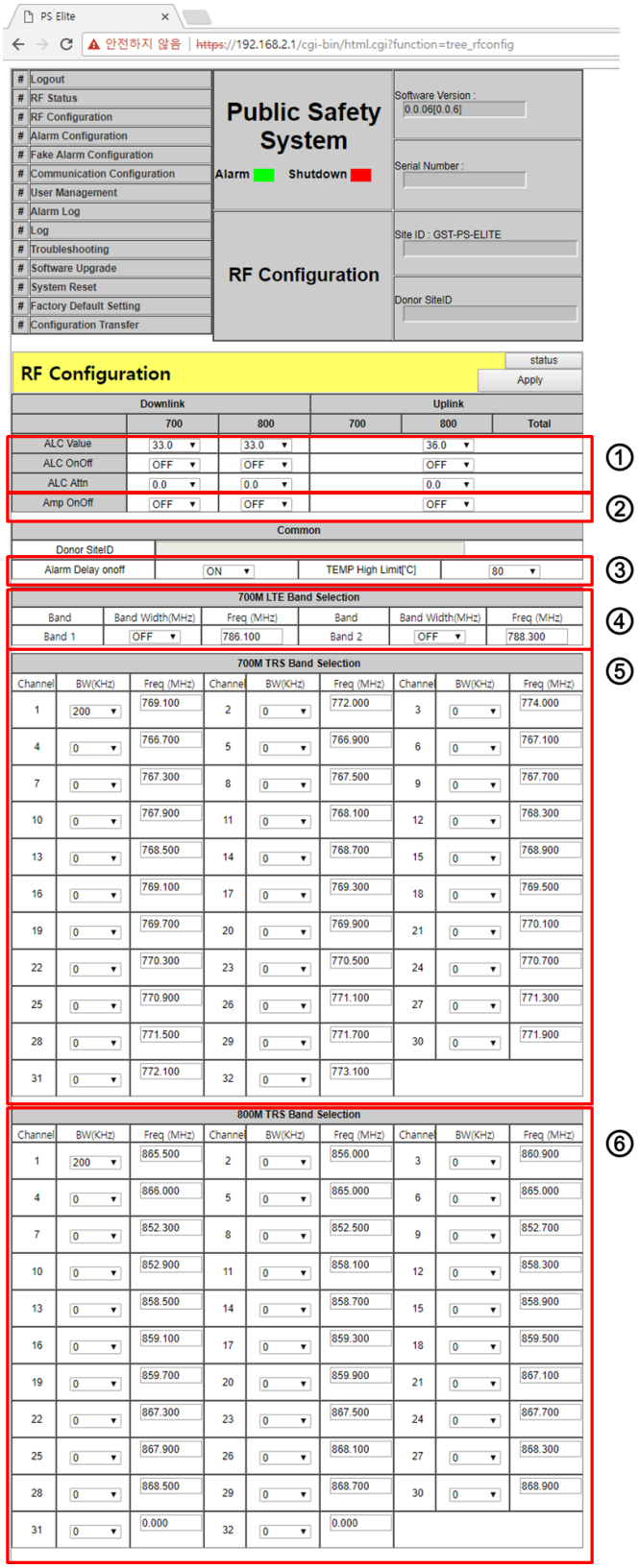
700M TRS Band Selection

Channel	BW(KHz)	Freq (Hz)	Channel	BW(KHz)	Freq (Hz)	Channel	BW(KHz)	Freq (Hz)
1	200.00	769.100	2	0.00	772.000	3	0.00	774.000
4	0.00	766.700	5	0.00	766.900	6	0.00	767.100
7	0.00	767.300	8	0.00	767.500	9	0.00	767.700
10	0.00	767.900	11	0.00	768.100	12	0.00	768.300
13	0.00	768.500	14	0.00	768.700	15	0.00	768.900
16	0.00	769.100	17	0.00	769.300	18	0.00	769.500
19	0.00	769.700	20	0.00	769.900	21	0.00	770.100
22	0.00	770.300	23	0.00	770.500	24	0.00	770.700
25	0.00	770.900	26	0.00	771.100	27	0.00	771.300
28	0.00	771.500	29	0.00	771.700	30	0.00	771.900
31	0.00	772.100	32	0.00	773.100			

800M TRS Band Selection

Channel	BW(KHz)	Freq (MHz)	Channel	BW(KHz)	Freq (MHz)	Channel	BW(KHz)	Freq (MHz)
1	200.00	865.500	2	0.00	856.000	3	0.00	860.900
4	0.00	866.000	5	0.00	865.000	6	0.00	865.000
7	0.00	852.300	8	0.00	852.500	9	0.00	852.700
10	0.00	852.900	11	0.00	858.100	12	0.00	858.300
13	0.00	858.500	14	0.00	858.700	15	0.00	858.900
16	0.00	859.100	17	0.00	859.300	18	0.00	859.500
19	0.00	859.700	20	0.00	859.900	21	0.00	867.100
22	0.00	867.300	23	0.00	867.500	24	0.00	867.700
25	0.00	867.900	26	0.00	868.100	27	0.00	868.300
28	0.00	868.500	29	0.00	868.700	30	0.00	868.900
31	0.00	0.000	32	0.00	0.000			

7.2.3 RF Configuration

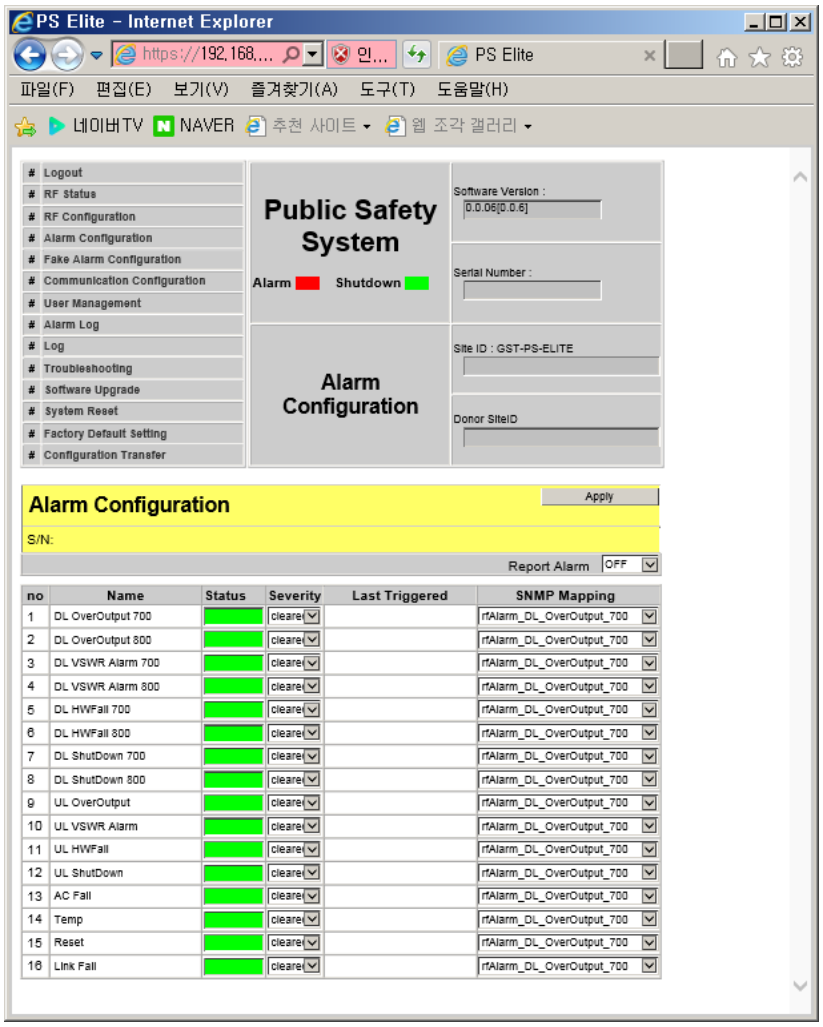


① ② ③ ④ ⑤ ⑥

1) ALC Function and ALC target threat hold level set up
2) HPA On / OFF
3) Alarm On / Off, Alarm Delay Function set up
4) FirstNet (LTE) Band Select (Frequency and Bandwidth)
5) 700MHz P25 Band Select (Frequency and Bandwidth)
6) 800MHz P25 Band Select (Frequency and Bandwidth)

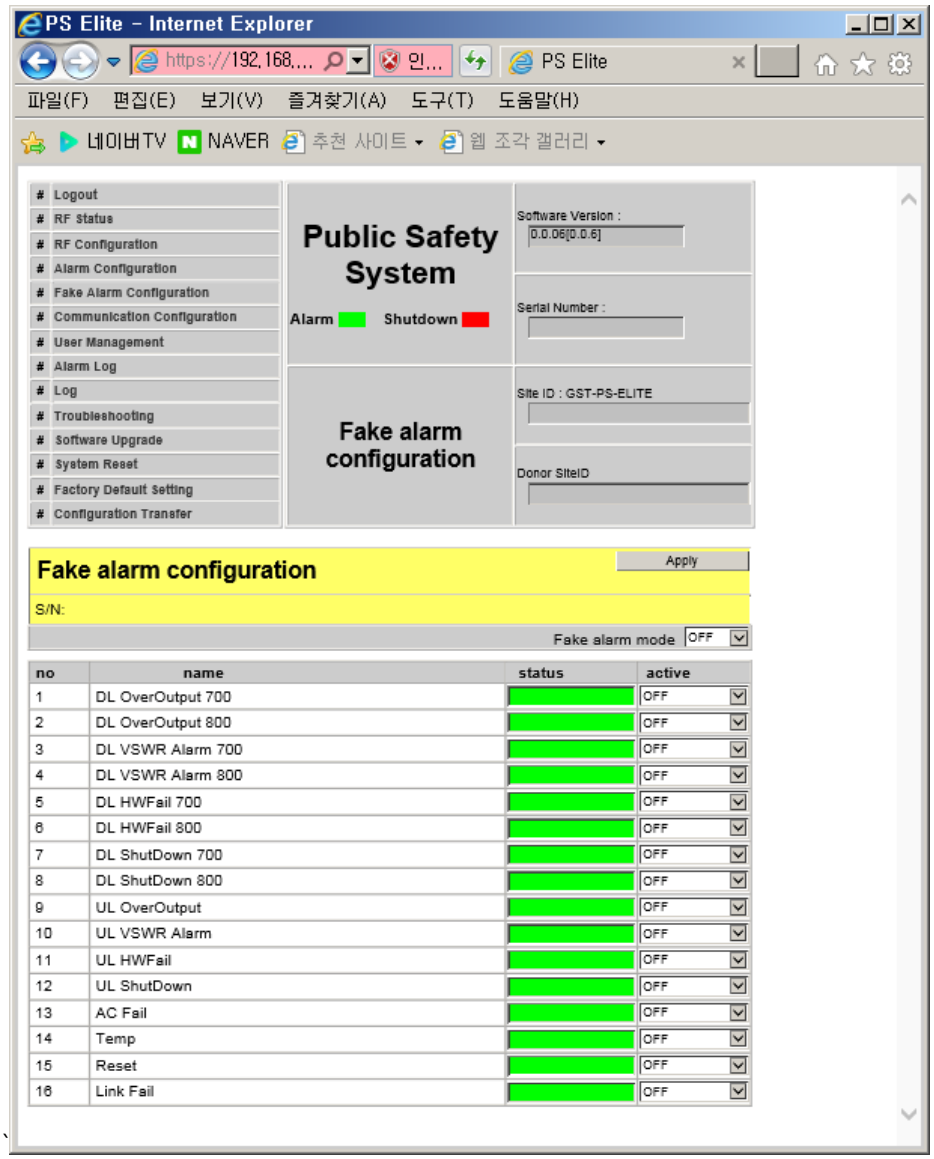
7.2.4 Alarm Configuration

1) Check the status and status of the alarm on the repeater.



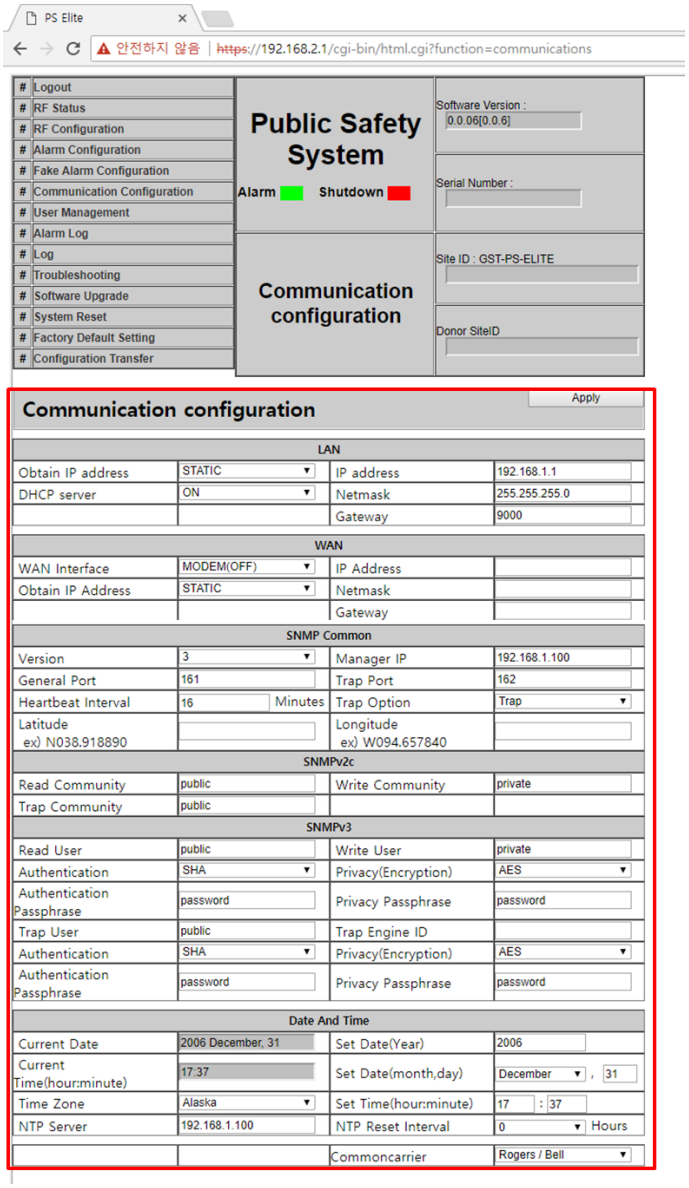
7.2.5 Fake Alarm Configuration

1) Set alarm for testing purposes.



7.2.6 Communication Configuration

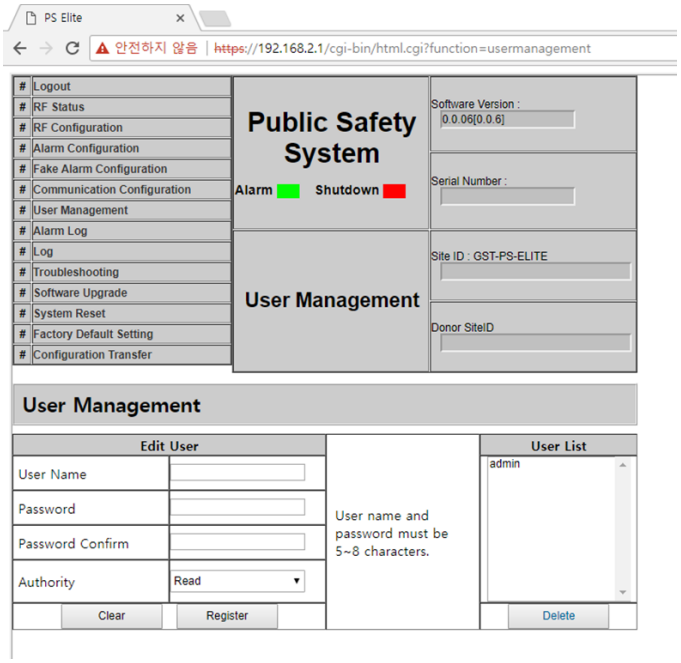
1) Set up the IP information for the network management communication.



7.2.7 User Management

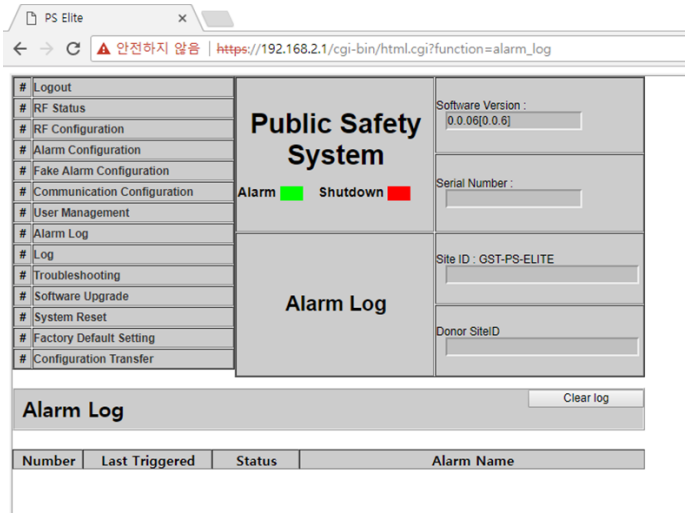
Manage user accounts to login to WEB UI.

1) Password Change
2) User account Permission authorization and change
3) New account setting



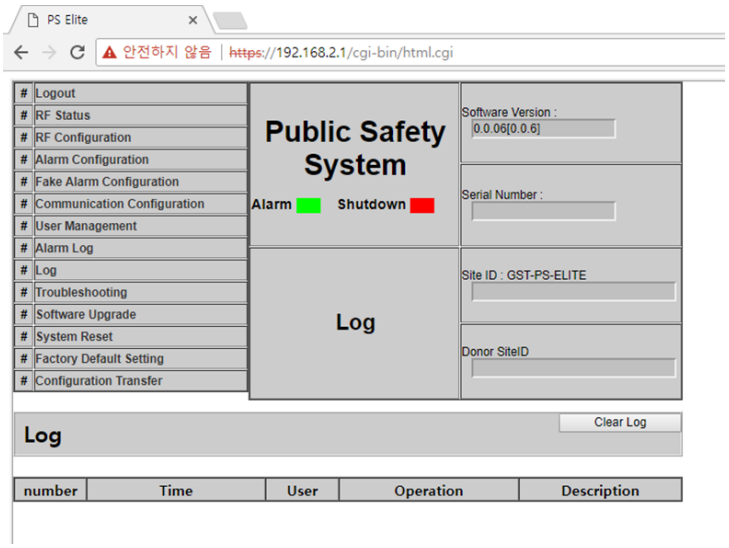
7.2.8 Alarm Log

Record the log on the alarm that occurred on the repeater.



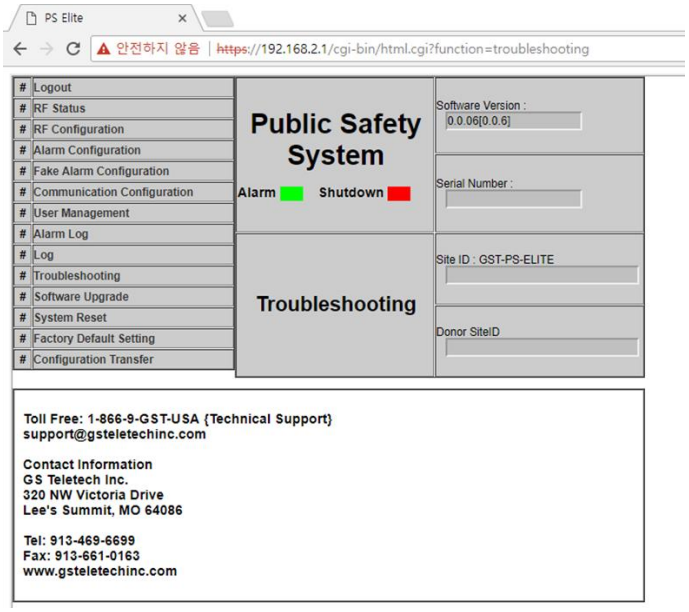
7.2.9 Log

Can view the log in connect to the WEB UI.



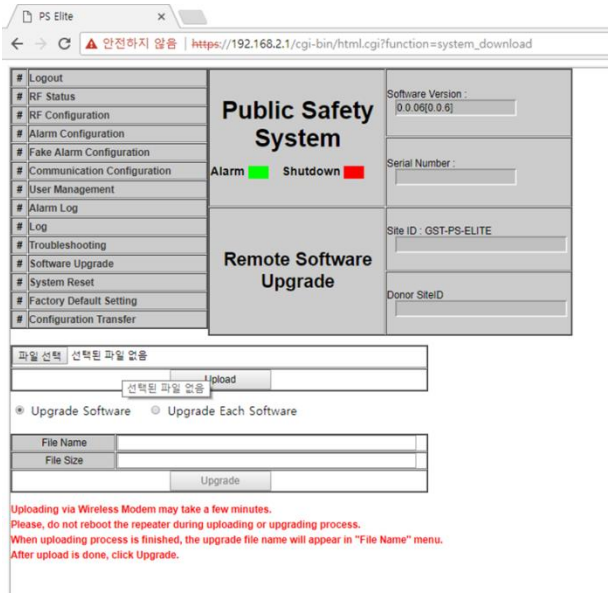
7.2.10 Trouble Shooting

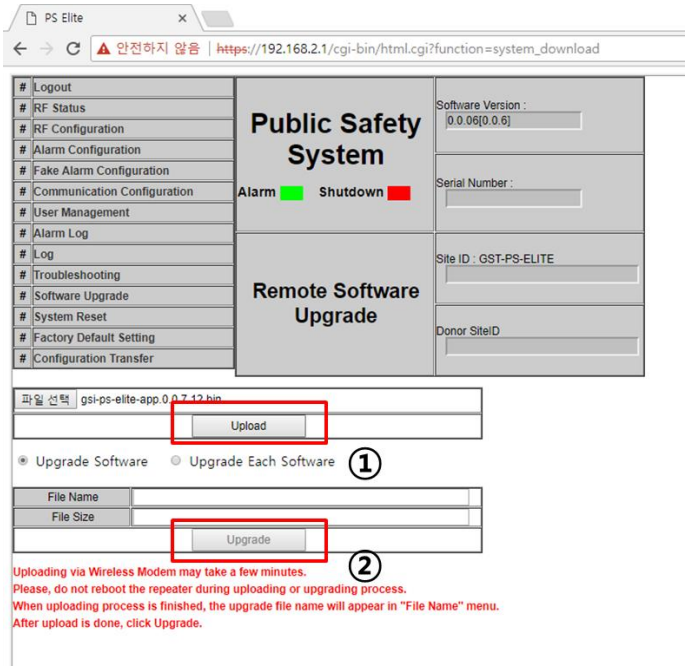
Provide contact information to assist in trouble shooting in the event of a repeater failure



7.2.11 Remote Software Upgrade

To enhance the performance of the repeater, perform the Software Upgrade through the network.

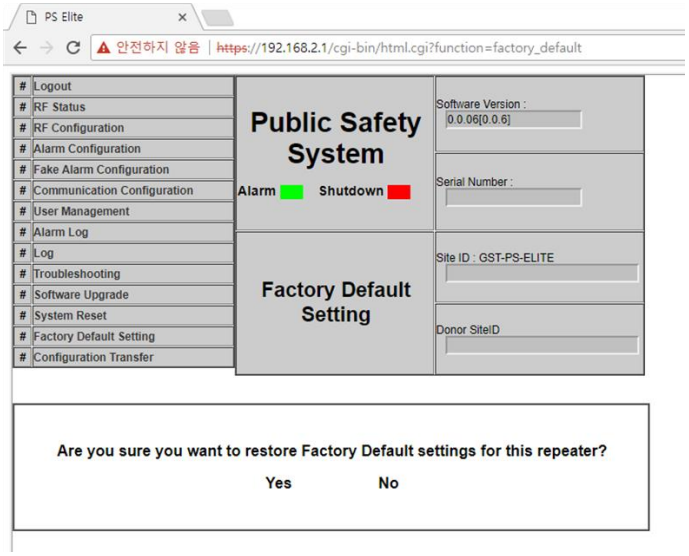




1) Select the file to upgrade and upload the file to the repeater's memory.
2) If the file is successfully uploaded, click the Update button to proceed with the upgrade.

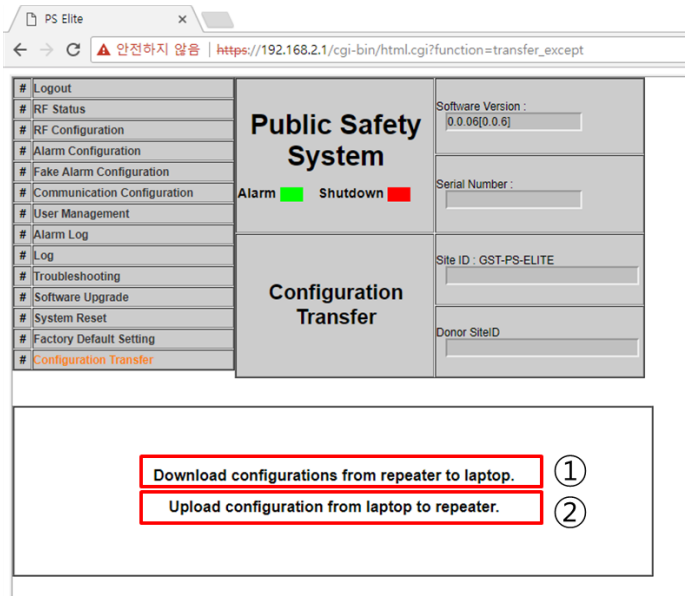
7.2.12 Factory Default Setting

The factory default setting is the default setting of the repeater that is controlled by the company. When performing a factory-defined setting, the L status set is initiated by the user.

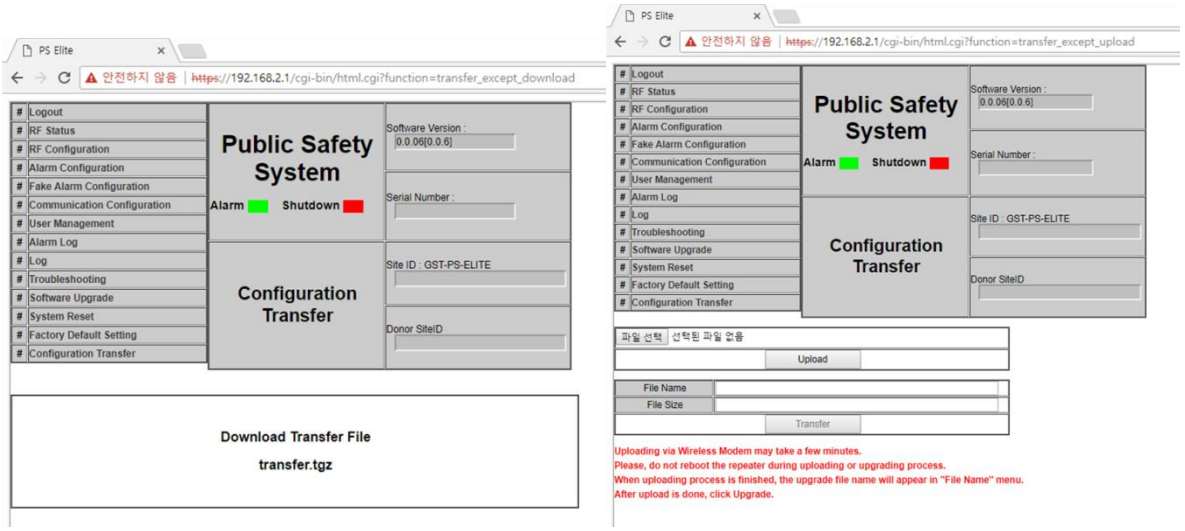


7.2.13 Configuration transfer

Configuration transfer can be saved setup status by storing and back up. And to change the settings by existed setup file upload.



1) The setting status of the repeater can be saved as a file on the connected PC.
2) It can be applied to the repeater by uploading the repeater setting value of the file status.



7.3 Web UI Ranges Table

GUI Feature	Range	Description
Downlink and Uplink Output Power Display	Below 0dBm to 35dBm	The output Power of the Repeater
Downlink Low RF Power	2dB to 10dB	Threshold for Low RF Power
Downlink and Uplink Attenuation Control	0dB to 30dB	Reduces Gain Internally
Downlink and Uplink ALC Limit	0dBm to 33dBm	Limits Output Power
Downlink RSSI Display	-100dBm to -17dBm	Downlink Receive Level at Donor Antenna Port
Downlink Low RSSI	-93dBm to -62dBm	Threshold for Low RSSI
HPA Control	On/Off	High Powered Amplifier
Gain Balance Control	On/Off	Equalizes Uplink and Downlink Gain
Gain Balance Value	0dB to 15dB	Subtract Uplink Gain by G/B Value
Shutdown Control	On/Off	Shutdown if Major Alarm is Reported
Auto Gain Setting	On/Off	Automatic Gain Setting for the Repeater
Auto Oscillation Check	On/Off	Preventing Oscillation
Temperature Display	32 to 260.6 Degrees	Internal Repeater Temperature
Band Blocks Used/Bandwidth	Each AMP	The Channel the Repeater will be using
Delay Alarm Report	0 or 5 Minutes	Time Delay of Reporting after Alarm is Detected

7.4 Troubleshooting

In case of abnormal operation, technician should diagnose abnormality via remote access or directly connecting to repeater using Ethernet cable. If technician is required to conduct repairs due to major alarm, repeater should first be powered off, and then technician should prepare the proper measurement equipment before trying to fix the problem. In most cases of major repairs, GST will simply replace the unit and conduct repairs at the appropriate facility.

7.4.1 Simple Troubleshooting Method

1) Verify LED Status, both on external and internal module LED's
   - Normal operation: Green light on. Alarming: Red LED on.
2) Technician should check external and internal connectors to ensure that all connections are tightly secure. These connectors should be cleaned regularly.
3) If technician thinks there is a serious problem, call after sales team for over-the-phone technical support. **1-913-469-6699.**

7.4.2 Troubleshooting Guide Related to RF

Item	Check Point	Troubleshooting
Check before system operation	System input power range (DL/UL)	-Downlink: -100dBm ~ -17dBm -Uplink: -100dBm ~ -17dBm
	System gain (DL/UL)	- 50dB ~ 95dB
	Output power at server port (DL/UL)	- Downlink: 33dBm ± 2dB - Uplink: 33dBm ± 2dB
	Check points before open for service	-Please check quantity of all accessories with specification before you set up -Fit cable length in accordance with field condition
Check after system operation	Check points after open for service	Check following status; -Verify that the antennas are securely mounted and pointed in the correct directions -Connection status between antennas and RF cable -Verify that the Repeater is securely mounted -Proper AC power status -Grounding status of electrical circuit -Coaxial cable (RF) construction status -Connectors and combiners connection status -Cable connection status against leakage of water
When repeater does not work properly	Check electricity cord connection status	-Re-Connection in power Cable

When in alarming	DL VSWR alarm	Please Check following status; -Make sure Server Antenna Port is disconnected. -Please reset Adapter upon completing Alarm troubleshooting
	DL / UL Over-output alarm	-Make sure output power is operating normally -Please reset Adapter upon completing Alarm troubleshooting
	Temperature alarm	Check following status; -Setting level of maximum temperature limit -Temperature offset is normal or not -Circumstances of temperature -Please reset Adapter upon completing Alarm troubleshooting
	RF off	-Verify that the HPA's are On -Please Reset Adapter upon completing Alarm troubleshooting
When output power is no longer problem	Technician should verify category of alarm at the front side of repeater	-When Red light on the Shutdown LED, technician should troubleshoot the alarm via Notebook computer

7.4.3 Troubleshooting Guide Related to NMS

Symptom	Check Points	Troubleshooting
Link Fail	Communication problem	In case of Ethernet, verify IP addressing, DHCP function, and that cookies are deleted -verify that a crossover Ethernet cable is being used

If technician thinks there is a serious problem, call after sales team for over-the-phone Technical support. **1-913-469-6699.**