KT-NCS

OPERATOR'S MANUAL

Emergency Code Call/Group Summon System

KT-NCS

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This guide describes all features and functions of Wireless Nurse Call system product of Kahroba Tarasheh

Company (ISO 9001/13485 certified by the IQ-NET member certification body (C.B.) CISQ/IMQ which is

accredited by International Accreditation Forum (IAF) member Accredia) under the brand "KT-NCS".

Your Nurse Call System is highly customizable and may not have some of the features given in this manual.

Manual Purpose:

This manual provides the instructions necessary to operate Kahroba Tarasheh Wireless Nurse Call System in accordance with its intended use. It also describes all parameters and options that your system may have depending on the way it has been customized.

Study of this manual is a prerequisite for proper operation and ensures patient and operator safety. If you have any question about the Wireless Nurse Call System, please contact our customer service. This manual is an essential part of the system and should always be kept close to it to be used whenever necessary.

Intended Audience:

This manual is provided for facility staff members and the patients. The users of this manual are expected to have working knowledge of simple button-based devices and English language.

Product Lifetime:

Since electric parts have lifetime of 10 years and recommended maintenance interval of the device is 1 year and its mandatory maintenance interval is 2 years, the expected lifetime of the device is 10 years.

Version Information:

This manual has a version number. The version number changes whenever the manual is updated due to software or technical specification changes. The version information of this manual is as follows.

Release Date	June 2023
Version Number	Emg. Code.-user-ver-02

Explanations of the used expressions in this Manual

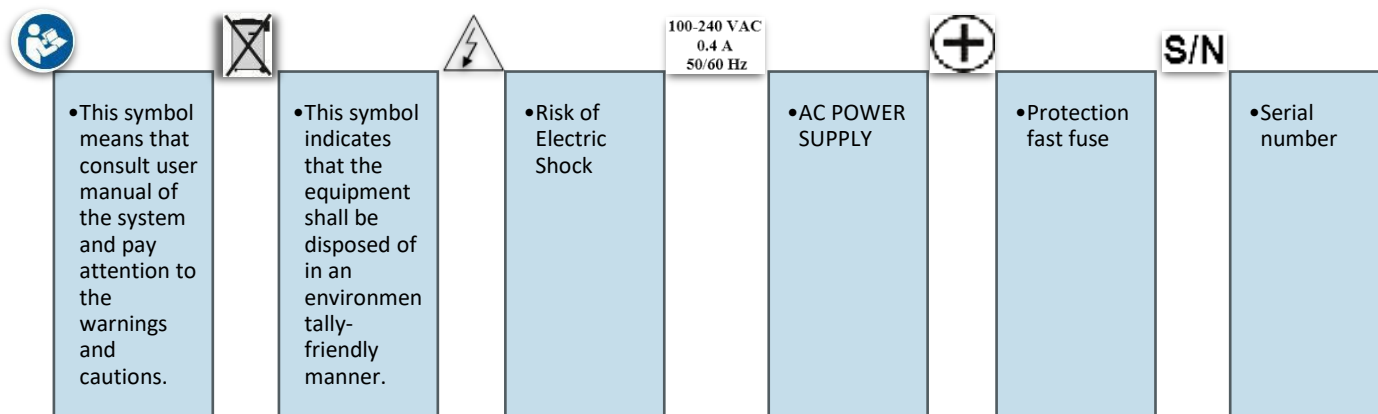
A WARNING symbol advises against certain actions or situations that could result in personal injury or equipment damage.

A NOTE symbol provides useful information and recommendations about device function.

Explanation of Symbols used on modules

			100-240 VAC 0.4 A 50/60 Hz			S/N
•This symbol means that consult user manual of the system and pay attention to the warnings and cautions.	•This symbol indicates that the equipment shall be disposed of in an environmentally-friendly manner.	•Risk of Electric Shock		•AC POWER SUPPLY	•Protection fast fuse	•Serial number

Patient Safety:

KT-NCS Nurse Call Systems are designed to comply with the international safety standard requirements for medical electrical equipment with UMDNS code 15614.

KT-NCS Wireless Nurse Call System is categorized as " Low Risk" or "Type I " (EU, Canada, USA) or " Type A" (CHTF) device in IAF Medical Devices Risk Classification.

KT-NCS Wireless Nurse Call System is in Compliance with IEC 60601-1 standard (Basic safety and essential performance requirements of medical electrical equipment).

According to IEC 60601-1 standard:

- KT-NCS Wireless Nurse Call System is evaluated as "Type II" in Electric Shock criteria and Type "B" in safety of applied parts as there is no floating contact to the patient.
- Operation in Oxygen-rich and in the vicinity of flammable anesthetics for KT-NCS Wireless Nurse Call System is considered as Not Applicable.
- The sterilization of KT-NCS Wireless Nurse Call System modules can be done using Gamma Ray when applicable.
- KT-NCS Wireless Nurse Call System has "Fixed" installation and " Permanent" mode of usage and "Continuous" Mode of operation .

KT-NCS Smart Nurse Call System has obtained the product standard IEC 60601-1-2 Certificate (collateral standard applying to electromagnetic compatibility of medical electrical equipment and medical electrical systems specifying general requirements and tests for electromagnetic compatibility) certified by EPIL company (accredited calibration & testing Laboratory member of International Laboratory Accreditation Cooperation (ILAC))

KT-NCS SMART Nurse Call System also has compliance to   UL-1069 product standard (UL Standard for Safety of Hospital Signaling and Nurse Call) tested by "Behineh Sanjesh Sadra" company accredited by National Accreditation Center of IRAN (NACI) which is a member of International Accreditation Forum (IAF).

TABLE OF CONTENTS

This guide describes all features and functions of Kahroba Tarasheh Company Wireless Nurse Call System under the brand "KT-NCS" .
Your Nurse Call System is highly customizable and may not have some of the features given in this manual.

1 INTRODUCTION

1.1 GENERAL WARNINGS

⚠️

Before use, carefully read this manual, directions for use of any accessories, all precautions, and all specifications.

⚠️

There could be hazard of electrical shock by opening the system casing. Watch for the sign ⚡ to avoid risk of electric shock. All servicing and future upgrading to this equipment must be carried out by personnel trained and authorized by manufacturer.

⚠️

The operator must check that system and accessories function safely and see that it is in proper working condition before being used.

⚠️

Alarm must be set according to different situations of individual patient. Make sure that audio sounds can be activated when an alarm occurs.

⚠️

Do not use cellular phone in the vicinity of this equipment. High level of electromagnetic radiation emitted from such devices may result in strong interference with the wireless modules of the wireless NCS performance.

⚠️

There will be some risks of polluting the environment associated with the disposal of the device and cables at the end of their useful lives. The device and accessories shall be disposed in accordance with national laws after their useful lives. Contact your municipality to check where you can safely dispose of old batteries.

⚠️

Do not expose the system near any local heating item such as the direct radiation.

⚠️

To prevent EMC effect on the Nurse Call System, it should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.

⚠️

If any liquid is spilled on the system or accessories, immediately turn off the system and wipe up it by a soft cloth.

⚠️

Make sure that cables and accessories are not under tension during operation.

1.2 GETTING STARTED

✓ CONNECT THE POWER CABLES

Connection procedure of the AC power line:

- Make sure the AC power supply complies with following specification: 100-240 VAC, 50 /60Hz

- Connect the power cables of the modules to a grounded power receptacle.

Check all the functions of modules that may be used and make sure that the system is fully operational.

⚠️

If any sign of damage is detected, or the system seems not have normal function, do not use it Contact technical staff in the hospital or local After Sale Service immediately.

1.3   GENERAL INFORMATION

1.3.1   ENVIRONMENT

| Temperature working	5~40° C
Temperature of Transport and Storage	-25 ~60° C
Humidity	20~90 %
Altitude	-200 to 3500m
Power Supply	100-240 VAC 60VA, 50/60 Hz

1.3.2   DEFINITION

Nurse Call system is an assembly of electronic devices, integrated within a facility infrastructure and/or wireless network, designed to provide an audio/visual signal to summon help when activated in response to a patient's need for (urgent) assistance. It typically consists of and/or interacts with user- or sensor-activated signal transmitters (e.g., patient-worn pendant, push-buttons, microphones, speakers, fall sensors, smoke alarm, door sensors), a network communicator, and alert communication devices (e.g., server computer, phone, dome lights, audible alarm). The device notifies medical professionals and caregivers and is intended for use in the healthcare facility.

The patient uses the pear-push call switch from his bed or pull-cord switch from the washroom to initiate a call which will be presented on the staff console by vocal and visual annunciation. The staff will have to press the cancel switch at the calling point for deactivation of the initiated call.

1.3.3   MAIN FEATURES

- Vocal/Visual summoning of Staff

- Radio Pager Code initiation/reception

- GSM/CDMA mobile network code reception

- Web-based code initiation

- Group/Individual staff to staff messaging

- Facility Legacy-LAN network wire usage

- Integration with Intercom & SMART nurse calling systems

- Twelve-strong Emergency code call capability
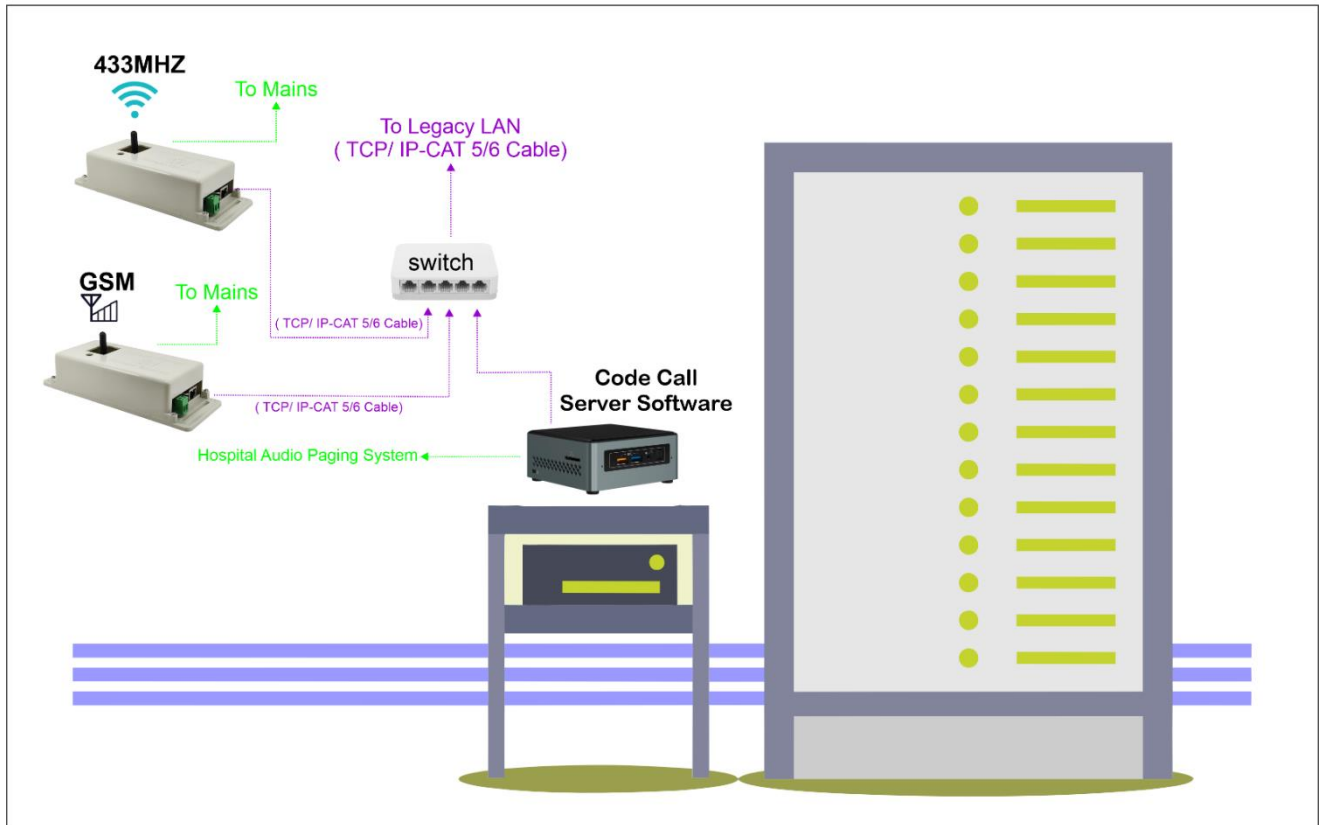
- SMS code summoning for the staff

- Non-Editable code call Reporting Log

1.4 MOUNTING / WIRING / CLEARANCE LAYOUT
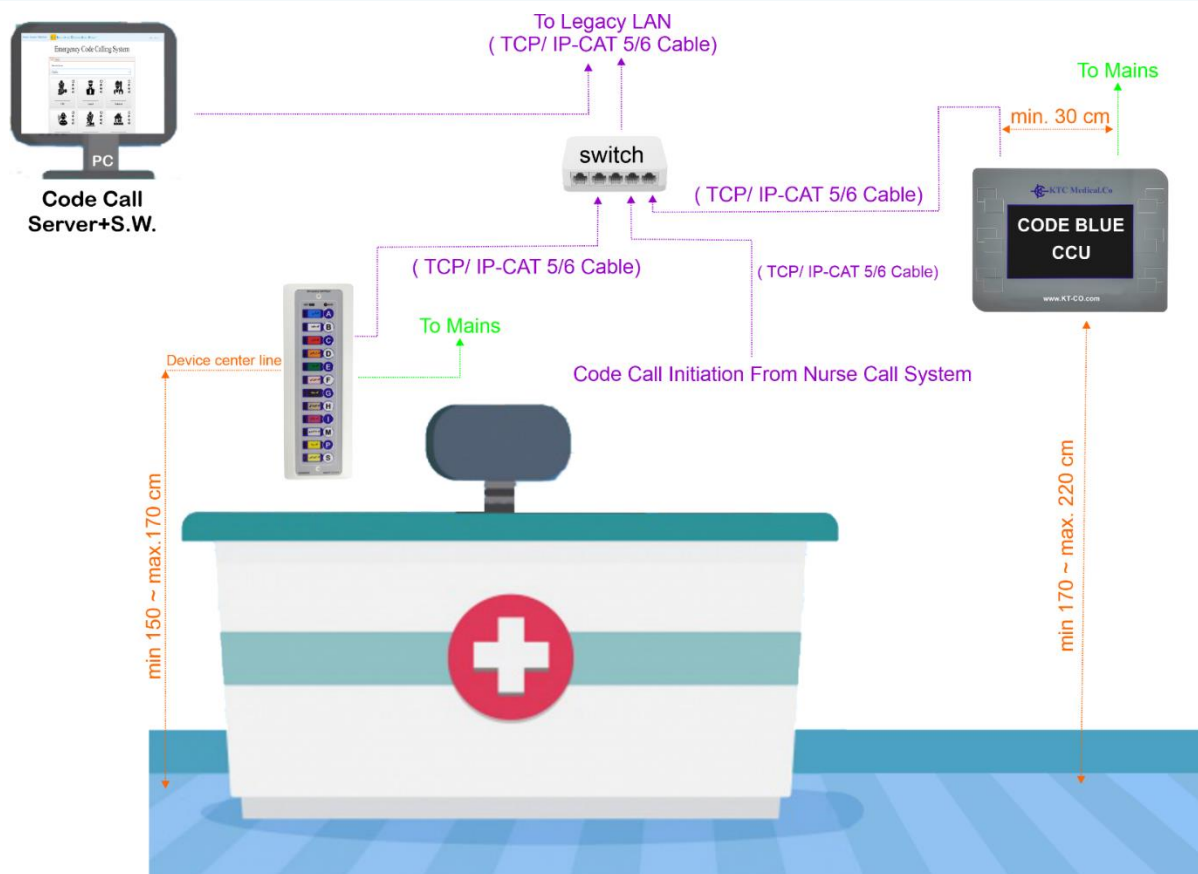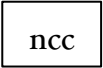
Staff Room
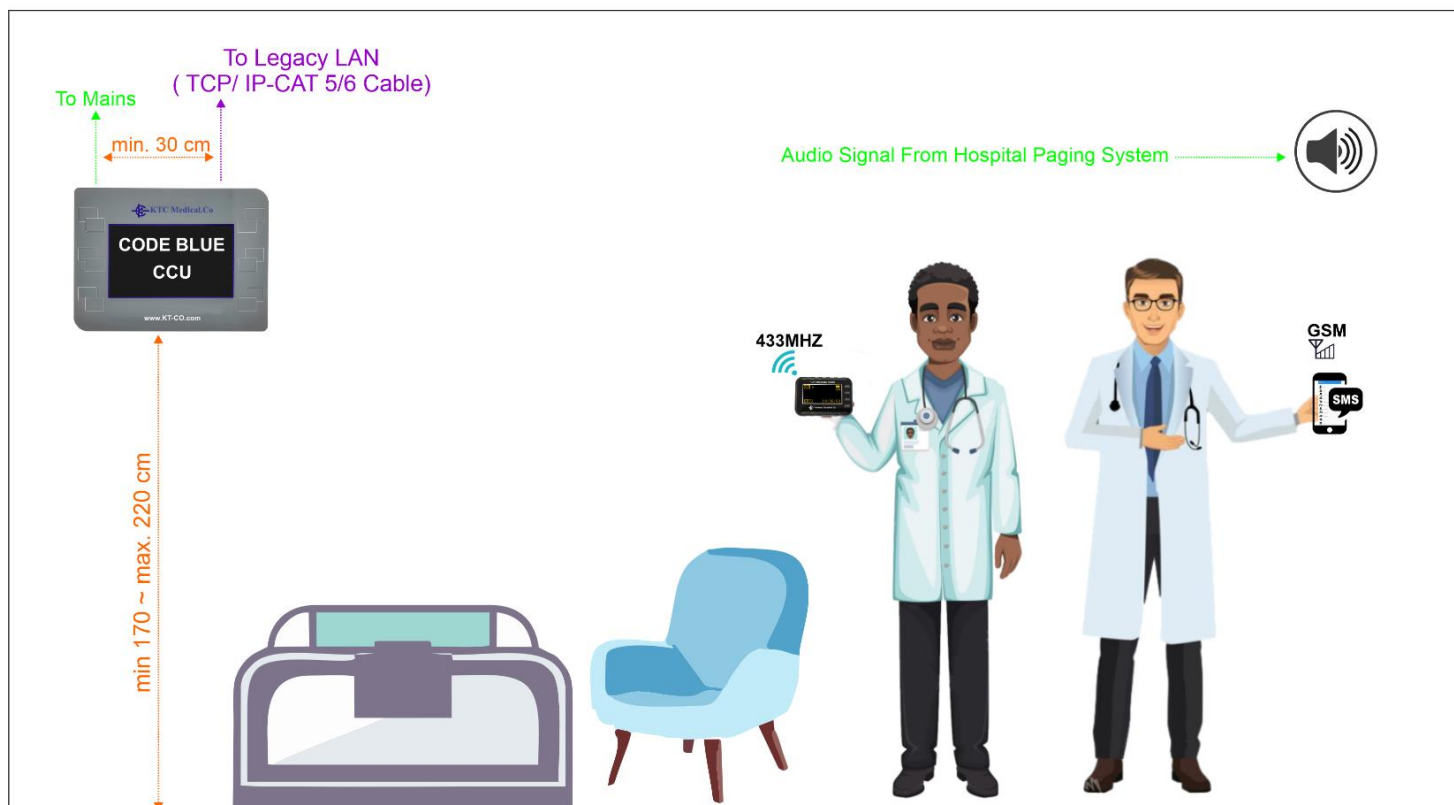
I.T. Room

- Minimum clearance of data cables to the 220 V power cables is 30 cm.
- Call switches clearance from floor is between 150 ~ 170 cm.
- Corridor display clearance from the floor is 170 ~ 220 cm.
- The power mains should have emergency power backup (UPS/Redundant Generator).
- Emergency Code Call initiation is done via legacy LAN network under TCP/IP protocol.
- The table below shows the features to be used when making the layout in ACAD.

Nurse Call Related Feature in AutoCAD	
Discipline	Electrical
Designator	EY
Description	Electrical Interior Auxiliary System
Major Group Layer Name	NURS
Minor Group Layer Name	CIRC : Nurse call system circuits
Minor Group Layer Name	CLNG: Nurse call system ceiling
Minor Group Layer Name	CNMB: Nurse call system numbers
Minor Group Layer Name	EQPM: Nurse call system equipment
Minor Group Layer Name	WALL: Nurse call system wall
Pen/Color/Line	3 / Green / Dashed
Patient Nurse Call Panel Symbol	NC
Emergency Pull Cord Station Symbol	E
Nurse Call Annunciator Symbol	NCA
Duty Station Symbol	DS
Staff Station Symbol	SS
NCS Central Cabinet Symbol	ncc
Dome Light with Tone Symbol	
Floor Duplex Receptacle Symbol	F f
Data Outlet Symbol	

2 CENTRAL SERVER UNIT (SERVER001)

2.1 INTRODUCTION

Each hospital using the emergency code call system will need one central server unit as the host for the emergency code application (KTC-RN-S).

All the emergency code initiating and receiving units (Panels, Radio Pagers, Staff Consoles,...) will connect to this central server unit to accomplish their corresponding tasks.

| Operating System	Mini PC: Windows 10
	Raspberry: Windows 10 IoT
H.D.D.	Mini PC: Min. 64 GB SSD
	Raspberry: 32 GB Micro SD
RAM	Mini PC: Min 4 GB
	Raspberry: Min 2GB
Special Hardware	Ethernet, USB, HDMI
Processor	Mini PC: Intel Quad Core
	Raspberry: ARM Quad Core
Ingress Protection	20 or better

3 CODE CALL PANEL (ECP-05)

3.1 INTRODUCTION

ECP-05 is a panel with 12 buttons to Launch a code call (blue, orange, purple, red, yellow, etc.) by pressing the corresponding button. The panel is connected to the main Emergency Code Call server KTC-RN-S over the hospital LAN.

The code associated to each button can be customized through the managing software installed on the main server.

The codes called by the panel are broadcast via the hospital paging speakers, corridor code displays, radio pagers and Short Message Service (SMS).
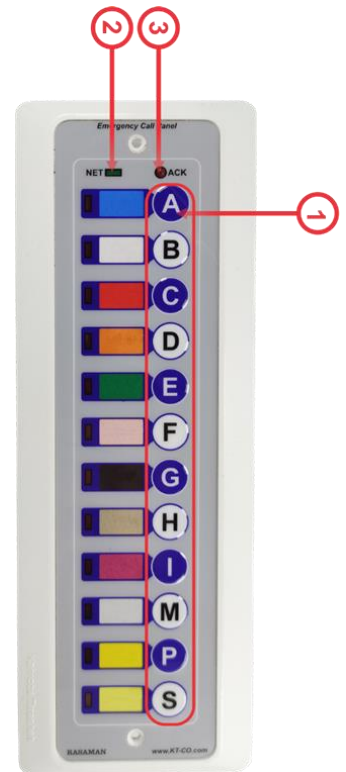
Weight	133 g		
Dimensions	W:230 mm	H:80mm	D: 48 mm
Raw Material	Polycarbonate + ABS		
Color	White		
Port	RJ45		
Power Supply	0V		
Operating Temperature	-10°C ~ +50° C		
Operating Humidity	30% ~ 80% RH		
Ingress Protection	20 or better		

| Number	Item	Description
①	Code Call Buttons	Pressing each button will initiate the corresponding Emergency Code
②	"Net" Indicator	Is lit steady red when connected to the Emergency Code Server
③	"Ack" Indicator	Lights blinking red as a visual assurance of code initiation after pressing one of the buttons

4   DISPLAY UNIT (NDP-31)

4.1   INTRODUCTION

NDP-31 is the corridor display connected to the emergency code call server (KTC-RN-S) via the hospital LAN to provide a visual guide for the emergency staff to attend an initiated emergency code call.

It displays the type and location of called code.
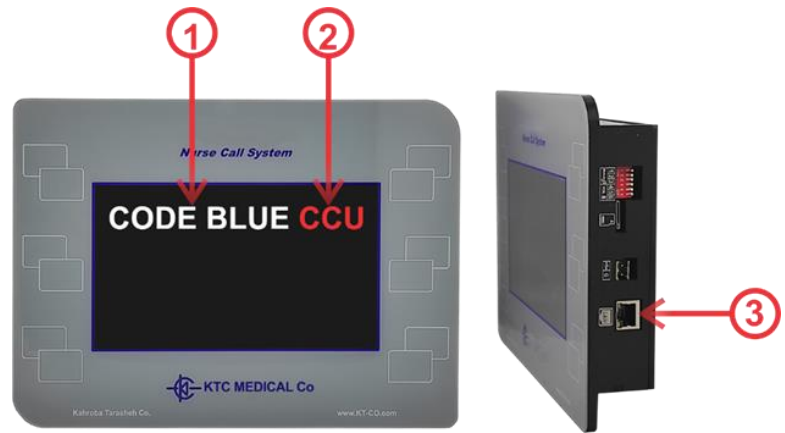
Weight	918 g		
Dimensions	W: 285 mm	H: 178 mm	D: 47 mm
Raw Material	Plexiglass + Plexiprint		
Color	Black		
Power Supply	5 V via external AC adapter		
Display Type	7-inch TFT		
Internal Speaker	2 W, 8 Ohms		
Port	RJ45 via Crossed Cable		
Operating Temperature	-10°C ~ +50° C		
Ingress Protection	20 or better		
Operating Humidity	30% ~ 80% RH		
Mounting	Surface		

| Number	Item	Description
①	Display Code Type	The Text or Color of the type of initiated Emergency code
②	Display Location	The Location in the facility initiating the Emergency Code
③	Cat 5/6 Cable Knockout	The connection to the server via RS485 protocol through the CAT5/6 cable

5 RADIO SIGNAL GATEWAY (RPCU-01/02)

5.1 INTRODUCTION

RPCU-01 is the gateway for transmission of the text corresponding to the emergency code or any other text from the management center to the holders of waist radio pager units and vice-versa.

RPCU-02 is the repeater unit to boost the signal when the facility has an architecture with obstacles for the 433 MHZ signal.

Any code call alert launched / received to/from the 2-way radio pagers is communicated to the main server (KTC-RN-S) via RPCU-01/02 units.
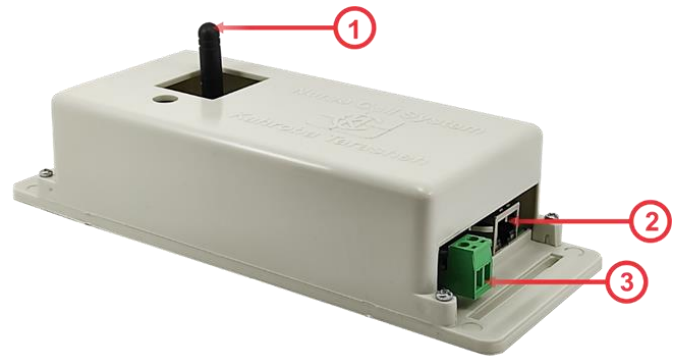
Weight	175 g
Dimensions	W:202 mm H: 77 mm D: 45 mm
Raw Material	ABS
Color	White
Power Supply	5 V /2 A
Wireless Range	Max 200 meters depending on the architecture
Port 1	Rj45
Wireless Frequency	433 MHz
Ingress Protection	00 A
Operating Temperature	-10°C ~ +50° C
Operating Humidity	30% ~ 80% RH
Mounting	Surface

| Number	Item	Description
①	Radio Wave Antenna	To communicate with the pagers in the system
②	RJ45 Port	Cat5 Connection Socket to the Server
③	Power Socket	The input from 5V/2A Adapter from the mains

6   SMS GATEWAY (SMGW01)

6.1   INTRODUCTION

The SMGW01 SMS gateway connects the KTC-RN-S server to GSM /CDMA mobile networks through its LAN port and its SIM card.

The Emergency calls initiated from different methods are sent to mobile phones of the related staff by this module through Short Message Service of local mobile service provider.

Also, the authorized staff can initiate an emergency code call by sending a short message (SMS) to the SIM card installed in SMGW01 module and the code call will be transmitted to other staff by all available methods.
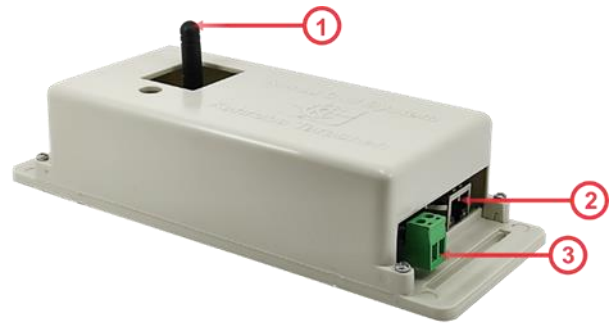
Weight	175 g
Dimensions	W:202 mm H: 77 mm D: 45 mm
Raw Material	ABS
Color	White
Power Supply	5 V /3 A
Frequency Bands	850, 900, 1800 and 1900 MHz (Quad-band)
Port 1	RJ45 (LAN)
Port 2	SIM card (Standard Size)
Ingress Protection	00 A
Operating Temperature	-10°C ~ +50° C
Operating Humidity	30% ~ 80% RH
Mounting	Surface

Number	Item	Description
①	GSM Antenna	To communicate with the Mobile Phones in the system
②	RJ45 Port	Cat5 Connection Socket to the Server
③	Power Socket	The input from 5V/2A Adapter from the mains

The SIM card Slot can be accessed by opening the cover of the module. The client must apply for an R-UIM or UICC SIM card from the local operator company for CDMA one/2000 networks.

7   TWO-WAY RADIO PAGER (PAGER02)

7.1   INTRODUCTION

The 2-way radio pager used in the Emergency code calling system is capable of launching a code call and a presence signal after a code has been attended.

It can launch any of the 12 codes defined on the system through its menu which is set by the main server of the emergency code call system.

Weight	98 g
Dimensions	W: 90 mm H:60 mm D: 20 mm
Raw Material	ABS + Plexiprint
Color	Black
Power Supply	5V /2A Battery Charging
Display Type	OLED 128 x 64 2.42 inch
Battery Type	Lithium 3.7 V/1600 mA Rechargeable Battery
Port 1	Micro-USB (Battery charging/ Setting)
Internal Buzzer	Yes
Wireless Range	Max 200 meters depending on the architecture
Wireless Frequency	433 MHz
Ingress Protection	65 or better
Operating Temperature	-10°C ~ +50° C
Operating Humidity	30% ~ 80% RH
Mounting	Portable

Number	Item	Description
①	LCD	To show the paged Emergency Code Type and Location
②	Micro USB Port	To connect to 5v DC charger (by the user) or computer (by the installing technician)
③	Enter Key	To Turn the pager "ON" and select tabs in the menu (Check Section 6-1)
④	Back Key	To go back in the menu (Check Section 6-1)
⑤	Scroll Keys	To scroll up and down in he menu (Check Section 6-1)

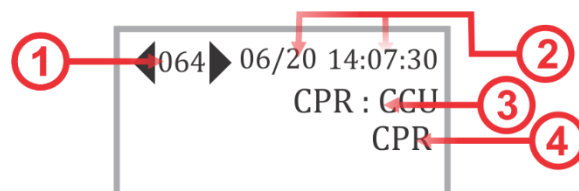## 7.2   TURNING THE PAGER ON

The pager will turn ON by pressing the "Enter" button for a few seconds. The home screen is as illustrated below:

Number	Item
①	KTCO Trademark
②	Battery Level
③	Current Time
④	Emergency Messages Inbox

Pressing any of the scroll keys will show the messages in the reverse chronological order as illustrated below:

Number	Item
①	Message Number in reverse chronological order
②	Date and Time
③	Emergency Code Initiating Location
④	Emergency Code Type

The time I pagers in set by the connecting gateways or by the technician at the time of installation through connection to the set up program in the computer

7.3   MAIN MENU

Pressing the "Enter" button will pop the main menu with the following options (Accessed through using the scroll buttons):

| Number	Item	Description
①	Call	Check Section 6-1-2-1
②	Alarm Type	Check Section 6-1-2-2
③	Start Self-Test	Check Section 6-1-2-3
④	Advanced	Check Section 6-1-2-4
⑤	Display Time Out	To set the Time-out to one of the 3 values: 5, 10 and 15 seconds
⑥	Delete Messages	To delete all the received Emergency Calls from the Pager
⑦	Power Down	To completely shut down the pager
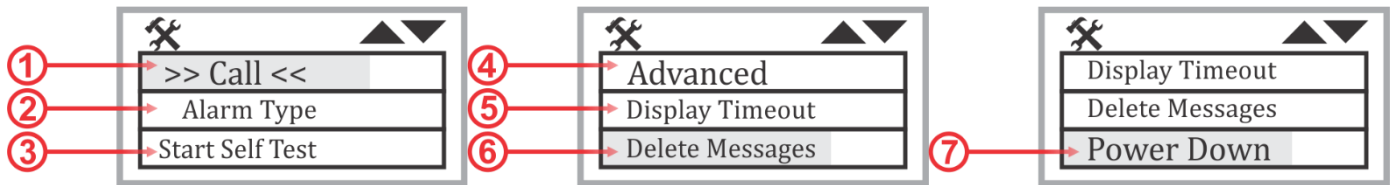
7.3.1   CALLING AN EMERGENCY CODE

The types of the emergency code that the pager can initiate are set by the installing technician and presented on this page. The user can simply scroll down to the desired Code and initiate it by pressing the ENTER button.
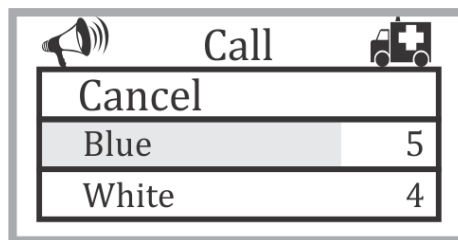
Up to 12 different Emergency Codes (Medical-Security-Facility) can be set for the pager to initiate.

7.3.2   ALARM TYPE

This option enables the user to Activate/Disactivate different notification methods of the pager (Buzzer or Vibrator or displaying the text on the screen) as illustrated below:
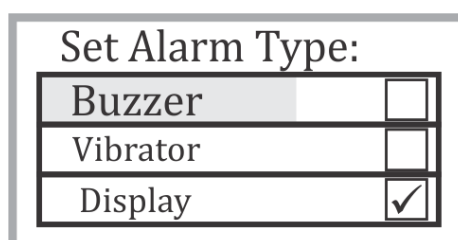
7.3.3   SELF-TEST

This option will test all the buttons, the memory and the USB port of the pager as illustrated below:

```
┌─────────────────────────┐
│      Self Test          │
│  Press The Keys      1  │
│  Serial      OK      2  │
│  EEPROM  OK          3  │
│  Cc1120   OK         4  │
└─────────────────────────┘
```

7.3.4   ADVANCED

This option shows the I.D. number for the staff holding the pager, the I.D. for the associated group that the holder of the pager belongs to and the I.D. of the gateway closest to the holder of the pager as illustrated below:

```
┌─────────────────────────┐
│  Advanced Optins        │
│  Person:       10027    │
│  Group :      246016    │
│  Location :   245568    │
│  Ver 45 SN:     2001    │
└─────────────────────────┘
```

The I.Ds enable sending the Emergency Codes to target people, group or location in the facility..

# 8 VOCAL PAGING SYSTEM ANNUNCIATION

8.1 INTRODUCTION

It is possible to create a vocal alert for the audience by sending a customized voice for each type of initiated emergency code to the Audio speakers in the facility.

In order for this to happen, the server of the Emergency Code Cal System is placed next to the voice amplifier of the facility and the Pre-recorded voice message is passed to the amplifier via the AUX connecting wires.

The type of the vocal alerting message can be the name of the code or plain language depending on the policies implemented by the authorized bodies in the facility.

The installing technician will set the Vocal alarms at the time of setting up the system.
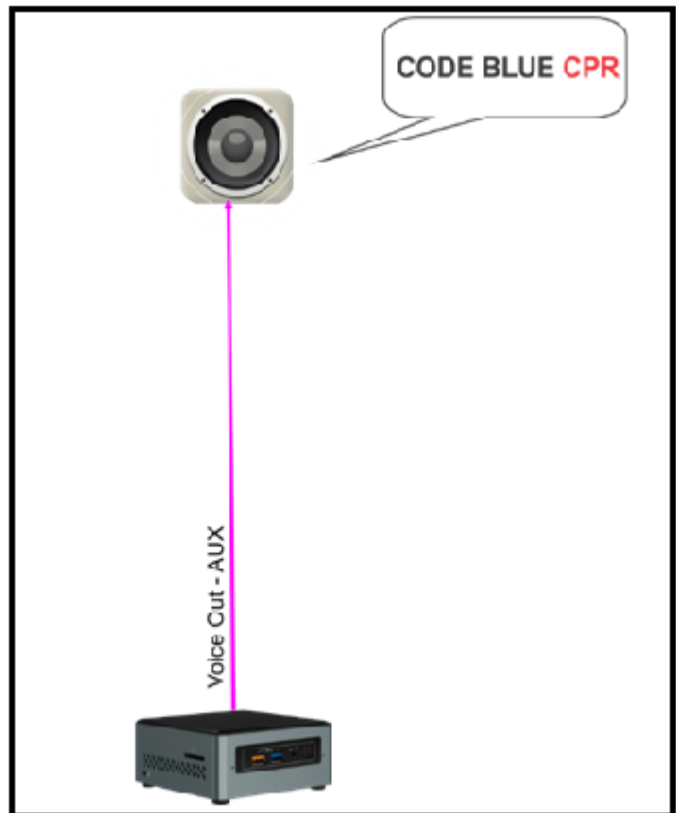
9   ANDROID MOBILE APP (KTC-RN-S-APP)

9.1   INTRODUCTION

The Mobile application can receive (Via SMS Gateway) and send Emergency Codes over the GSM network.

To facilitate fast code initiation, there is a predefined menu for the 12 preset codes that enables the user to simply press a tab instead of typing the code type as illustrated below:
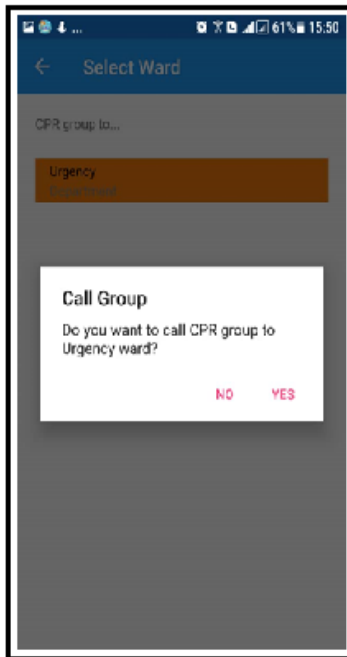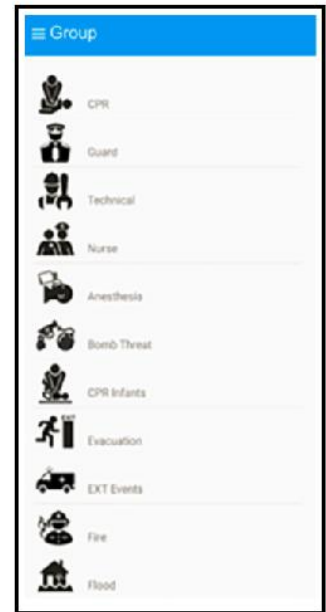
New wards can be added in the WARD section of the main menu as illustrated below:
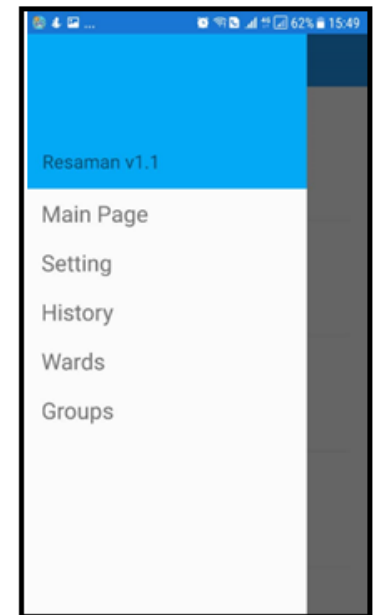
The user can add new active groups as required in the facility in the following menu of the application:
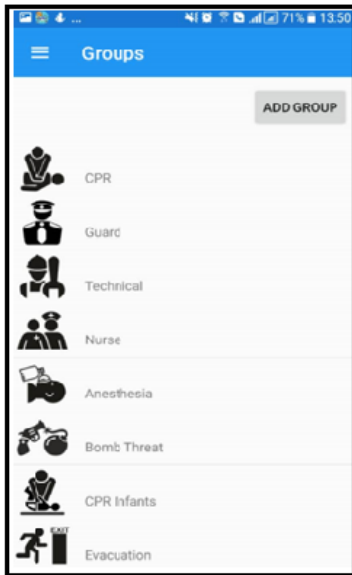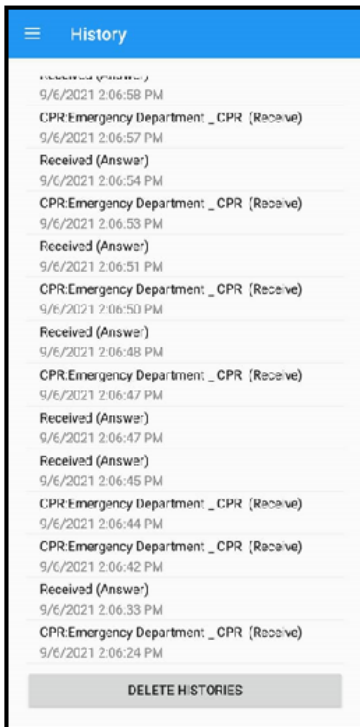
To initiate a call , one can simply press on the corresponding tab on the main screen.

Also, the application pops a notification window in case there is a Code Call initiated from other units in the Emergency Code Call system even if it is not running:

The history of all initiated or received code calls can also be viewed through the application:

The user has the option to set the mobile number associated with the SMS gateway connected to the main server of the Emergency Code Call/ Group Summon system in the SETTING tab of menu section of the application.
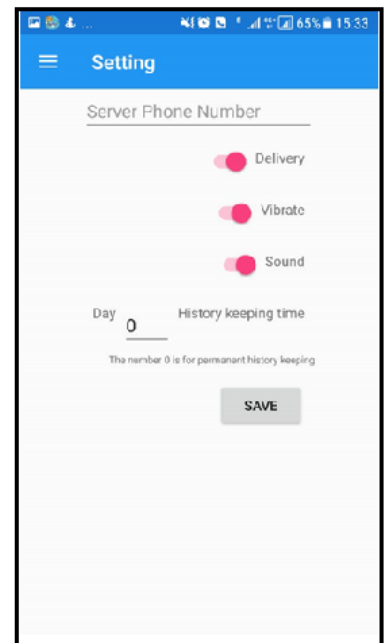
The option to Vibrate and audio alarm when receiving a code and also getting a delivery report of the initiated codes have also been added in this section.

10 WINDOWS WEB-BASED APPLICATION (KTC-RN-S)

10.1 INTRODUCTION

KTC-RN-S is the main software installed on the main server of the emergency code call system. The content of the message, the receiving individual/group and the conveyance method of the calls can be customized through the software menus.

KTC-RN-S can send the Emergency code call through Speakers, pagers, Mobile applications and display units in the facility. It can also receive the emergency code call launched from 2-way pagers, staff console {CUl-04), panel (ECP-02/05) and Android Mobile application and beam it to the desired group of staff/locations.

KTC-RN-S has the option to get a report on the Emergency code call Types and locations launched in a given period of time.

KTC-RN-S can be accessed via its web-gate via an Android application which can launch the

Emergency codes from Android Mobile Handsets

Required Operating System	Windows 10/Server
Required H.D.D.	Min.120 GB SSD
Required RAM	Min4G
Required Hardware	Ethernet Port
Required Processor	Min Core i3 or equivalent
Centralized Database	MSSQL

10.2 USING THE WEB-BASED APPLICATION

The web-based application is set up by the installing technician on a typical web browser like Google Chrome and the facility staff can use it after entering the associated login and password as illustrated below:

After logging in the main home page of the application is present with the tabs given in the following table:

Number	Tab Name	Description
①	Call	Check Section 10-1-1
②	Report	Check Section 10-1-2
③	Chart	Check Section 10-1-3
④	Monitoring	Check Section 10-1-4
⑤	Map	Check Section 10-1-5
⑥	Setting	Check Section 10-1-6

10.2.1   CALL

The installing technician sets up the method of calling each group (Pager or Mobile phone or Speaker or Display). There are 2 options provided in this section:

10.2.1.1   GROUP CALL

To Call a predefined Group of Staff as illustrated below:

Number	Tab Name	Description
①	Group Tab	To Choose Group Calling Method versus Individual Calling
②	Group Names Drop Down	To choose the Group to be Called (Medical/ Security/Facility)
③	Code Type	Up to 12 Tabs can be added for 12 codes to be initiated the Tab of the Chosen Code will Change color to blue
④	Text Box	To add a text to accompany the initiated call
⑤	Call Method Logos	To demonstrate the method to be used to access a group
⑥	Call Tab	To Initiate the call after choosing the Group and Type of the Call

10.2.1.2   INDIVIDUAL CALL

To call a predefined staff with customized text. The user can add new people to the list as illustrated below:

Number	Tab Name	Description
①	Person Tab	To Choose Individual Calling Method versus Group Calling
②	Individual Names List	To choose the Group to be Called (Medical/ Security/Facility)
③	Add New Record Tab	To Add new Staff Names to the List by the user
④	Remove/Edit Tab	To Remove or Edit one of the Entries
⑤	Text Box	To add a text to accompany the initiated call
⑥	Call Tab	To Initiate the call after choosing the Individual from the List

The recipient should have either a pager or a mobile phone to get an private individual message from the Emergency Code Call System.

10.2.2 REPORT

This tab will show the chronological log of the initiated calls along with details like: Sender, Type, Accompanying Text and incident location as illustrated below:
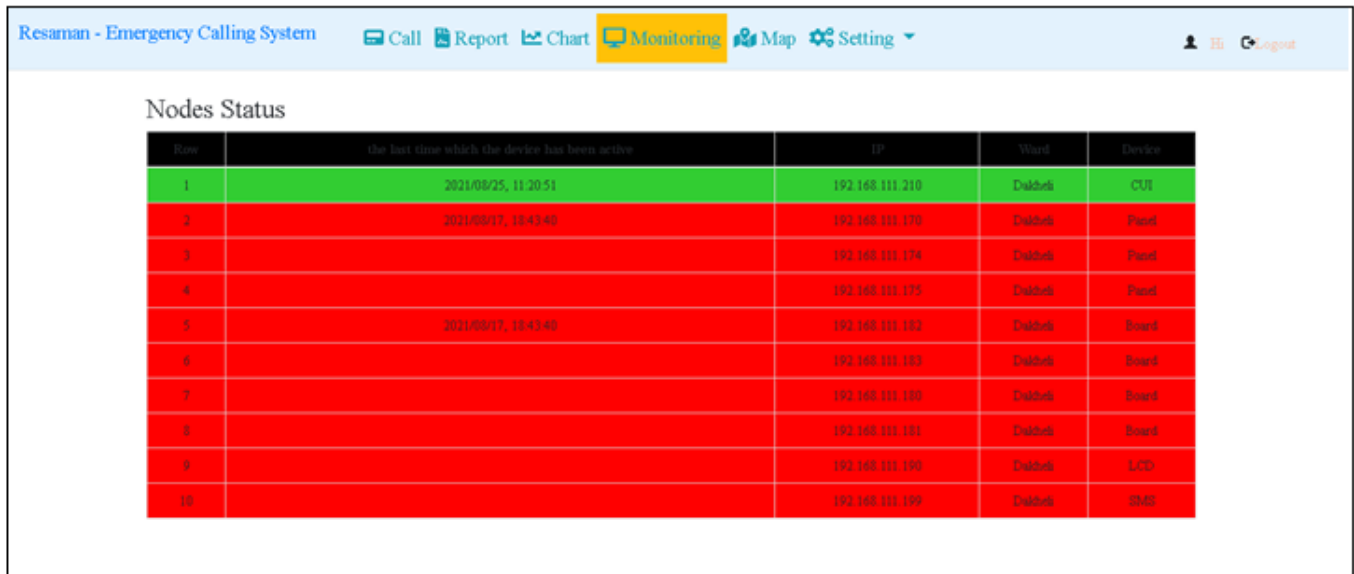

10.2.3 CHART

This tab will present a managerial chart of Emergency Call Statistics serving for resource or staff management purposes as illustrated below:
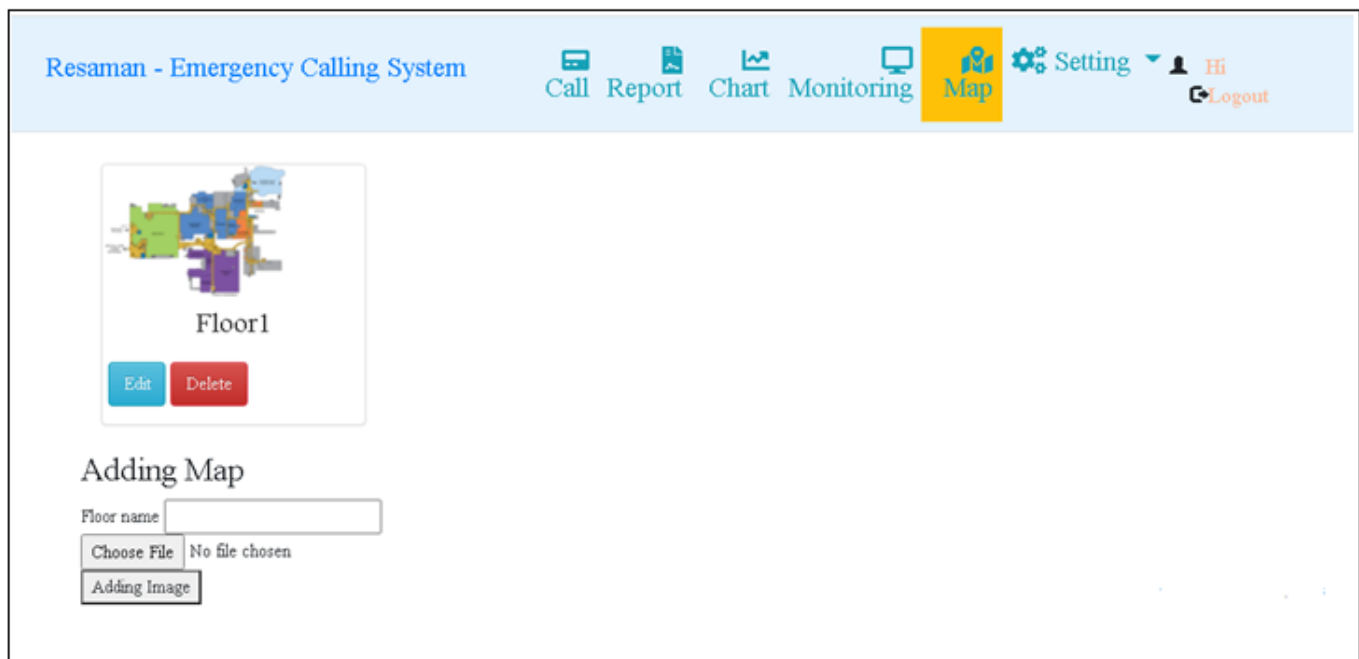
10.2.4 MONITORING

This tab will show the status of the nodes to initiate or receive an Emergency Call in the system. A Green color means the node is connected to the network and a Red color shows that the node is absent and not active in the network as illustrated below:

10.2.5 MAP

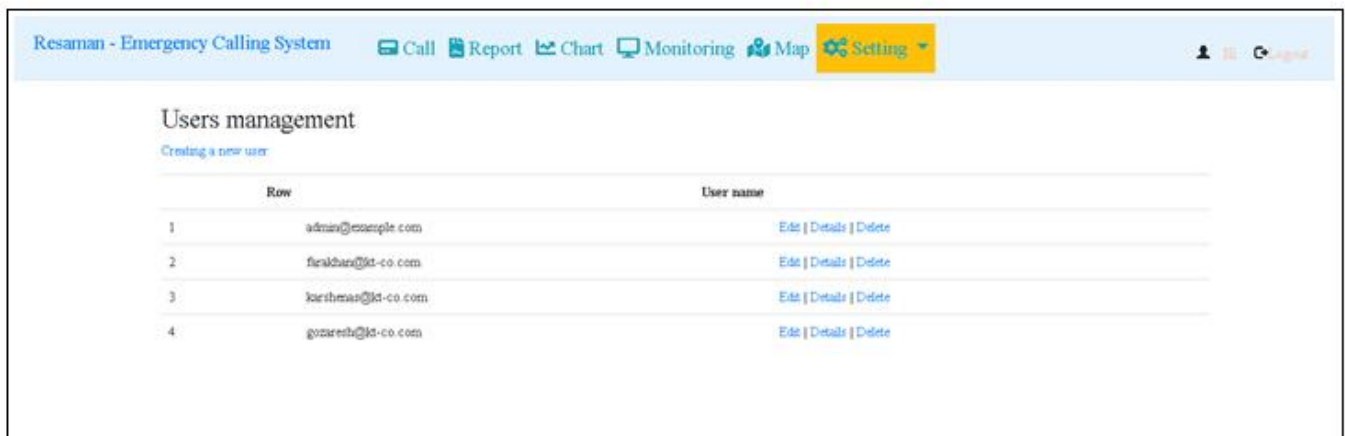This tab will show the graphical location of the nodes in the system as illustrated below:

The location of the Radio Gateways is of importance as the approximate location of an Emergency Call initiated from a 2-way pager is determined by the location of the FIRST Gateway processing the initiated Call.

10.2.6 SETTING

This tab enables to Add/Remove the users of the web-based Emergency Code Call Application as illustrated below:

11 CARE AND CLEANING

11.1 SYSTEM CHECK

Before using the Nurse Call System,

- Check if there is any mechanical damage in the system and accessories.
- Check if all the power cable and accessories are firmly connected.
- Check all the functions of keyboard and modules to make sure that the monitor is in propercondition.

If you find any damage on any module in the system stop using it and contact thebiomedical engineer of the hospital or local After Sale Service.

The overall check of the system, including the safety check, should be performed only by qualified personnel.

All checks which need any module to be opened and safety and maintenance checks should beperformed by After Sales Service.

11.2 CLEANING AND DISINFECTION

11.2.1 GENERAL POINTS

Use only the substances approved by us and methods listed in this chapter to clean or disinfectyour equipment.

Manufacturer makes no claims regarding the efficacy of the listed chemicals or methods as a means for controlling infection. For the method to control infection, consult your hospital's Infection Control Officer or Epidemiologist. See also any local policies that apply within yourhospital.

KT-NCS Emergency Code Call System elements fall in the following Ingress Protection group:

- Server001/RPCU/NDP31/TECP05/SMGW01: IP 20 or better
- Two/one-way Radio Pagers : IP 55 or better

> - **Sterilization may cause damage to the device and is therefore not recommended.**
> - **If you see any signs of damage or deterioration in the device and its accessories, do notuse it, and if necessary, contact the after-sales service company.**
> - **Allow the modules of the system to dry completely before making connections. And please make sure all connectors tightly connected to the system before using the system.**

Please pay special attention to the following items:

- All the modules in the system shall be kept dust-free.
- Do not use strong solvents such as acetone or ammonia.
- Most cleaning agents must be diluted before use.
- Don't use rough or sharp material or your fingernail to remove stubborn stains.
- Do not let the cleaning agent enter into the chassis of the system.
- Do not leave the cleaning agents on any part of the equipment.

Do not use ETO gas to disinfect any module in the system.

11.2.2 EXTERNAL SURFACES

In-between patients and as required:

For cleaning: wipe gently using a moist cloth for disinfection use Alcohol 70%

11.2.3 DISPLAY SCREEN

Use clean and soft cloth with screen cleaner or moist with Isopropyl alcohol may be used for cleaning and disinfection.

- Take extra care when cleaning the screen of the staff console because it is more sensitiveto rough cleaning methods than the housing.
- Don't spray a liquid directly on the screen.

11.2.4 ACCESSORIES

Accessory holders and extension cables should be cleaned and disinfected after each patient or when necessary, using a soft, clean cloth soaked in mild soapy water and, if necessary, Isopropyl alcohol, and then wiped with a soft and dry cloth.

- **To avoid damaging of the cable, probe, sensor or connector, do not immerse it in any liquid.**
- **Disposable accessories shall not be sterilized or reused.**
- **To prevent environmental pollution, the disposal of any part shall be done inaccordance with the policies of the hospital.**

The following table summarizes the methods of cleaning, disinfecting and sterilizing differentparts of the device:

Device parts	Cleaning	Disinfection	Sterilization
External surface of device	In-between patients and as required wipe gently using a moist cloth and warm soapywater or mild detergent.	In-between patients and as required with: • Alcohol 70% • Isopropyl Alcohol • N-Propanol	If needed, can be done using Ultra-violate or gamma ray methods.
Holders of accessory, Extension cables		I In-between patients and as required with:	
Display screen	In-between patients and as required: Clean and soft cloth with screen cleaner.	• Isopropyl Alcohol	

11.3 PREVENTIVE MAINTENANCE (PM)

To ensure that the device is kept in the best condition, it shall be kept clean and all points relatedto the maintenance of the system shall be observed. There are no repairable parts in the system and all repairs shall be done by the manufacturer.

11.3.1 STORAGE

The storage environment shall be clean and dry. If possible, use the original packaging of thedevice.

If any module falls from falls from a height and is damaged or in the vicinity of a very high temperature and high humidity, contact the company's after-sales service at the earliest opportunity to ensure the correct operation.

Thoroughly clean the system before and after the system is not used for a while.

11.3.2   WEEKLY CHECKS

- Device cleanness
- Visual inspection of device (case, screen, keys and indicators)
- Visual inspection of accessories
- Function of accessories

11.3.3   MONTHLY CHECKS

- Visual inspection of device
- Device cleanness
- Function of keys and indicators
- Visual inspection of accessories

The preventive maintenance (PM) checklist # KT-NCS-PM-CHK-WIRLSS-NCS should be completed by responsible individuals of healthcare center. It should be noted that PM checklist only is used to perform systematic inspection of the equipment and will not guarantee their correct function.

11.4 PREVENTIVE MAINTENANCE (PM) CHECKLIST

KT-NCS Co Form # KT-NCS-PM-CHK WIRLSS-NCS.					
City:		**Facility:**		**Ward:**	
Bedside:		**Corridor/Ward/Room:**		**Management Center:**	
Model:		**Serial Number:**	**Installation Date:**	**Inspection Date:**	
No.		**Test and Inspection Item**	**OK**	**NOT OK**	**N/A**
1	**Visual inspection**	No damage or breakage in the back case and panel			
		Cleaning and disinfection according to the user manual			
2	**Display screen**	Correct display of information			
3	**Alarms**	Alarm activation			
		Clarity of alarm sound			
		Correct function of alarm LEDs			
4	**Setup**	Saving date & time settings			
5	**Switches**	Correct function			
6	**Connectors**	Firmly fastened			
7	**Pull Cords**	Correct function			
8	**Assurance LEDs**	Correct function			
9	**Speakers**	Clarity of sound			

Final Decision: **PASS:**   **FAIL:**

Recommendation:

Name and signature of responsible individual   **Name and signature of expert:**

12 TROUBLESHOOTING

Repairing the internal parts of any module in the system must be only done by trained and authorized personnel of "After Sale Service"; otherwise manufacturer will not take any responsibility for any possible hazard to the patient and the monitor.

Troubleshooting guide is intended to help users to solve minor problems caused by incorrect use of any module.

When you face any problem, please make sure that you have followed all procedure mentioned in Correct Action column before contacting "After Sale Service".

For symptoms not mentioned in the table, please turn OFF the system and contact "After Sales Services" department.

Fault Symptom	Possible Cause	Correct Action
Staff Display is OFF	12 V DC adapter not connected	Connect the 12 V DC adapter to the mains
	12 V DC adapter Broken	Replace the 12 V DC Adapter
No Nurse Calling Function from all rooms in the ward	Staff display not programmed	Contact the technician to set the staff display
No Nurse Calling function from a specific room	The adaptor not connected/broken	Connect/replace the adapter
	The battery depleted	Replace battery
Self-triggering	Another transmitter at 433 MHz present	Intermittent problem, contact the technician
Service room Alarm Self Triggering	The unit has been exposed to water	Dry the Unit and check the sealing /Replace the unit
One of the Nurse call panels in a room not working	No Power to the panel	Connect the power supply
		Replace the Battery
No Chime from staff console	Broken staff console	Replace the unit /Factory Reset the unit
	Volume down	Raise the volume
Bed/Room wrong numbering	Wrong initial setup / Change of bed number after setup	Contact the technician to do the setup
Call/Cancel switch on the Nurse call panel not working	No Power to the unit	Replace the battery/Connect the adapter
Pull cord switch not working	No Power to the unit	Replace the battery/