iPECS

iPECS eMG80&eMG800&UCP

System DECT Installation Guide

Please read this manual carefully before operating System.
Retain it for future reference.

ERICSSON | LG

Regulatory Information

Before making connections to the telephone network, you may be required to notify your local serving telephone company of your intention to use "customer provided equipment." You may further be required to provide any or all of the following information:

PSTN line Telephone numbers to be connected to the system

<u>**Model name**</u>

- iPECS eMG80 DECT
- iPECS eMG800 DECT
- iPECS UCP DECT

The required regulatory agency registration number is available from your local Ericsson-LG Enterprise representative.

This equipment complies with the following regulatory standards, EN 301, EN 406, TBR 10 and TBR 22. Also, this equipment complies with the safety requirements of EN 60950-1 and the EMC requirements of EN5022, EN5024, EN301 489-1 and EN 301 489-6.

GDC DECT Series has been designed to comply with the Hearing Aid Compatibility requirements as defined in Section 68.316 of Part 68 FCC Rules.

If the telephone company determines that customer provided equipment is faulty and may possibly cause harm or interruption in service to the telephone network, it should be disconnected until repair can be affected. If this is not done, the telephone company may temporarily disconnect your service.

The local telephone company may make changes in its communications facilities or procedures. If these changes could reasonably be expected to affect the use of iPECS eMG80/eMG800/UCP or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

iPECS eMG80/eMG800/UCP complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user:

⚠ **WARNING**

"This equipment generates and uses R.F. energy, and if not installed and used in accordance with the Instruction Manual, it may cause interference to radio communications. It has been tested and found to comply with the appropriate limits for a telecommunication device. The limits are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area could cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference."

Revision History

ISSUE	DATE	DESCRIPTION OF CHANGES
1.0	Mar., 2014	Initial Release
1.1	Feb., 2015	S/W version 1.1.x. - Update the contents according to SW integration.
1.2	July, 2015	S/W version 1.2.x. - Changed LG logo type and system connection diagram.
1.3	Jan, 2016	S/W version 2.0.x. - Added GDC-480H and corrected the wrong operation in subscription and Attendant service.
1.4	April, 2016	S/W version 2.0.x. - Integrate eMG and UCP manual.
1.5	Aug., 2016	S/W version 2.1.x. - Added Multi zone for WTIM4/8 (UCP).
1.6	May., 2017	S/W version 2.2.x. - Added WTIM24 and updated Multi Zone.
1.7	Aug., 2017	S/W version 2.2.x. - Updated Multi Zone.
1.8	Jan., 2018	S/W version 3.0.x. - Updated WTIM24 installation - Updated Configuring Multi zone for WTIM4/8 & WTIM24
1.9	May., 2018	S/W version 3.1.x. - General Update (Style, Table.)
2.0	May., 2019	S/W version 3.5.x. - General Update (Text Style, Table.)
2.1	Dec., 2019	S/W version 4.0.x. - General Update (Text Style, Table.)
2.2	Sep., 2020	S/W version 4.1.x. - Applied S/W version 4.1.x
2.3	Mar., 2021	S/W version 5.0.x. - Applied S/W version 5.0.x

Table of Contents

1   Introduction

iPECS System DECT (Digital Euro Cordless Technology) solution employs Ericsson-LG Enterprise DECT technology to provide convenience and enhanced productivity with increased office mobility. With the System DECT solution, any DECT Gap compatible handset such as Ericsson-LG Enterprise GDC-450H/480H/500H DECT handset can use wireless connectivity for accessing features and functions of the iPECS system. GDC-450H/480H/500H connect with Ericsson-LG Enterprise DECT Base Stations, providing a fixed radio coverage area or cell. Arranging multiple base stations with overlapping cells forms zones of transparent coverage. As the handset is moved within the zone, a Radio Frequency (RF) connection can be established with any Base station in the zone for transparent operation of the handset throughout the zone, using active call hand-off.
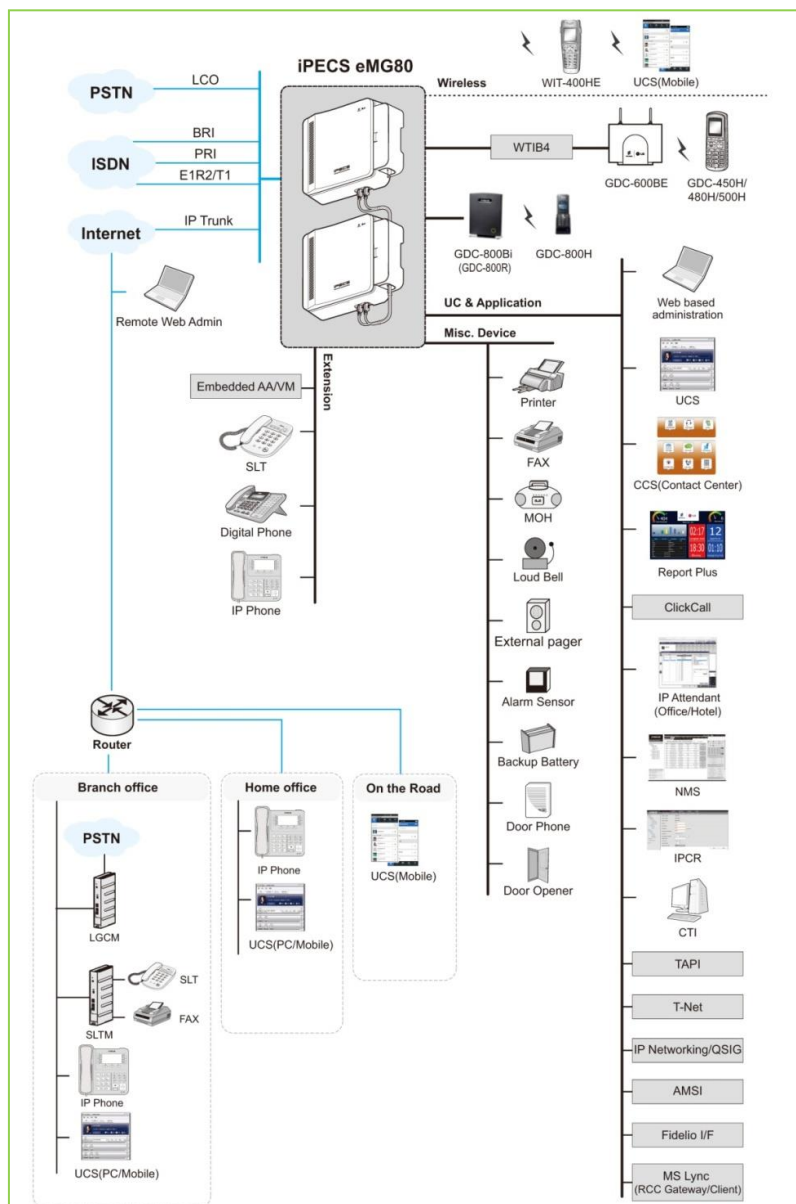

Figure 1.1-1 iPECS eMG80 Connection Diagram
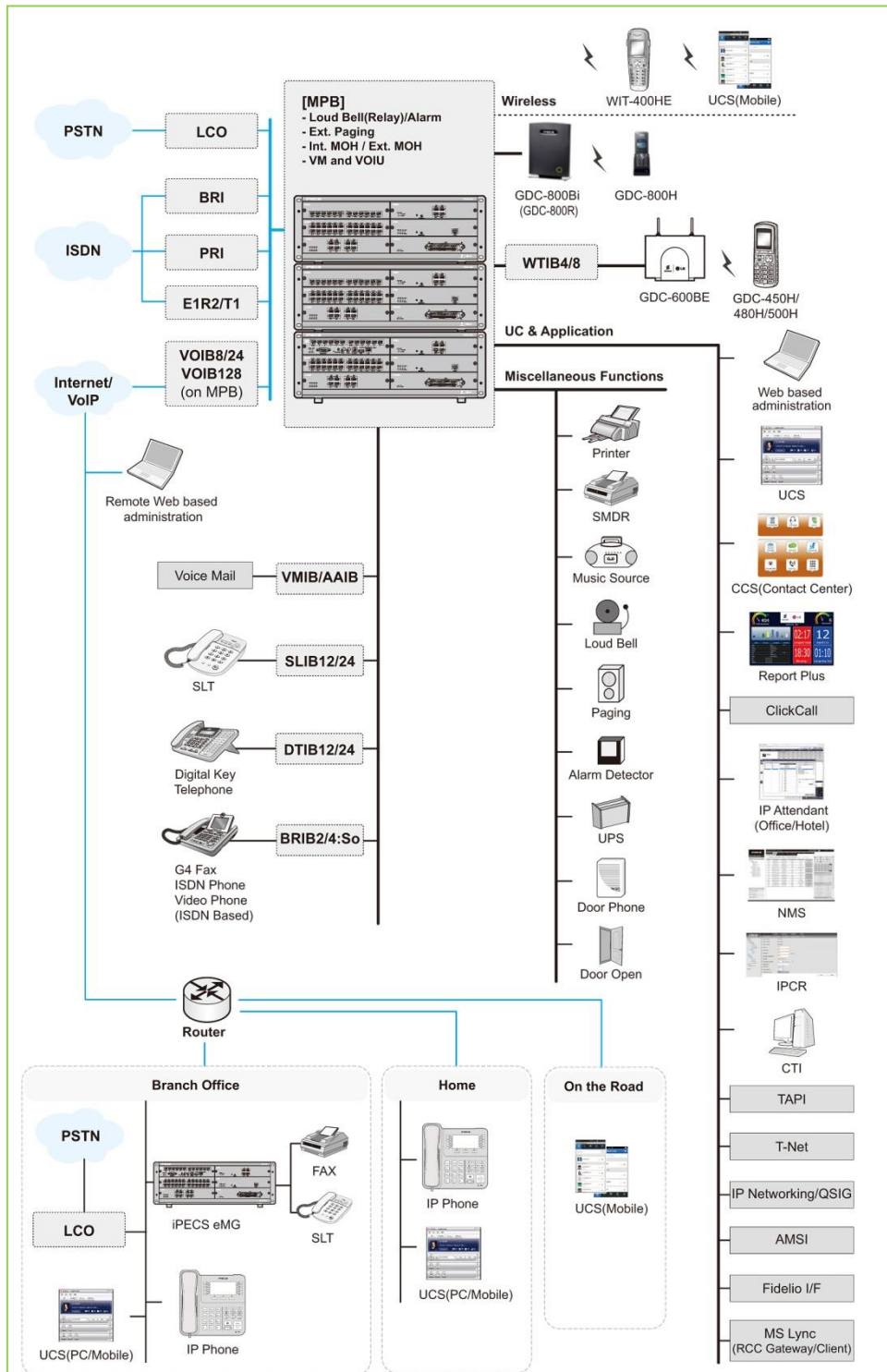
Figure 1.1-2 iPECS eMG800 Connection Diagram
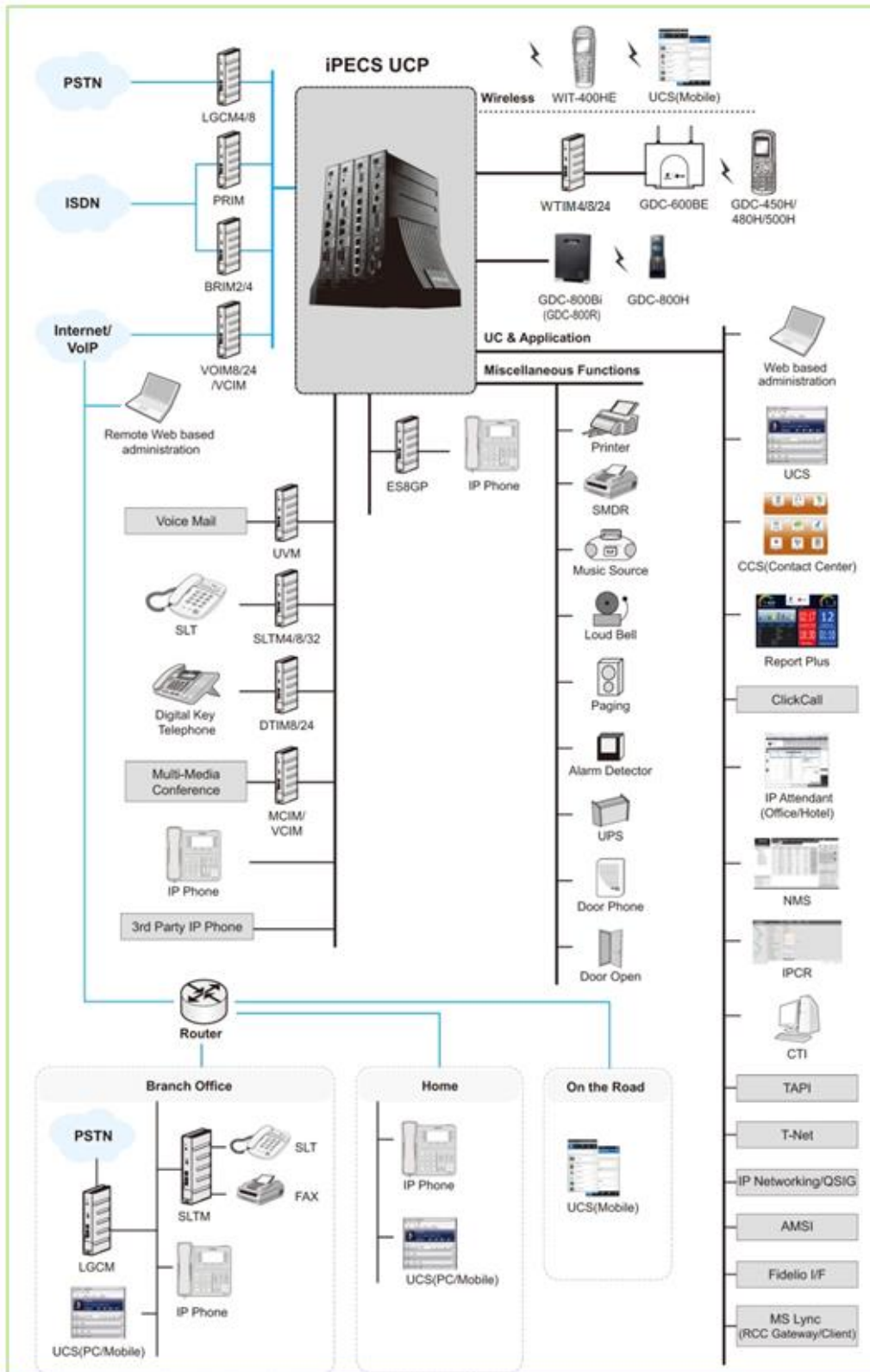
Figure 1.1-3 iPECS UCP Connection Diagram

2 DECT Components & Specifications

The System DECT solution works well with iPECS System which is comprised of Boards, Base Station (RFP), and DECT terminal. The next figure shows a general DECT reference model of Wireless Office Terminal System (WOTS).
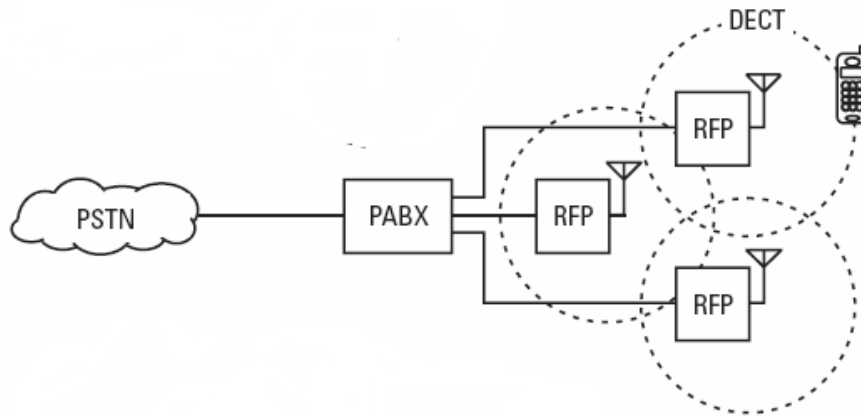
Figure 2.1 General DECT reference model of Wireless Office Terminal System

- **PABX** – Private Automatic Branch Exchange
- **RFP** – Radio Fixed Part (Base Station)
- **PSTN** – Public Switched Telephone Network

The following is needed to configure the System using DECT phones:

- **Board** – The following board can be connected to the iPECS System.
- **Base Station –** The base station should be installed indoors and protected from surge because it is designed for indoor station.

  Each base station provides similar coverage for a particular area call as a cell, and supports 6 simultaneous calls (6 traffic channels). However, since individual wireless terminals are not continuous in call, the system may support more than 6 wireless terminals.
- **Wireless Terminal –** The available DECT terminals based on the following table can be registered.

Item	eMG80	eMG800	UCP100	UCP600	UCP2400
Max. WTIB(M)	1	30	30	30	30
Max. DECT Phone	48	192	192	192	192

Item	UCP
Max. WTIM24	10
Max. DECT Phone	254

- Note) WTIM24 support Only GDC-480H & GDC-500H.

2.1 General Specifications

2.1-1 Environment Specifications

Item	Degrees (℃)	Degrees (℉)
Operation Temperature	0~40	32~104
Optimum Operation Temperature	20~26	68~78
Storage Temperature	10~70	32~158
Relative Humidity	0~80% non-condensing	

2.2 Board Specifications

2.2-1 WTIB4 Specifications for iPECS eMG80

Item	Specification
Power Consumption	3.3W (= 660mA @ +5V)
DECT base station connection port	4
DECT base station interface	E1(line coding : HDB3)
DECT base station feeding voltage	+30V (±2.5%)
Serial Port for GDK-TRC1	1 (115,200bps); ELG proprietary 4-pin serial interface

2.2-2 WTIB4/8 Specifications for iPECS eMG800

Item	Specification	
	WTIB4	WTIB8
Power Consumption	3.3W (= 660mA @ +5V)	4.2W (= 839mA @ +5V)
DECT base station connection port	4	8
DECT base station interface	E1(line coding : HDB3)	
DECT base station feeding voltage	+30V (±2.5%)	
Ethernet Port	1	
Serial Port	1 (115,200bps)	

2.2-3 WTIM4/8/24 Specifications for iPECS UCP

Item	Specification		
	WTIM4	WTIM8	WTIM24
Power Consumption	2.2W (= 440mA @ +5V)	3.7W (= 740mA @ +5V)	4.2W (= 840mA @ +5V)
DECT base station connection port	4	8	24
DECT base station interface	E1(line coding : HDB3)		
DECT base station feeding voltage	+30V (±2.5%)		
Ethernet Port	1		
Serial Port	1 (115,200bps)		

2.3   GDC-600BE Specifications

2.3-1 Base Station Specifications

Item	Specification
Power Feeding	+30V DC
Transmission Max Power	250Mw 100mW(USA)
Access Method/Duplex	TDMA/TDD
Frequency Band	1,880 ~ 1,900MHz 1,920 ~ 1,930MHz (USA)
Channel Spacing	1.728MHz
Modulation	GFSK
Data rate	1.152Mbps
Max. Base Station distance from the WTIM	600m (Recommended CAT5 cable or CAT3 cable)

2.4   GDC-450H/480H/500H Specifications

Battery type, battery life, charger/base input voltage and current, charger output voltage and current, minimum receive power for operation, etc.

2.4-1 Wireless Terminal Specifications

Item	Specification
Max. Transmission Power	250Mw 100Mw (USA) maximum
Modulation Method	GFSK
Frequency Band	1,880MHz ~ 1,900MHz 1,920 ~ 1,930MHz (USA)

3 Installation

3.1 Installation Overview

The installation of System DECT begins with a Site Survey to establish a temporary site map including initial locations for Base Stations.

After the site map is developed, the WTIM(s) is installed and iPECS is configured to support System DECT (refer to your system iPECS Administration and Programming Manual for establishing DECT data in Web Admin).

Once configuration is complete, the Base Stations are mounted in their preliminary locations and an RF coverage survey is conducted to refine the Base Station locations.

With the Base Stations placed and installed in their permanent locations, handsets can be registered to System DECT.

DECT employs RF signals to communicate between the handsets and Base Stations.

In order to address the variation in range, prior to installation, a site survey should be conducted to establish a map with the preliminary locations for the DECT Base Stations.

After installation, the handset is employed in the Cell Tool mode to define the actual RF radiation pattern and Base Station locations can be adjusted to provide seamless coverage.

3.2 Site Planning for Base Stations

The purpose of Site Planning is to provide you with information and explain tasks that should be considered to ensure the best operation of the system.

Read the following information before installing the unit.

⚠ <u>CAUTION</u>

The Base Station should be installed indoors and protected from surge because it is designed to be an indoor station.

3.2.1 Cell-coverage Region Survey (CRS)

In order to obtain the most complete coverage in your facility, this Section explains the measuring procedures using the Cell-coverage Region Survey (CRS) tool of GDC-600TBE.

The temporary positions of Base Stations should be determined prior to this measurement according to instructions outlined in this section.

The temporary positions will be adjusted according to the measurement findings, if necessary. Before reading this part, it is recommended to get used to the manipulation of the CRS tool. GDC-450H/480H/500H support CRS function.

3.2.2   Preliminary Positions of Base Stations

Obtain the plane drawings of the building.

First, understand the general constructing materials of the walls, doors, windows, etc.

The materials of the building are the main factors of attenuation of the RF signals.
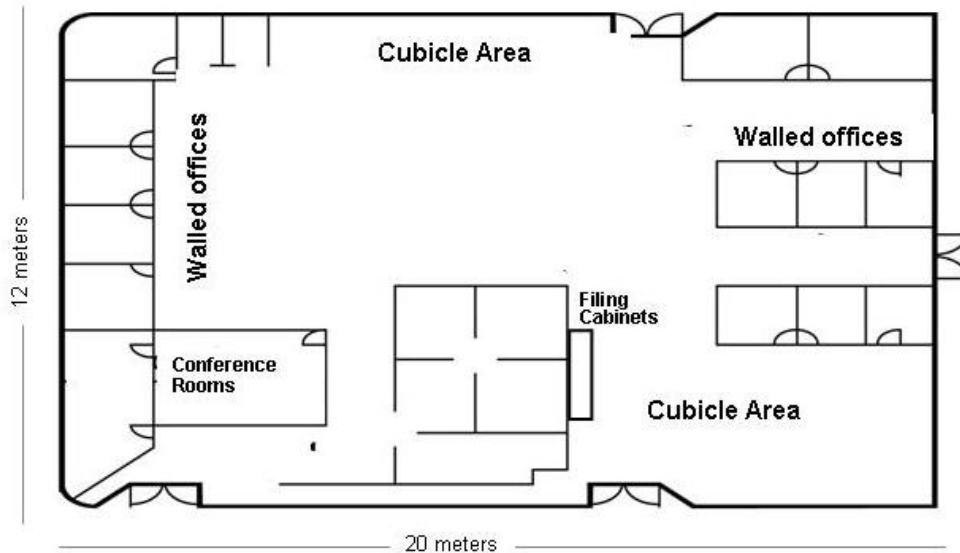
Figure 3.2.2-1 DECT Site Survey

As the Base Station or Handset RF signal propagates, it is subject to several characteristics that affect the ability to receive the signal in a useable form.

Normal attenuation, reflection, and noise all contribute to signal degradation over distance. The Base Station and Handset transmit at about 10 dbm and can receive a signal of -70 dbm.

In an open field with line-of-sight, the handset and Base station can have a separation of about 175 meters. The antenna radiation pattern is approximately circular in the horizontal plane (shown Figure 3.2.2-2).

In an office environment, walls, doors, windows, etc. will further attenuate the RF signal to varying degrees (guidelines below), significantly reducing the coverage area.

Figure 3.2.2-2 Antenna Radiation Pattern

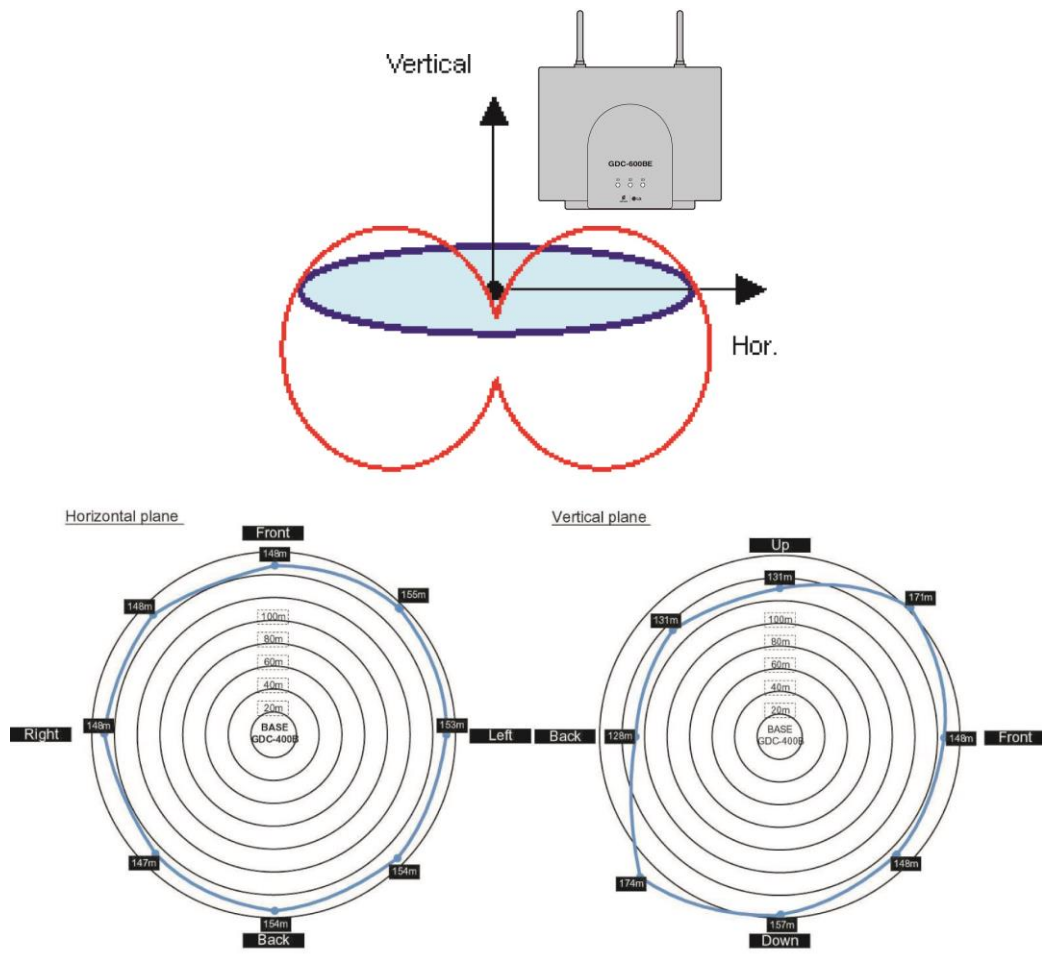Office furniture and structures such as filing cabinets, and certain windows and other surfaces can cause reflections of the original signal.

Some materials cause significant reflections, which can reduce the received signal. GDC-600BE has two antennas to implement antenna diversity, which minimizes the affects of signal reflections.

By employing the antenna with the best signal, the affects of reflected signals can be reduced. Although reflections cannot be eliminated in an office, consider locating the Base Stations away from cabinets and other tall furniture.

High noise levels affect the ability of the receiver to separate the desired signal from the general noise. Office and industrial equipments such as Fax machines, office electronics, welders, microwave ovens and even poorly maintained fluorescent lighting can generate high RF emissions, which appear as background RF noise.

Also multiple reflections of the original signal can appear as noise. Again, although RF noise cannot be eliminated, noise can be reduced by locating Base stations away from nearby emitters.

Determine the broadcasting range of a Base Station.

In a typical office environment, the radios of the cell supported by a Base Station is approximately 15-30 meters. If it is an open area inside of a building, as in a factory, the signals may reach 20-50 meters.

These figures however, are truly dependent on the office characteristics (ex., construction material of walls, placement of metallic objects, doors, windows, etc.); make sure to get to know the broadcast range in your environment taking each office characteristic into account (refer to Figure 3.2.2-3).
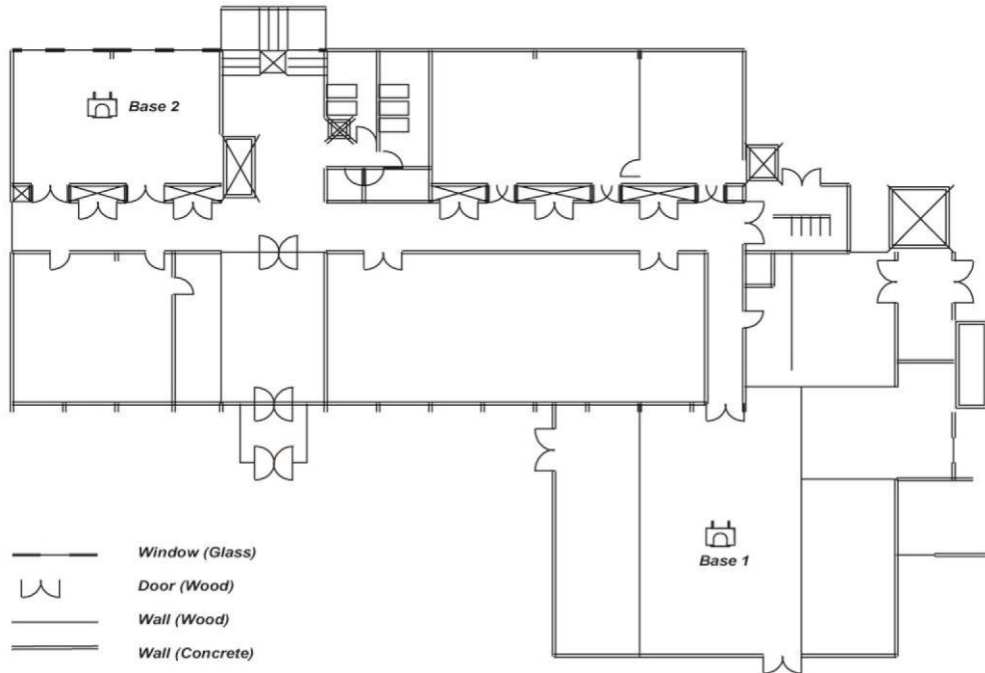

Figure 3.2.2-3 Sample Temporary Base Station Position

Mark the position of the offices where wireless handsets (450H/480H/500H) mainly will be used, and mark the places where high call demands would exist; these areas should be well covered by the Base Stations.

Roughly determine the number of Base Stations and the positions needed according to the above tips.

3.2.3 General Procedure for CRS

After getting well-acquainted with the operation of GDC-600TBE, and how the Base Stations work as applicable to your facility, the CRS can be conducted. Section 3.2.2, Preliminary Positions of Base Stations should already have been completed.

 To conduct a CRS:

1) First, verify that other DECT Base Stations in the area are powered OFF; only the one you are working with currently should be ON.

2) Enter the same PARK ID in GDC-600TBE and GDC-450H/480H/500H.

3) Mount GDC-600TBE at the determined temporary position as high as possible; it is recommended to place the GDC-600TBE at higher than 2 meters.

4) Check the Remote System Service Indicator (RSSI) level in GDC-450H/480H/500H by walking around the area; decide the cell-coverage range temporarily using the pre-determined RSSI level.

5) Repeat CRS procedure from Step 1 at the next tentative Base Station position; it is likely and recommended that the cell-coverage will overlap a bit as shown:
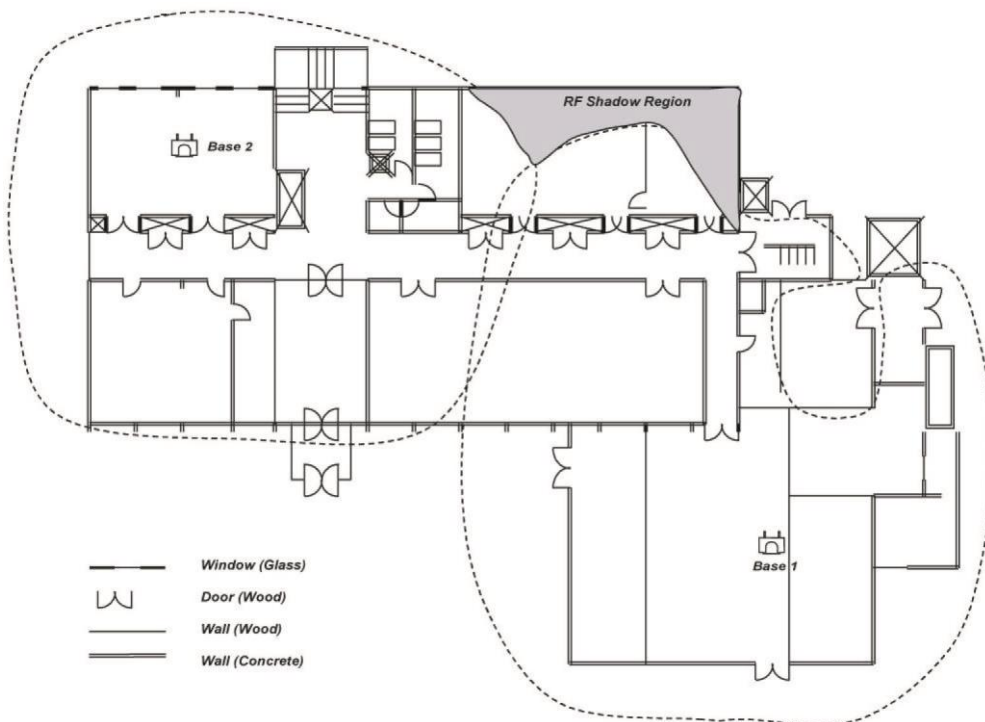

Figure 3.2.3-1 Cell Boundary Map with Base 1 and Base 2

6) If marked positions on the drawing need to be adjusted, move Base Station positions by checking shadow area on plan drawing, and adjusting the Cell-Coverage Regions (consider traffic of 6 calls per area, and add to plan) as shown:
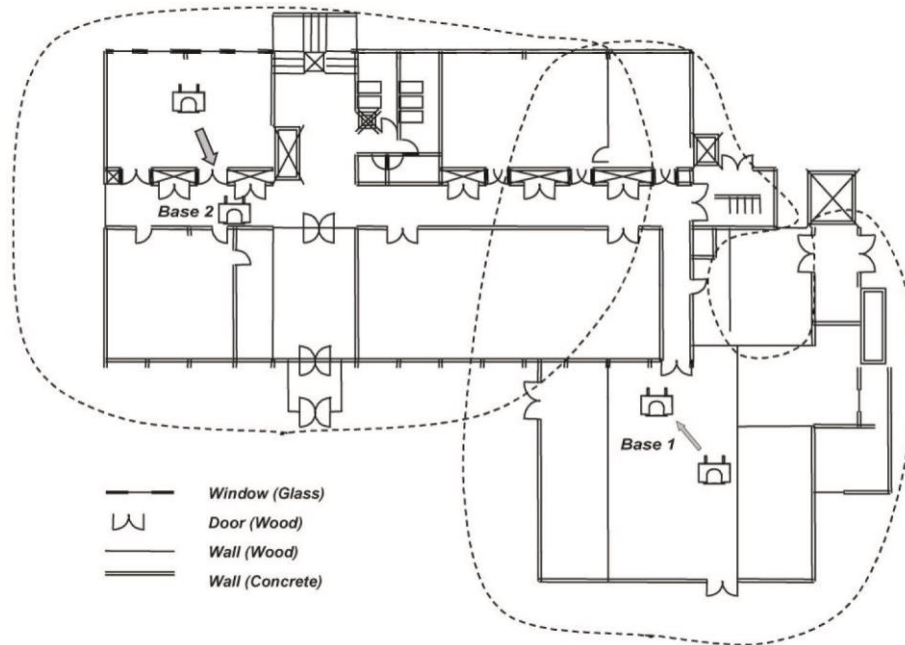

Figure 3.2.3-2 Adjusting Cell Boundary Positions for Base 1 and Base 2

7) After completing the CRS, install the Base Stations (GDC-600BE) in the optimal locations.
8) Finalize the Base Station position by performing a handover and call test with wireless terminals (ex., GDC-450H/480H/500H), by checking the cell coverage region with GDC-450H/480H/500H monitor RSSI level (recommended -65 ± 5dBm, walk with 2 handsets and monitor for voice quality).

3.2.3.1   Additional Tips for CRS

The following lists what you should keep in mind during the CRS Test:

- Draw a cell-coverage region map for each Base Station temporary position.
- The height of a mounted Base Station highly affects the performance of Base Station; it is recommended Radio Fixed Parts (RFP) such as Base Stations, should be mounted as high as possible, and at least higher than 2 meters.
- It is good to locate the position of the RFP in order to secure as many line-of-sight paths as possible, no obstacles between the RFP and Handset (PP), and the path is direct; a line-of-sight path is a good travel way for Radio Frequency signal.
- All other DECT products should be powered-OFF, and GDC-600TBEs cannot work simultaneously.
- Testing during daytime in the real environment is more recommended, as the RSSI is very sensitive to environmental situations; testing at night when the interfering factors are minimized will bring quite different results from a real office environment.
  If there is fading due to metal material, the RSSI value can be varied over a wide range.
- Use a fully-charged battery pack.

3.2.4   Base Station General Guidelines

Using the guidelines and examples below, determine and indicate the approximate Base station locations on the drawing.

- Maximize line-of-sight.
- Distance in open field 150 meters ~ -65 dbm.
- Distance in-office 25 to 40 meters.
- Distance in hallway or open factory floor 40 to 70 meters.
- Locate Base stations to minimize obstructions (sprinklers, exit signs, etc.).
- Locate Base stations away from noise emitters (FAX machines, etc.).
- Locate Base stations away from metal objects (tall filing cabinets, security/fire doors, etc.).
- Locate Base stations near the center of the desired coverage area.
- For proper handover, the coverage area of each Base station should overlap by 10 to 15 meters.
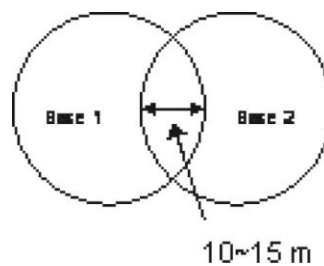
- Consider high traffic areas such as conference rooms and cafeterias.
- Each Base station supports four (6) simultaneous conversations.
- Multiple Base stations can be co-located with a minimum distance of 0.25 meters.
- For a multi-floor installation, plan coverage for each floor separately.
- Attenuation approximations considering office equipment and materials:
  - Open field = 0.5 db/meter
  - Office environment = 2 to 3 db/meter (25 ~ 40 meters)
  - Hall or open factory floor = 1 to 2 db/meter (40 to 70 meters)
  - Concrete and masonry = 15 db/cm
  - Windows, clear glass = 5 dbWindows, mirrored glass = 15 db
  - Drywall, standard = 5 db
  - Drywall, metal backed = 12 db
  - Metal, 1.5 mm = > 20㝒
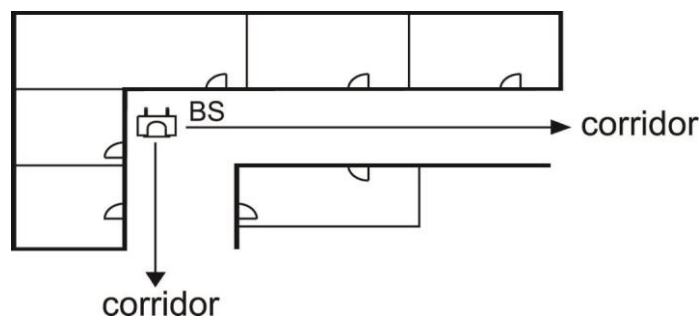
Figure 3.2.4-1 Hallway Placement
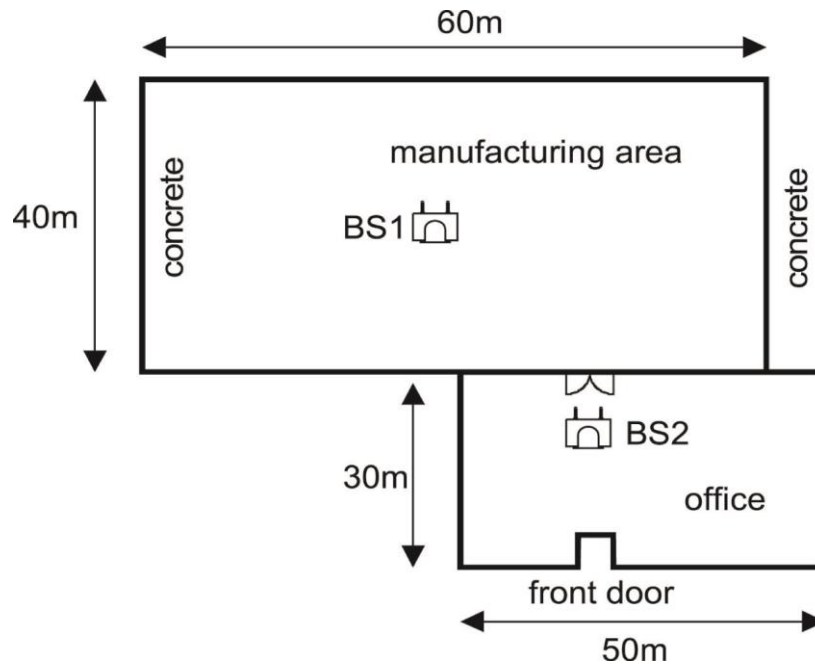
Figure 3.2.4-2 Centralized Base Station Placement
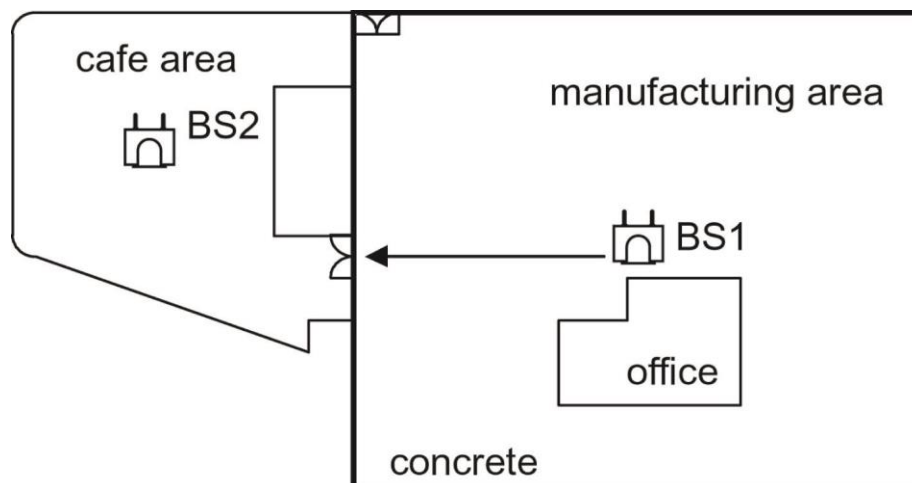
Figure 3.2.4-3 Base Station Aligned with Corridor to Adjoining Area

⚠ CAUTION

1) The appropriate position for a Base Station is no closer than 1.8m above the floor and 0.5m below the ceiling.
   - The best communication environment is when a Base Station and a user are of the same height. In an office environment, however, it is recommended to consider office furniture (especially iron desktops or cabinets) to minimize reflection, diffraction and scattering of DECT wave when you set the position of a Base Station.

2) Keep away from any electronic equipment such as copy machines, printers or computers.

3) The lower wall of a corridor where many people pass by, corner of a wall, and narrow indoors also should be avoided.

4)   When you install a Base Station on the wall, it is better to include intervals.

- DECT wave is attenuated by reflection indoors. In order to minimize attenuation, when you install a Base Station on the wall, give at least three-wave-length intervals. The intervals should be about 45cm because the wavelength is 15cm at DECT frequency.

In iPECS eMG80 System, WTIB4 is Base Station interface board. iPECS eMG80 System can have one WTIB4 (up to 4 ports).

In iPECS eMG800 System, WTIB4 and WTIB8 are both Base Station interface boards. iPECS eMG800 System can have up to three WTIB4 (up to 4 ports) or WTIB8 (up to 8 ports).

In iPECS UCP System, WTIM4 and WTIM8 are both Base Station interface boards. iPECS UCP System can have up to three WTIM4 (up to 4 ports) or WTIM8 (up to 8 ports).

3.3   Board (WTIB/WTIM) Description

3.3.1   WTIB4 (iPECS eMG80)

WTIB4 can be installed on KSU.

⚠ <u>CAUTION</u>

Prior to installing the WTIB4, System power should be turned OFF to avoid any damage.

The layout and dip switch setting of WTIB4 is shown:
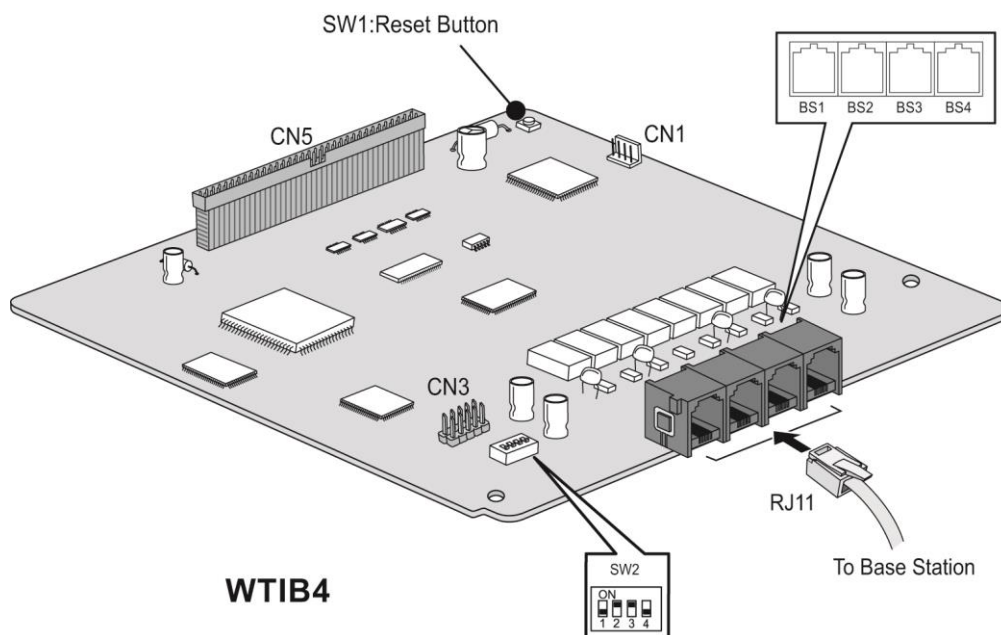
Figure 3.3.1-1 WTIB4

⚠ <u>CAUTION</u>

The Base Station is connected to WTIB4 by an unshielded twisted pair cable (at least CAT3).

<u>NOTE</u>
- The unshielded twisted pair cable (at least CAT3) should be used to connect WTIB4 with a Base Station.
- Shielded cable can be used if it can withstand interference from noise sources such as an AC power cable with high voltage. A shorter cable length and/or clear line-of-view between the WTIB4 and Base Station will decrease the possibility of data degradation.
- Even though there are connection points such as MDF or the connection tab between WTIB4 and Base Station, the connection points should be connected with twisted-pair cable (at least CAT3). For example, WTIB4 to MDF, MDF to MDF, MDF to connection tab, and connection tab to Base Station should be joined using twisted-pair cable.

<u>Pin Assignment</u>

Table 3.3.1-1 WTIB4

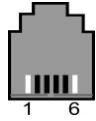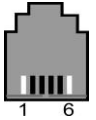| Connector	Label	PIN number		Signal name	Function	Note
RJ11	WTI1		1, 6	Unused/reserved		Cell1
			2	RX+(GND)	Receive Data	
			3	TX-(+30V)	Transmit Data	
			4	TX+(+30V)	Transmit Data	
			5	RX-(GND)	Receive Data	
	WTI2	The same as the above contents				Cell2
	WTI3	The same as the above contents				Cell3
	WTI4	The same as the above contents				Cell4

Table 3.3.1-2 Base Station

Connector	Label	PIN number		Signal name	Function	Note
RJ11	MJ1		1, 6	Unused/reserved		
			2	TX+(GND)	Transmit Data	
			3	RX(+30V)	Receive Data	
			4	RX(+30V)	Receive Data	
			5	TX-(GND)	Transmit Data	

<u>NOTE</u>
- Using unshielded twisted-pair cable (more than CAT3), wire the Base Station RJ-11 to the termination point/MDF for connection to a WTIB4.
- Tag or number wiring for maintenance.

<u>Connectors, Switch and LED Functions</u>
The following table shows the relation between modular connector and associated cell numbers.

Table 3.3.1-3 Connector Functions

Connector	CELL Number
MJ1-1(WTIB4)	Cell 1
MJ1-2(WTIB4)	Cell 2
MJ1-3(WTIB4)	Cell 3
MJ1-4(WTIB4)	Cell 4

The 4 LEDs mounted on WTIB4 provide diagnostic information for status of the board. The following table shows the meaning of the different LED status indicators.

Table 3.3.1-4 Switch Functions-SW1

Switch	Function	Remark
SW1	Reset Button	Static switch

Table 3.3.1-4 Switch Functions-SW2(DIP Switch)

Pole	Functions	ON	OFF	Default
1	Operation	TBR6 mode	Normal service mode	OFF
2	Echo canceller Control	Echo canceller on	Echo canceller off	ON
3	Reserved	Reserved	Reserved	ON
4	Registration mode	Registration Management OFF	Registration Management ON	OFF

NOTE

TBR6 test mode needs not to be set for normal operation because TBR6 test mode is used only for DECT confirmation test.

Table 3.3.1-5 LED Indications

LED	Color	Description
LD1	Blue	HDLC Interrupt
LD2	Blue	Working indication (400ms period)
LD3	Blue	BASE Message Interrupt
LD4	Blue	On: Echo canceller enable Off: Echo canceller disable

3.3.2   WTIB4 & WTIB8 (iPECS eMG800)

WTIB4/8 can be installed on universal slot 1-6 of any KSU except slot 1 of 1st KSU and should be installed on the same KSU when installing more than one WTIB4/8.

⚠ CAUTION

1)   Prior to installing WTIB4/8 System power should be turned OFF, to avoid any damage.

2)   If WTIB4/8 is plugged back into the System after being removed, WTIB4/8 should be plugged into the original slot to avoid the loss of programmed data.

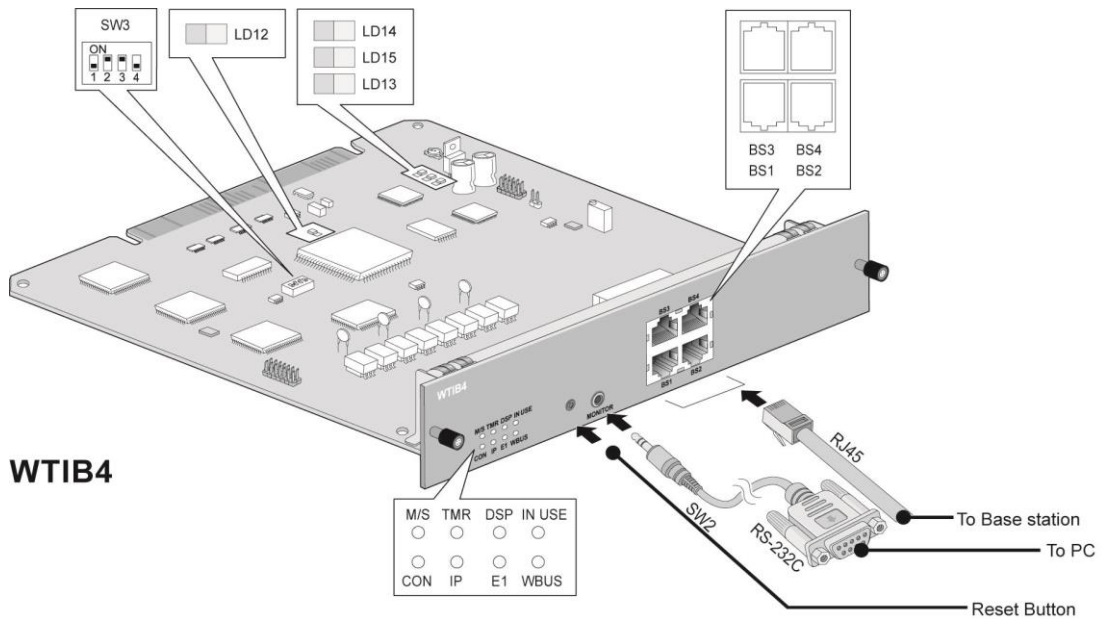The layout and dip switch setting of WTIB4/8 is shown:
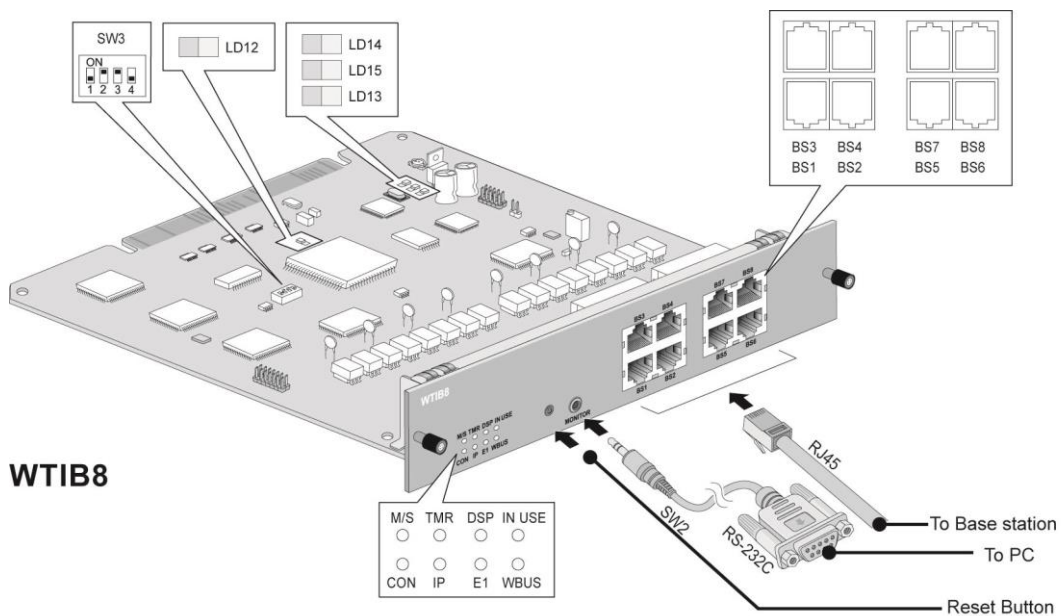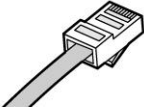

Figure 3.3.2-1 WTIB4
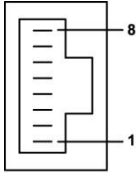

Figure 3.3.2-2 WTIB8

⚠️ **CAUTION**

Base Station is connected to WTIB4/8 by an unshielded twisted pair cable (at least CAT3).
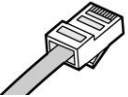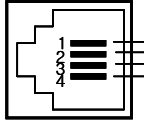
NOTE
- The unshielded twisted pair cable (at least CAT3) should be used to connect WTIB4/8 with a Base Station.
- Shielded cable can be used if it can withstand interference from noise sources such as an AC power cable with high voltage. A shorter cable length and/or clear line-of-view between WTIB4/8 and Base Station will decrease the possibility of data degradation.
- Even though there are connection points such as MDF or the connection tab between WTIB4/8 and Base Station, the connection points should be connected with twisted-pair cable (at least CAT3). For example, WTIB4/8 to MDF, MDF to MDF, MDF to connection tab, and connection tab to Base Station should be joined using twisted-pair cable.

Pin Assignment

3.3.2-1 WTIB 4/8

Connector	PIN Number		Signal name	Function
RJ45		1, 2, 7, 8	Unused/reserved	
		3	RX+(GND)	Receive Data
		4	TX-(+30V)	Transmit Data
		5	TX+(+30v)	Transmit Data
		6	RX-(GND)	Receive Data

3.3.2-2 Base Station

Connector	PIN Number		Signal name	Function
RJ11		1 & 4	TX (GND)	Transmit Data
		2 & 3	RX (+30V)	Receive Data

NOTE
- Using unshielded twisted-pair cable (more than CAT3), wire the Base Station RJ-11 to the termination point/MDF for connection to a WTIB4/8.
- Tag or number wiring for maintenance.

Connectors, Switch and LED function

The following table shows the relation between modular connector and associated cell numbers.

3.3.2-3 Connector Function

Connector	Cell Number	Connector	Cell Number
MJ1-1(WTIB4/8)	Cell 0	MJ2-1(WTIB8)	Cell 4
MJ1-2(WTIB4/8)	Cell 1	MJ2-2(WTIB8)	Cell 5
MJ1-3(WTIB4/8)	Cell 2	MJ2-3(WTIB8)	Cell 6
MJ1-4(WTIB4/8)	Cell 3	MJ2-4(WTIB8)	Cell 7

The 8 LEDs mounted on WTIB4/8 provide diagnostic information for status of the board. The following table shows the meaning of the different LED status indicators.

3.3.2-4 Switch function

SW	ON	OFF	Description	Default
SW3-1	TBR6 test mode	Normal	Reserved for test	OFF
SW3-2	Enable Echo-can.	Disable Echo-can.	Echo-canceller control	ON
SW3-3	Not used	Not used	Not used	ON
SW3-4	All base reset	Only new base reset	On: All base reset Off: One base reset	OFF

NOTE

- TBR6 test mode needs not to be set for normal operation because TBR6 test mode is used only for DECT confirmation test.

3.3.2-5 LED Indications

LED	Normal	Label
1	ON: Master WTIB, Toggle: Slave 1 WTIB, OFF: Slave 2 WTIB	M/S
2	When Nios CPU is normal, TMR LED toggles every 100msec.	TMR
3	ON: DSP Echo cancellation enabled, OFF: DSP Echo cancellation disabled	DSP
4	When more than one DECT channel is used, LED8 is ON.	IN USE
5	When WTIB is connected with MPB, CON LED is ON.	CON
6	When WTIB sends or receives data from MPB, IP LED toggles.	IP
7	When WTIB sends or receives data from Base Station, E1 LED toggles.	E1
8	When WTIB sends or receives data from other WTIB, WBUS LED toggles.	WBUS

### 3.3.3   WTIM4 & WTIM8 & WTIM24 (iPECS UCP)

3.3.3.1   WTIM4

The four (4)-channel Wireless Terminal Interface gateway Module (WTIM4) provides 4 GDC-600BE interfaces. DECT handsets can be used if GDC-600BE is connected to WTIM4 and the proper attendant programming is done. WTIM4 contains a processor for IP to TDM and signaling conversion and DSP circuitry to provide trans-coding for each channel.

GDC-600BE can be connected to WTIM4 up to 600 meters from the gateway using 24 AWG twisted pair cabling. WTIM4 includes the PHY and MAC for the 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.3.3.1-1, the front panel of WTIM4 has:

1)   Power jack for the AC/DC adapter supplied.

2)   Power status LED.

3)   Normal/Service switch – In Service mode, circuits in use are busied as they return to idle.

4)   RJ-45 Female LAN connector with Speed and Link/Activity LEDs.
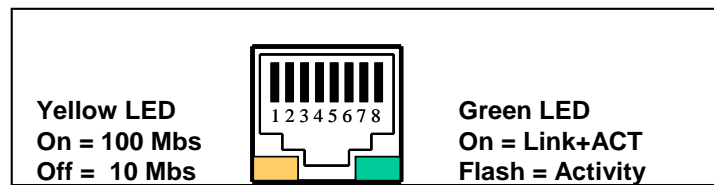
5)   Function switch, SW4.

SW	On	Off	Description	Default
SW1-1	TBR6 test mode	Normal	Reserved for test	OFF
SW1-2	Enable Echo-can.	Disable Echo-can.	Echo-canceller control	ON
SW1-3	Nios-II(FPGA) Serial Mode	Mindspeed Serial mode	Serial selection	ON
SW1-4	All base reset	One base reset	S/W debugging	OFF

6)   Eight (8) WTIM4 status LEDs.

LED	Define	Label
1	When WTIM is connected with UCP via LAN, LED1 is turned on.	LINK
2	Whenever WTIM receives/sends the message from/to MFIM, LED2 is toggled.	HBUS
3	Whenever WTIM receives/sends the message from/to BASE, LED3 is toggled.	E1
4	If WTIM is master, LED4 is always turn-on. If WTIM is 1st slave, LED4 is blink for 1 sec period. If WTIM is 2nd slave, LED4 is always turn-off.	M/S
5	When Mindspeed CPU is normal, LED5 is toggled.	CP1
6	When Nios-II CPU is normal, LED6 is toggled.	CP2

LED	Define	Label
7	Whenever WTIM4/8 receives/sends the message from/to other WTIMs, LED7 is toggled.	WBUS
8	When more than one DECT channel is used, LED8 is turned on.	USE

7) DB-9 RS-232 connector.

8) Reset Switch.

On the rear panel, the WTIM4 has:

1) Four (4) RJ-45 female connectors.

2) Ground Lug.

3) Fifty (50)-pin back plane connector.

4) Two(2) WTIM link connectors(24 pins)
   - OUT: connected to the next slave WTIM with link cable
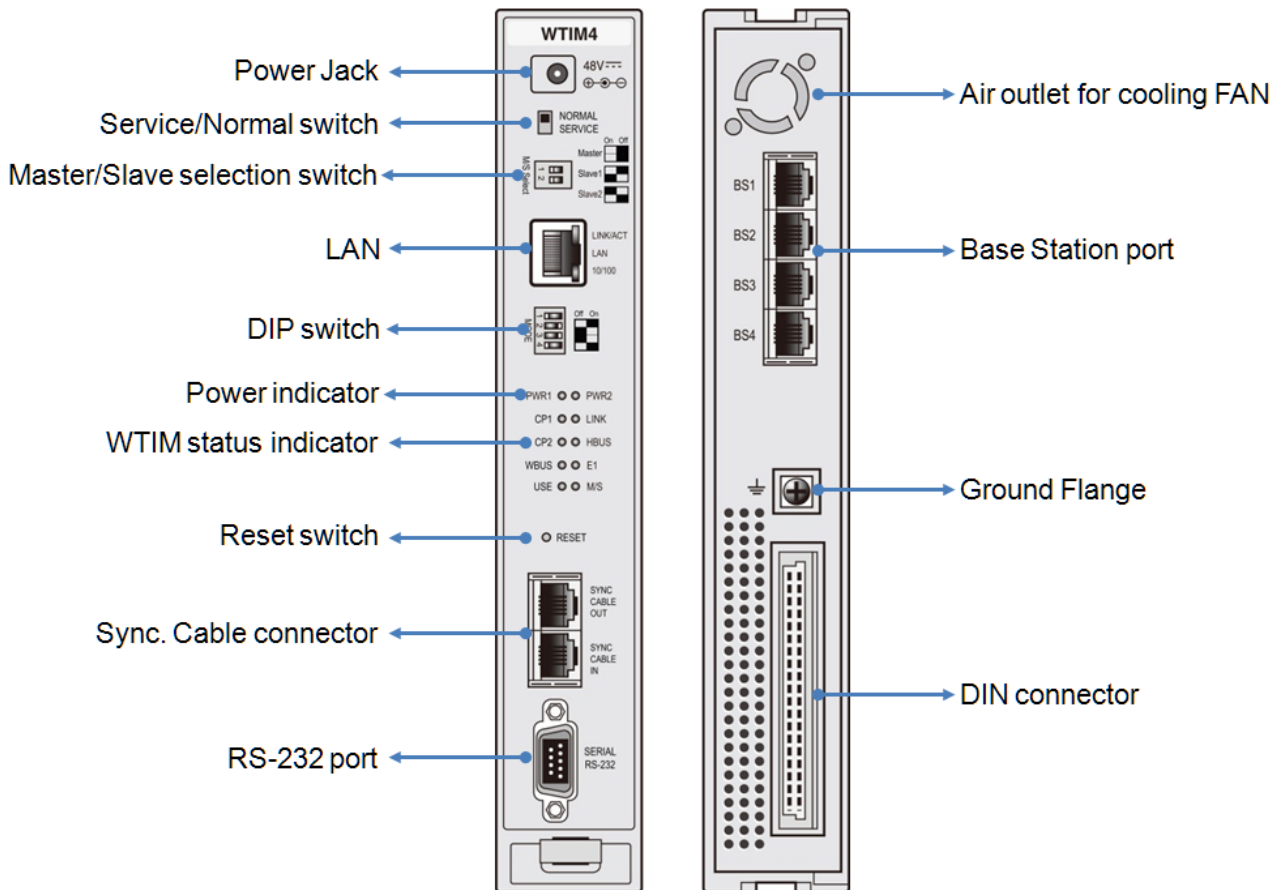   - IN: connected to the previous WTIM with link cable

Figure 3.3.3.1-1 WTIM4 Front & Rear Panels

3.3.3.2   WTIM8

The eight (8)-channel Wireless Terminal Interface gateway Module (WTIM8) provides 8 GDC-600BE interfaces. DECT handsets can be used if GDC-600BE is connected to WTIM8 and the proper attendant programming is done. WTIM8 contains a processor for IP to TDM and signaling conversion and DSP circuitry to provide trans-coding for each channel. GDC-600BE can be connected to WTIM8 up to 600 meters from the gateway using 24 AWG twisted pair cabling. WTIM8 includes the PHY and MAC for the 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in Figure 3.3.3.2-1, the front panel of WTIM8 has:

1) Power jack for the AC/DC adapter supplied.
2) Power status LED.
3) Normal/Service switch – In Service mode, circuits in use are busied as they return to idle.
4) RJ-45 Female LAN connector with Speed and Link/Activity LEDs.

Yellow LED		**Green LED**
On = 100 Mbs	1 2 3 4 5 6 7 8	On = Link+ACT
Off = 10 Mbs		Flash = Activity
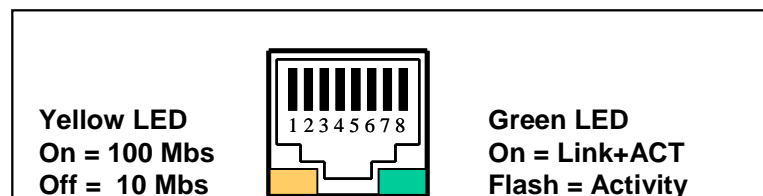
5) Function switch, SW4.

SW	On	Off	Description	Default
SW1-1	TBR6 test mode	Normal	Reserved for test	OFF
SW1-2	Enable Echo-can.	Disable Echo-can.	Echo-canceller control	ON
SW1-3	NiosII(FPGA) Serial Mode	Mindspeed Serial mode	Serial selection	ON
SW1-4	All base reset	One base reset	S/W debugging	OFF

6) Eight (8) WTIM8 status LEDs.

LED	Define	Label
1	When WTIM is connected with UCP via LAN, LED1 is turned on.	LINK
2	Whenever WTIM receives/sends the message from/to MFIM, LED2 is toggled.	HBUS
3	Whenever WTIM receives/sends the message from/to BASE, LED3 is toggled.	E1
4	If WTIM is master, LED4 is always turn-on. If WTIM is 1st slave, LED4 is blink for 1 sec period. If WTIM is 2nd slave, LED4 is always turn-off.	M/S
5	When Mindspeed CPU is normal, LED5 is toggled.	CP1
6	When Nios-II CPU is normal, LED6 is toggled.	CP2
7	Whenever WTIM4/8 receives/sends the message from/to other WTIMs, LED7 is toggled.	WBUS
8	When more than one DECT channel is used, LED8 is turned on.	USE

7) DB-9 RS-232 connector.
8) Reset Switch.

On the rear panel, WTIM8 has:

1) Eight (8) RJ-45 female connectors.

2) Ground Lug.

3) Fifty (50)-pin back plane connector.

4) Two (2) WTIM link connectors (24 pins).
   - OUT: connected to the next slave WTIM with link cable.
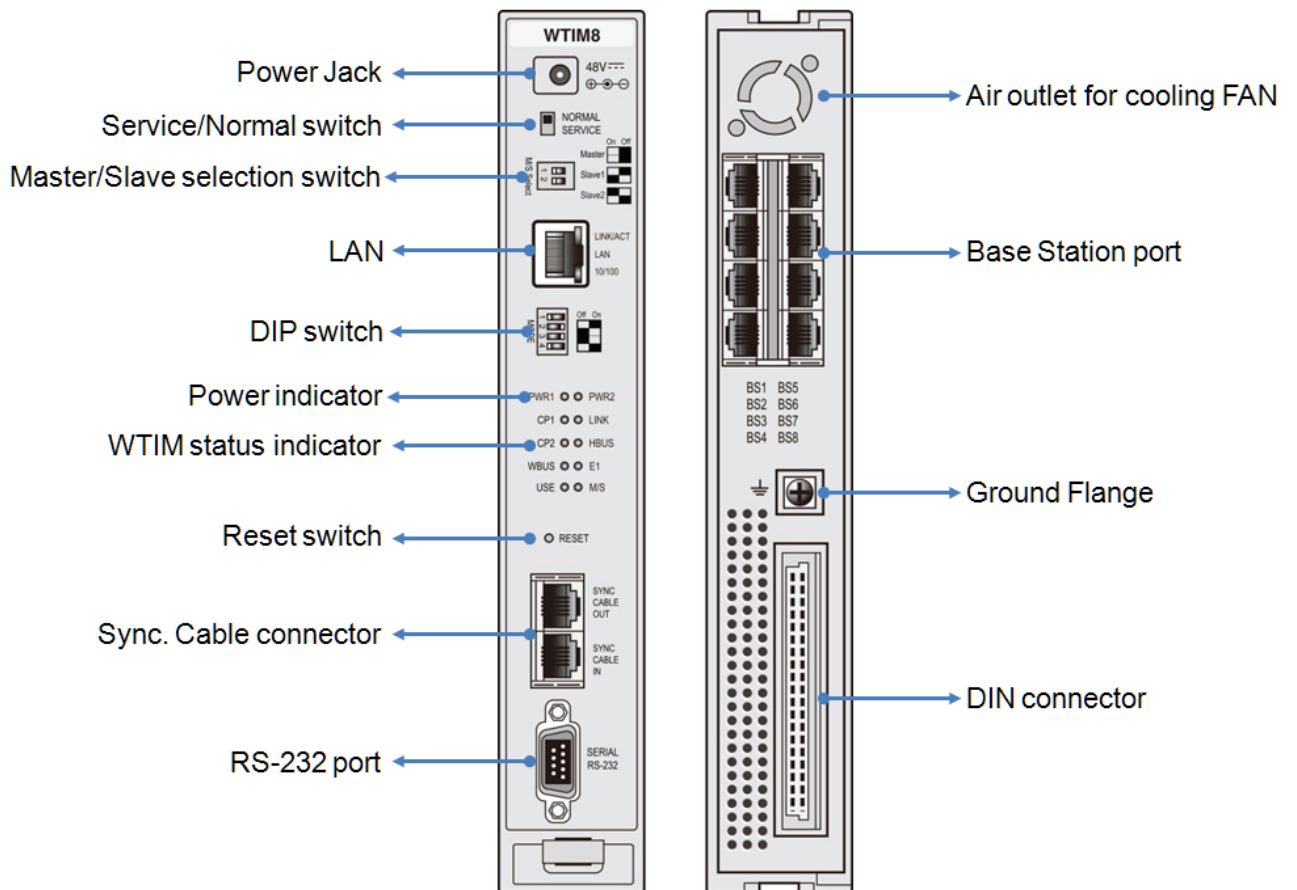   - IN: connected to the previous WTIM with link cable.

Figure 3.3.3.2-1 WTIM8 Front & Rear Panels

3.3.3.3   WTIM24

The Wireless Terminal Interface gateway Module (WTIM24) provides connections for twenty-four (24) Ericsson-LG Enterprise multi-channel DECT Base stations. The DECT Base station acts as the Remote Fixed Part (RFP) defined in the DECT specifications. The GDC-600BE DECT Base Stations are supported only.

DECT handsets can be used if the Base station is connected to the WTIM24 and the proper Attendant programming is completed. The WTIM24 contains a processor for IP to TDM and signaling conversion and DSP circuitry to provide transcoding for each channel. The Base station can be connected to the WTIM24 up to 600 meters from the gateway using 24 AWG twisted pair cabling. DECT handsets are supported GDC-480H and GDC-500H only.

Remark

To use the auto call recording in the DECT Handset connected to the WTIM24, MCIM modules should be installed in the system. But, WTIM8 supports up to 15 channels recording without MCIM modules.

The WTIM24 includes a 10/100 Base-T Ethernet interface as well as packet voice processing functions. The Ethernet port incorporates auto MDI, MDIX switching, therefore, both straight and cross cables can be used.

As shown in figure 3.3.3.3-1, the front panel of the WTIM24 has:

- Six (6) blue color Link status LEDs and One (1) red color LED for FAN fault
- Twelve (12) dual color (Blue/ Yellow) status LEDs for DECT base connection
- Six (6) blue color status LEDs
- Two (2) green power status LEDs
  - PWR1 - + 5 VDC, PWR2 - + 30 VDC
- RJ-45 Female LAN connector with Speed and Link/Activity LEDs
- DB-9 RS-232 connector
- Four position Mode switch for setting
- Reset Switch

On the rear panel, the WTIM24 has:
- AC input connector and Ground Lug
- Three (3) x Eight (8) ports RJ-45 female connectors for DECT Base stations
- Two (2) x Four (4) ports RJ-45 female connectors to link WTIMs (Master/ Slave System)
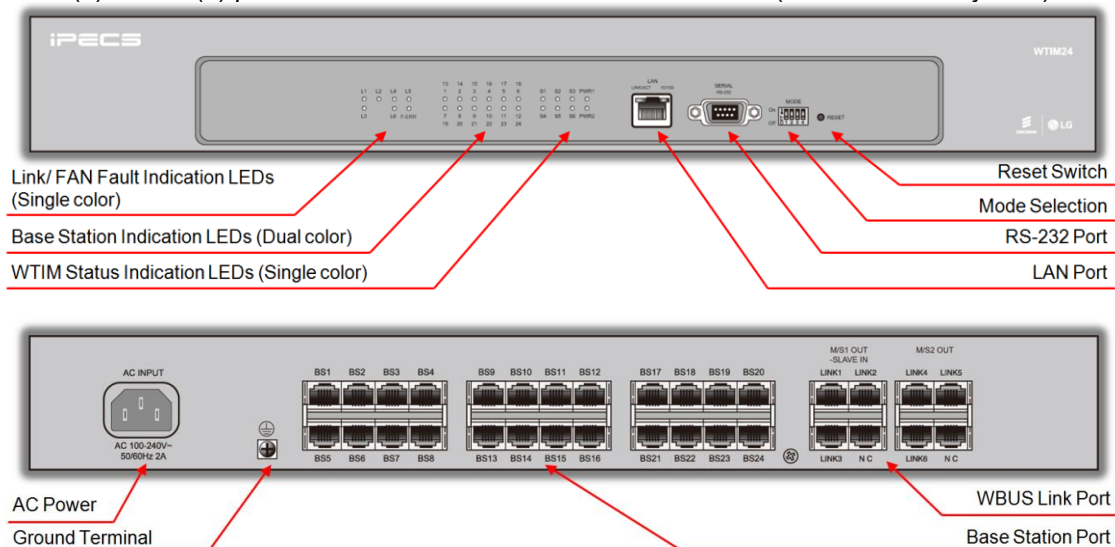

Figure 3.3.3.3-1 WTIM24 Front & Rear Panels

3.3.3.4   WTIM4/8 Installation

WTIM may be installed in any slot of the Main Cabinet, or may be installed anywhere in the Desk Mount Holder. WTIM provides a gateway between DECT handsets as like GDC-450H/480H/500H.

WTIM4 can provide four (4) GDC-600BE interfaces.

WTIM8 can provide eight (8) GDC-600BE interfaces.

LEDs

In addition to the Power and LAN LEDs, the WTIM has eight (8) status LEDs for each function (Refer to the LED definition for the detail).
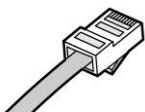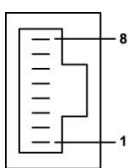
Wiring Connectors

Before wiring any of the Modules, first connect the " ⏚ " screw on the back of the Module to a known ground.

On the front of the WTIM is the RJ 45 type "LAN" connector. This connector should be wired to the appropriate LAN points.

⚠ CAUTION

1) Wire "LAN" to a 10/100/1000 Base-T switch, ES8GP or ES8G can be used, to connect to LAN. Before connecting to the LAN X port of ES8G, the appropriate switch for DTE power must be in the "OFF" position.

2) Tag or number wiring for maintenance.

Pin assignment

Connector	Pin Number	Number	Signal name	Function
RJ45		1, 2, 7, 8	Reserved	
		3	RX+(GND)	Receive Data
		4	TX-(+30V)	Transmit Data
		5	TX+(+30v)	Transmit Data
		6	RX-(GND)	Receive Data

The above table shows the pin assignment of each RJ45 on the rear panel of WTIM.

The pin number 3 and 6 of each base station port is connected to the circuit ground (GND) of WTIM, and the pin number 4 and 5 is connected to the DC power (+30V) of WTIM. So, the base station receives DC power from WTIM when the base station is connected to the base station port.

Category 5 cable should be used to connect between WTIM and GDC-600BE.

It is not possible to connect between WTIM and GDC-600BE through the Main Cabinet back-plane.

- Wire using another CAT5 cable between each RJ-45 on rear panel of WTIM and the termination point/MDF connected to GDC-600BE with CAT5 cable.
- Tag or number wiring for maintenance.

AC/DC Adapter

Assure the AC/DC Adapter is plugged into a live AC outlet and the Module Power jack.

WTIM cascading

WTIMs should be connected with link cable one another to make it possible to handover between GDC-600BE connected to each WTIM. Cascading connection of up to three (3) WTIMs is possible irrespective of the kind of WTIM.

Note) that hot plugging is not recommended when connecting between WTIM with link cable.

The next figure shows how to connect WTIMs for cascading WTIM.
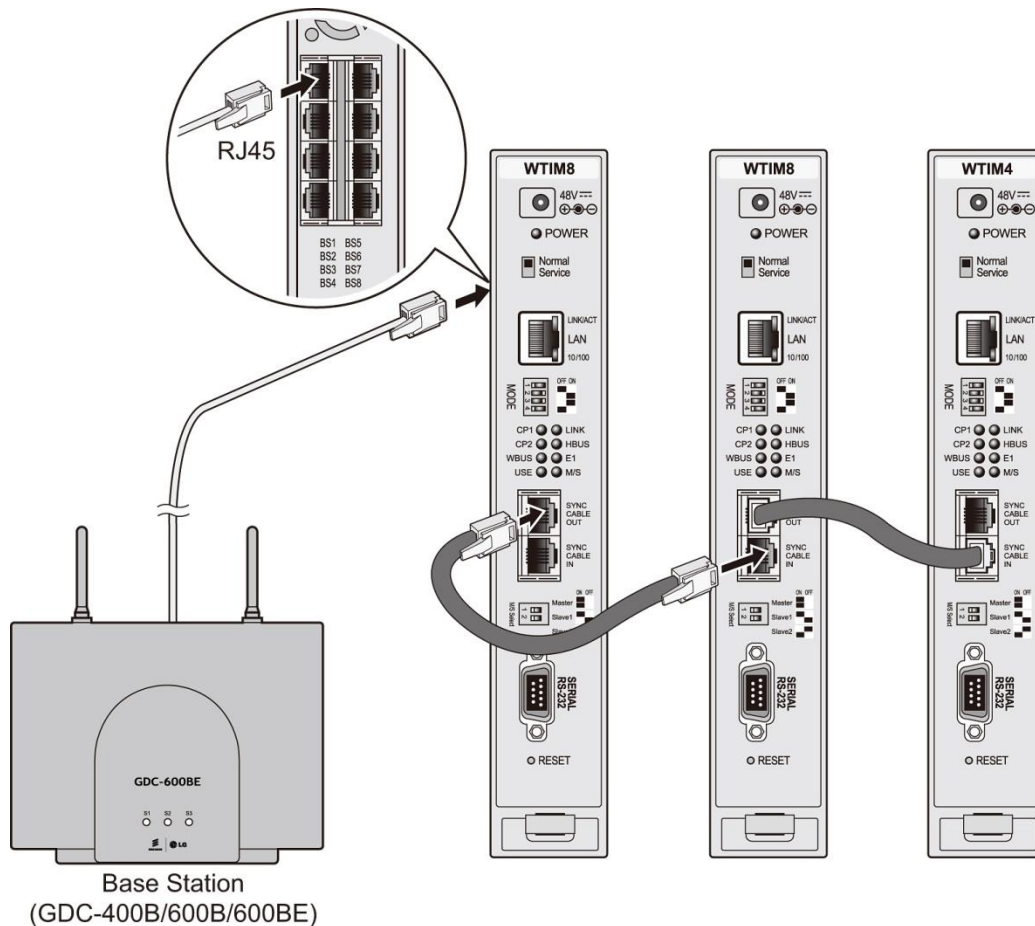
3.3.3.5   WTIM24 Installation

The WTIM24 is intended for installation in a 19" rack**, it is NOT intended for installation in the cabinet.** The WTIM24 provides twenty-four (24) DECT base stations (GDC-600BE) interfaces for DECT handset registration.

To mount the WTIM24 in a 19" rack,

1)   Mount the left and right mounting brackets to the WTIM24 module using the eight (8) machine screws provided as shown in figure 3.3.3.5-1.

2)   Mount the Module in the 19" rack with the four (4) machine screws, nuts and washers as shown in figure 3.3.3.5-1.

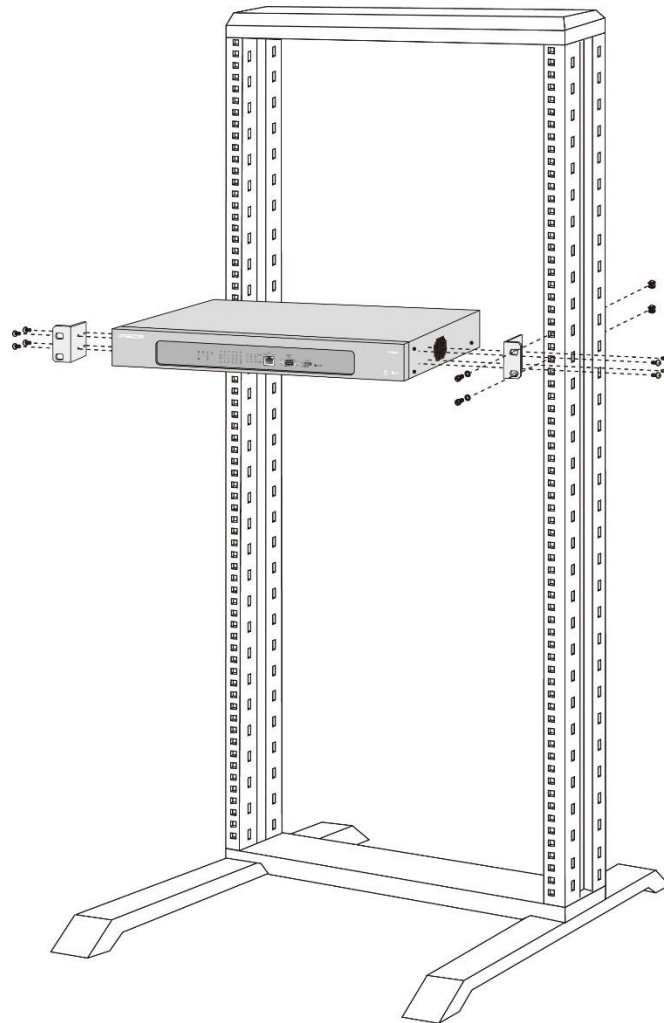3)   Complete the installation using the instructions for wiring given below.

Figure 3.3.3.5-1 WTIM24 Rack Mounting Installation

LEDs

In addition to the Power and LAN LEDs, the WTIM24 has Twelve (12) dual color LEDs, which indicate the status of the DECT base connection.

Furthermore, the WTIM24 has Six (6) blue color LEDs for system operation indication.

Additional Six (6) blue color LEDs are supported to check the multiple WTIM connection.

WTIM24 Status LED Functions

Silk Name	Color	Function	Description
PWR1	Pure Green	Power Indication	+5V Indication
PWR2			+30V Indication
S1	Blue	Status LEDs for WTIM24	LINK (WTIM24 connected to UCP via LAN, LED ON)
S2			BASE (WTIM24 communicating with Base Station, LED flashes)
S3			CPU (NIOS II CPU is normal, LED flashes)
S4			UCP(WTIM24 communicating with UCP, LED flashes)
S5			WITM(WTIM24 communicating with another WTIM24, LED flashes)
S6			MODE (Master-ON, Slave 1-Toggle, Slave2-OFF)
1, 13	Bi-color (Blue/Yellow)	Status LEDs for DECT Base	ON (Connected), OFF (not connected)
2, 14			
3, 15			
4, 16			
5, 17			
6, 18			
7, 19			
8, 20			
9, 21			
10, 22			
11, 23			
12, 24			
L1~L6	Blue	Master/Slave Connection Status	L1~L3 (Master-Slave 1 connection), L4~L6 (Master-Slave2 connection). ON (Connected and Normal), OFF (not connected or Abnormal)
F-ERR	Red	FAN Fault	ON (Fault), OFF (Normal)
LINK/ACT, 10/100	Left-Green Right-Orange	LAN Status	Left-Link/Act, Right- Speed (10/100Mbps)

LAN and Power Connection

Before wiring any of the Modules, first connect the "⏚" screw on the back of the Module to a known ground.

On the front of the WTIM24 is the RJ–45 type "LAN" connector. This connector should be wired to the appropriate LAN points.

- Wire "LAN" to a 10/100 Base-T switch, an ES8G/ES8GP can be used to connect to the LAN.
- Tag or number wiring for maintenance.

Assure the AC power cord is plugged into the power input of the WTIM24 and a live AC outlet.

MODE Switch & Settings

Each WTIM24 has a four (4) position DIP-switch. The function of each switch position is given in the following table.

WTIM24 Mode Switch Functions

| SWITCH	FUNCTION	ON	OFF	DEFAULT
1	TBR6 Test	TBR6 test mode	Normal	OFF
2	Serial selection	Sub CPU Serial mode	Main CPU Serial mode	OFF
3	Mode Selection 0	Pole 4/ Pole 3		ON
4	Mode Selection 1	(00 – Master, 01 – Slave 1, 10 – Slave 2)		ON

- Master mode: Pole 1 ~ Pole 4 (OFF/ OFF/ ON/ ON)

- Slave 1 mode: Pole 1 ~ Pole 4 (OFF/ OFF/ OFF/ ON)

- Slave 2 mode: Pole 1 ~ Pole 4 (OFF/ OFF/ ON/ OFF)

Wiring Connectors

The RJ-45 connectors on the rear of the WTIM24 are used to connect to the Base Stations.

This wiring is detailed in the System DECT Installation Manual.

The pin assignments given in the following table are provided for reference only.

Base Station
(GDC-600BE)
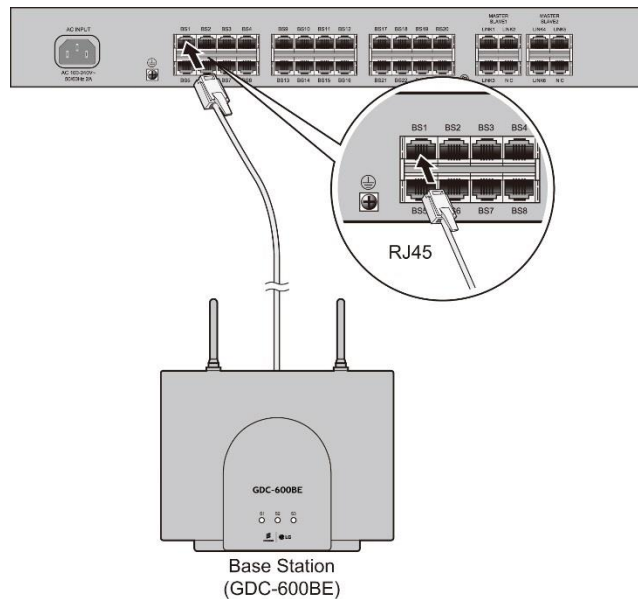
WTIM24 Pin assignments for DECT Base Station

Connector	Pin Number	No.	Signal Name	Function
RJ-45		1, 2, 7, 8	RESERVED	
		3	RX+	Receive Data
		4	TX-	Transmit Data
		5	TX+	Transmit Data
		6	RX-	Receive Data

Multiple WTIM connection

When multiple WTIMs are installed and handover between Base Stations (GDC-600BEs) is required, the WTIMs must be interconnected.

Up to three (3) WTIMs may be interconnected to allow handover between the connected Base Stations. Wiring for this connection is shown in the following figure.

The WTIM interconnection is a separate connection not provided by the back panel, thus, even when the WTIMs are installed in a cabinet the interconnection of the WTIMs is required.

On the rear side of the WTIM are the RJ–45 type female connectors. These connectors should be wired to the next slave WTIM from master WTIM using RJ-45 cross cable as shown in Figure.

- Wire "LINK1" directly to the "LINK1" of the next WTIM (Slave 1)
- Wire "LINK2" directly to the "LINK2" of the next WTIM (Slave 1)
- Wire "LINK3" directly to the "LINK3" of the next WTIM (Slave 1)
- Wire "LINK4" directly to the "LINK1" of the next WTIM (Slave 2)
- Wire "LINK5" directly to the "LINK2" of the next WTIM (Slave 2)
- Wire "LINK6" directly to the "LINK3" of the next WTIM (Slave 2)
- Tag or number wiring for maintenance.

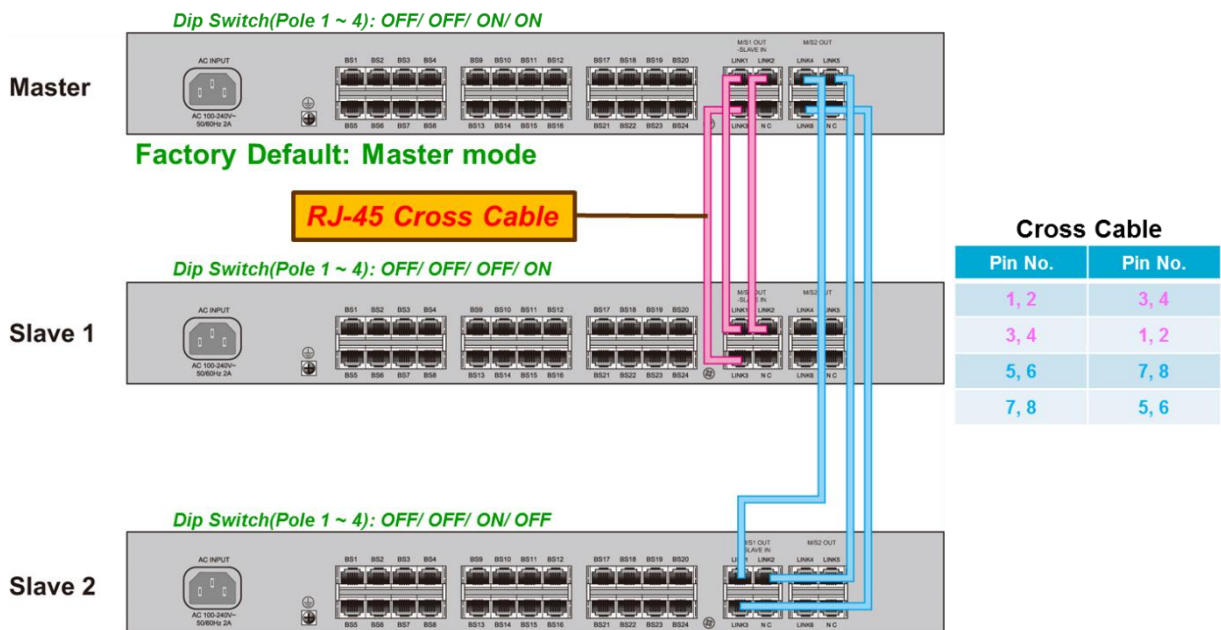| Cross Cable	
Pin No.	Pin No.
1, 2	3, 4
3, 4	1, 2
5, 6	7, 8
7, 8	5, 6

Figure 3.3.3.5-1 Multiple connections of WTIM24

Remark

RJ-45 Cross cable must be connected between master and slave system

The detailed connection diagram given in the following figure is provided for reference only.
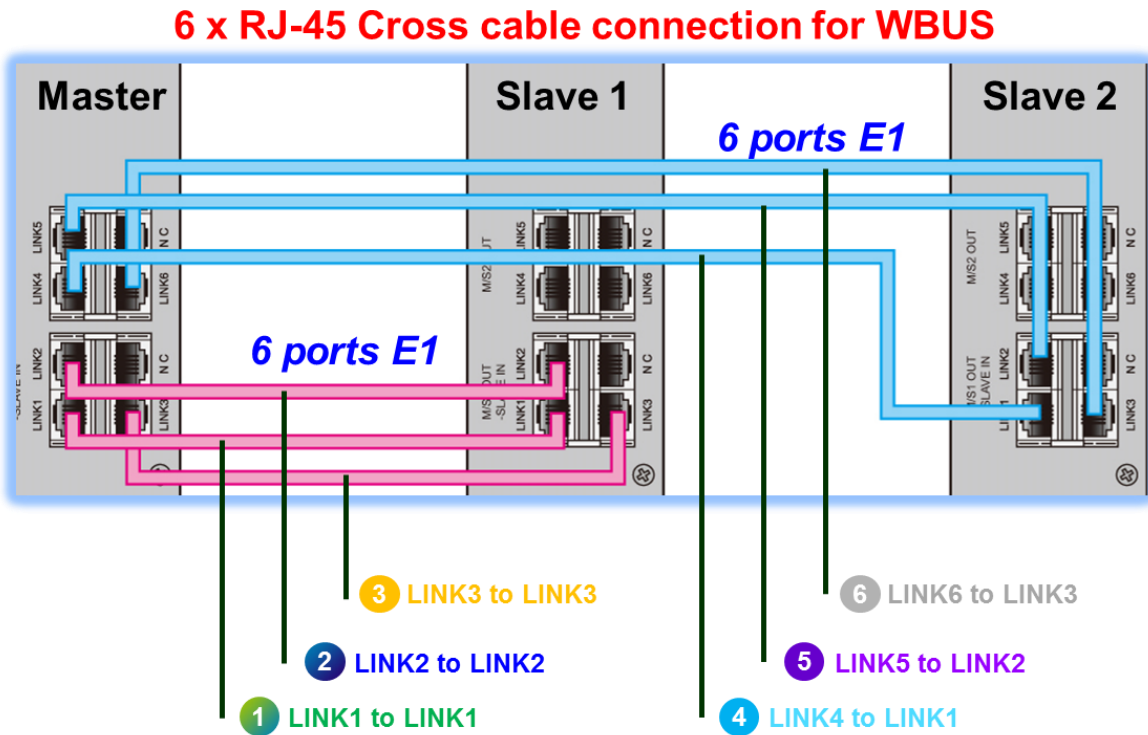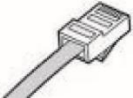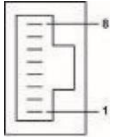

Figure 3.3.3.5-3 detailed connections for WBUS

The pin assignments given in the following table are provided for RJ-45 cross cable.

Cross cable Pin assignments for WBUS

Connector	Pin Number	Connection	Pin No.	Pin No.
RJ-45		2 E1 Interface Cross Connection	1, 2	3, 4
			3, 4	1, 2
			5, 6	7, 8
			7, 8	5, 6

3.4   Description and Installation of GDC-600BE

3.4.1   GDC-600BE Description

GDC-600BE Base station employs DECT technology to provide an RF link to any standard DECT GAP handset such as GDC-450H/480H/500H. The Base Station connects to a WTIM4/8 for access to features and resources of iPECS with an RJ-11 4-wire connector on the left-side of the unit. In addition to providing the path for signaling and audio between the Base Station and WTIM4/8, this connection provides power to GDC-600BE.

Two antennas provide antenna diversity to minimize the effects of RF signal reflection. The Base Station is meant for indoor wall mounting only. The Base Station is directly mounted on the wall using two (2) screws.
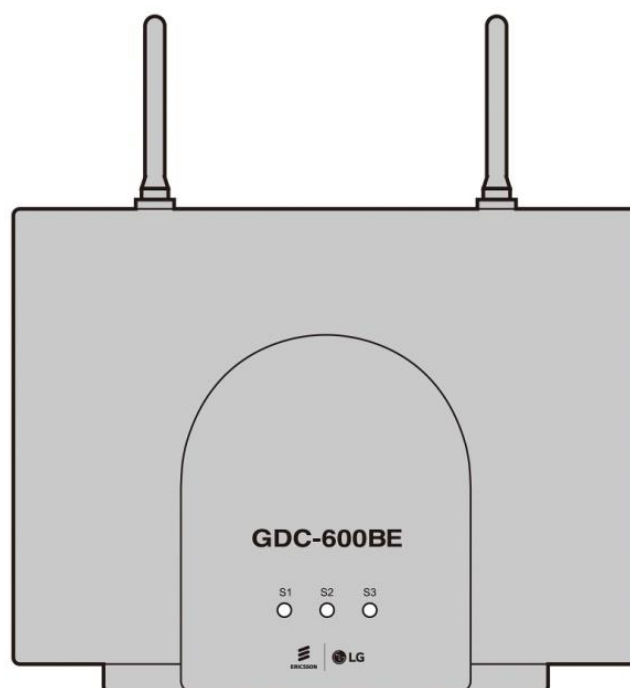
Figure 3.4.1-1 GDC-600BE Base Station

3.4.2   Base Station Installation

As mentioned in previous sections in this chapter, before permanently mounting a Base Station, you should determine the most appropriate location for providing the best coverage. Base Stations may be mounted on wall or desktop up to 600m away from DECT board using a twisted 2-pair unshielded cable (0.5φ, AWG 24). They are remotely powered (DC 30 volts) by DECT board.

The number of Base Stations used in a system depends on the area to be covered and the traffic density. The typical in-house coverage is a 75m radius for GDC-600BE. In practice, the cell outdoor radius in free space may be up to 400m for GDC-600BE.

There are two ways to install the Base Station: mounting directly to wall surface, or mounting using a wedge, as described in the following Section.

3.4.2.1   Mounting Base Station

The weight of a Base Station is approximately 460g (1.2lb.), so it can be mounted on a masonry or dry-wall surface, wooden wall, or partition wall.

Before mounting Base Station permanently, you should determine locations that provide the best coverage (refer to General Procedure for CRS).

To wall mount the Base Station, perform the following Steps:

1)   Drill two 3.5mm holes in a fixed wall; to properly position the holes, use the mounting template (last sheet of this manual) and copy it if necessary. The distance between mounting holes is 121mm as shown in the image.

2)   Insert anchors into the drilled holes.

3)   Insert screws in the anchors, leaving a 3mm gap between the wall and screw head.

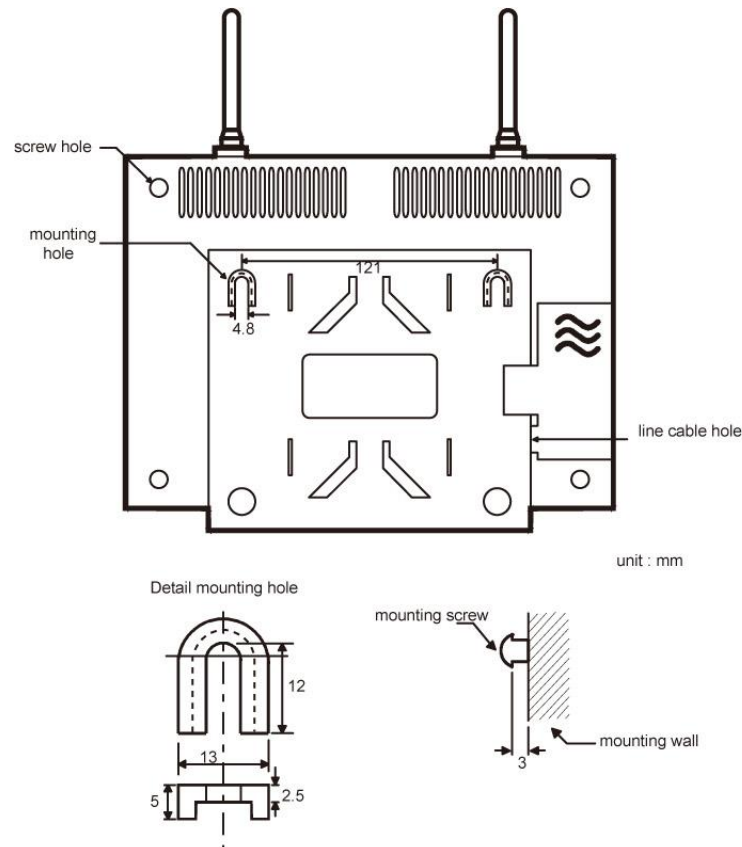4)   Mount the Base Station eyelets on the screws.

Figure 3.4.2.1-1 Back side of GDC-600BE

Before mounting base station permanently, you should determine locations that provide the best coverage. The wall mounting procedure of a base station is as follows:

1)   Drill two 3.5mm holes in a fixed wall. To properly position the holes, you can use mounting template that is the last sheet of this manual and copy it if necessary.

2)   Insert anchors into the drilled holes. Then insert screws in the anchors, leaving a 3mm gap between the wall and screw head.

3)   Mount the base station eyelets on the screws.

3.4.2.2 Mounting Base Station - 2 (Using Wedge)

To Install the Base Station using the wedge:

1) First determine the appropriate location on wall where the wedge will be mounted.

2) The wedge should be affixed to the wall using two screws; use the mounting template as in #1 of the previous procedure.

3) Attach the Base Station to the wedge by aligning the guides to the back the Base Station and pulling the Base Station down until it is secure on the wedge.
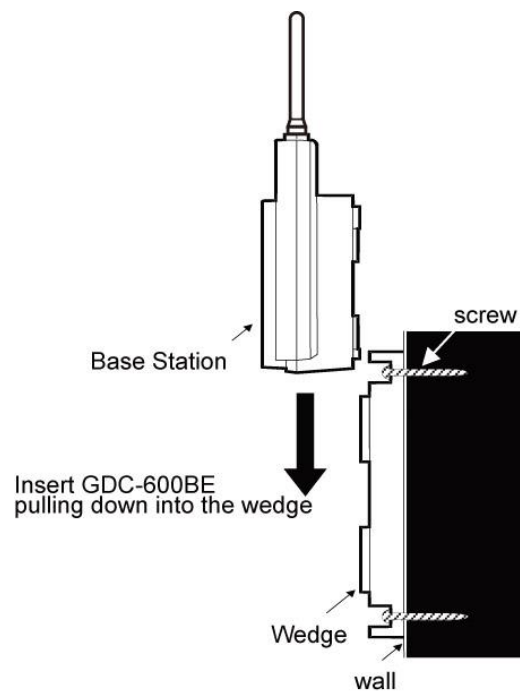

Figure 3.4.2.2-1 Side of GDC-600BE

3.4.2.3 LED Indications

3.4.2.3-1 GDC-600BE

LED	Color	Status
S1	RED	Booting status or communication error.
	AMBER	Steady ON: image downloading mode.
		Blinking: normal operation + all 6 channels used.
	GREEN	Steady ON: normal operation (idle).
		Blinking: normal operation + up to 5 channels used.
S2	RED	Booting status or E1 Sync. Error.
	AMBER	E1 loopback mode or downloading mode.
	GREEN	Steady ON: Sync. OK.
		Blinking: Synchronizing.
S3	RED	FPGA function error.
	AMBER	Blinking (downloading mode).
	GREEN	Blinking (E1 Tx/Rx operation indication).

3.4.2.4 Traffic Guidelines

Each GDC-600BE Base Station supports 6 simultaneous calls, but because all users are not usually simultaneously on calls, a Base Station can support a greater number of wireless terminal users in practice.

3.4.2.4-1 GDC-600BE for eMG80

Number of CELL (Base Station)	Number of Wireless Terminal	Max. Number of simultaneous conversation
1		6
2	Up to 48	12
3		18
4		24

3.4.2.4-2 GDC-600BE for eMG800 & WTIM4/8 (UCP)

Number of CELL (Base Station)	Number of Wireless Terminal	Max. Number of simultaneous conversation
1		6
2		12
3		18
4	Up to 192	24
23		138
24		144

3.4.2.4-2 GDC-600BE for WTIM24 (UCP)

Number of CELL (Base Station)	Number of Wireless Terminal	Max. Number of simultaneous conversation
1		6
2		12
3		18
4	Up to 254	24
23		138
24		144

3.5 Ferrite Core Installation and Wiring

Ferrite core is provided in the packaging of the Base Station for EMI. The Ferrite core should be installed when the WTIM4/8 is installed in the key telephone system. One Ferrite core is to be used with the line cord between the Base Station and each port of board (as shown).

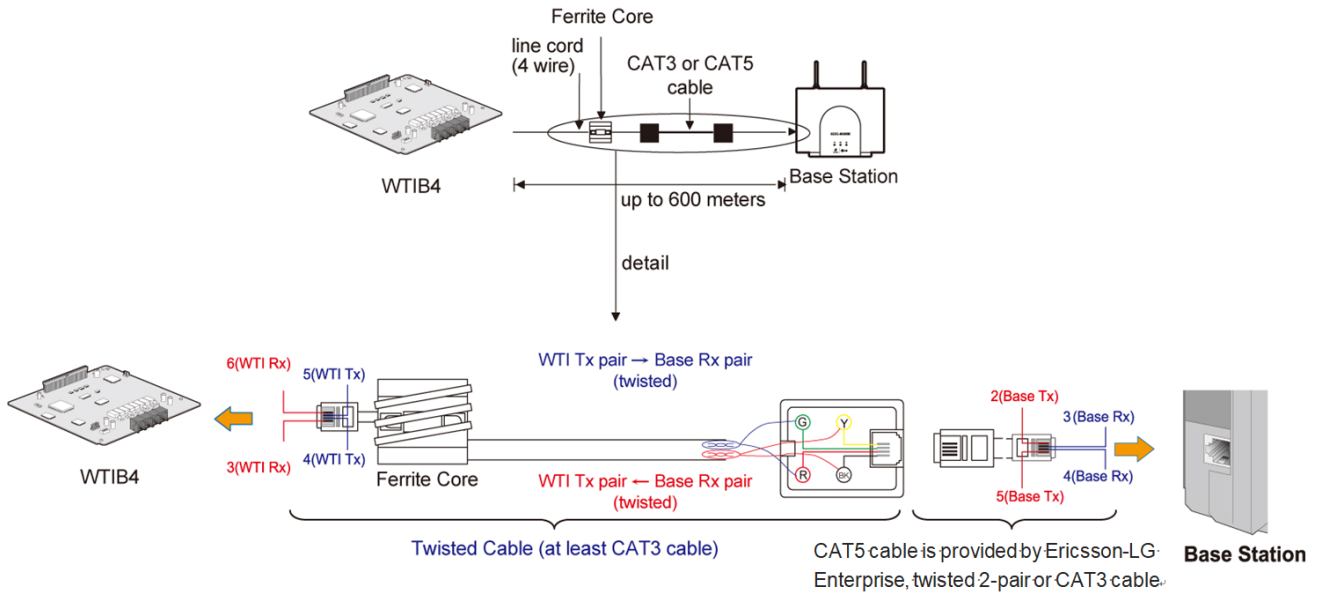### 3.5.1 Ferrite core installation and wiring for iPECS eMG80

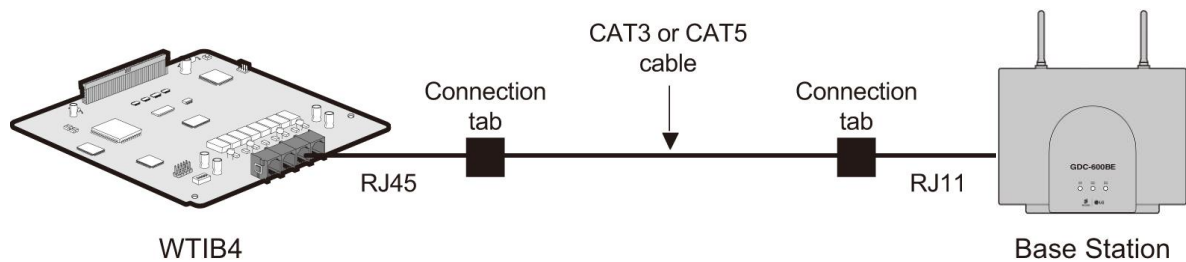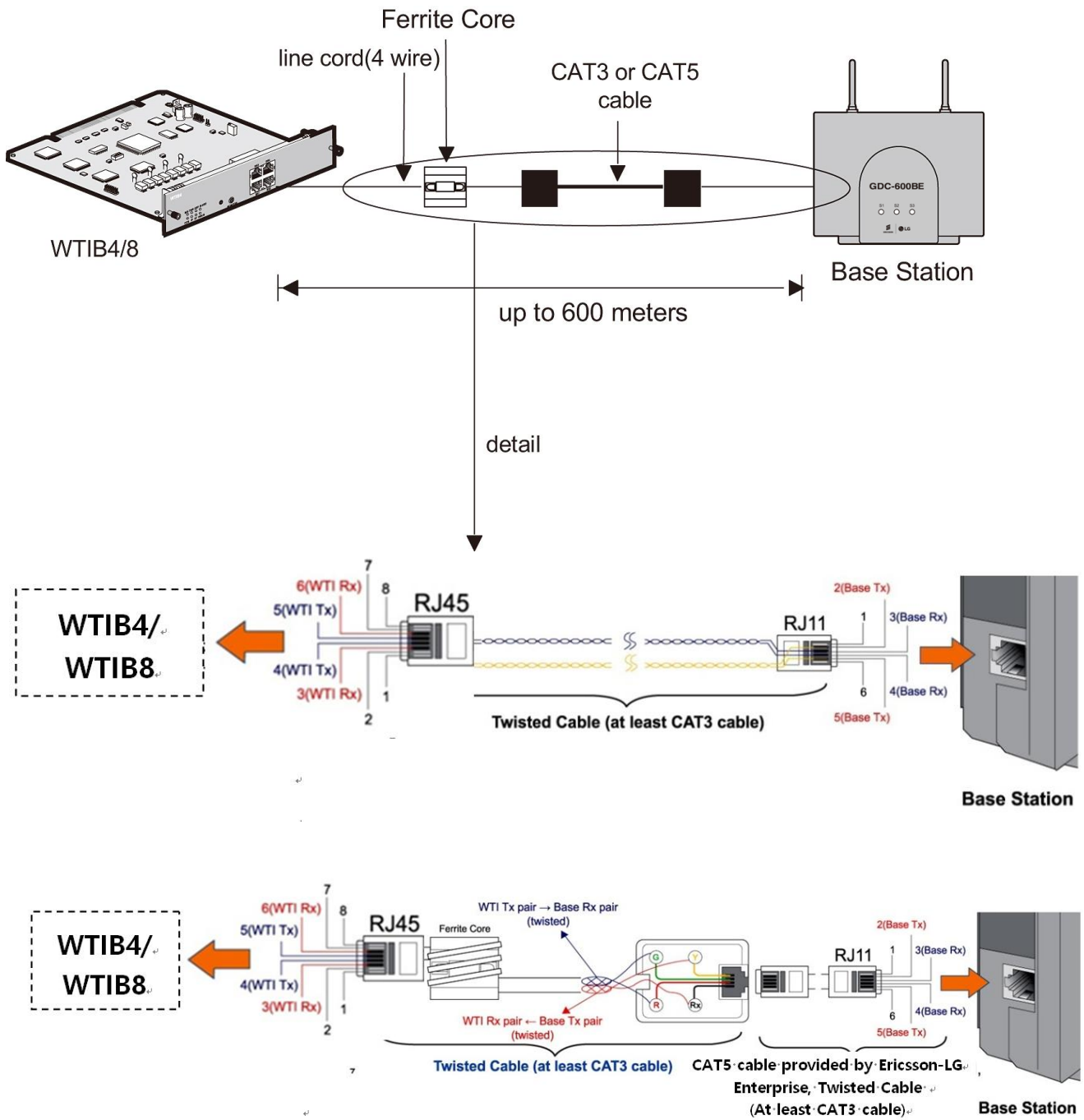**Figure 3.5.1-1 Cable connection with Ferrite Core between WTIB4 and Base Station**
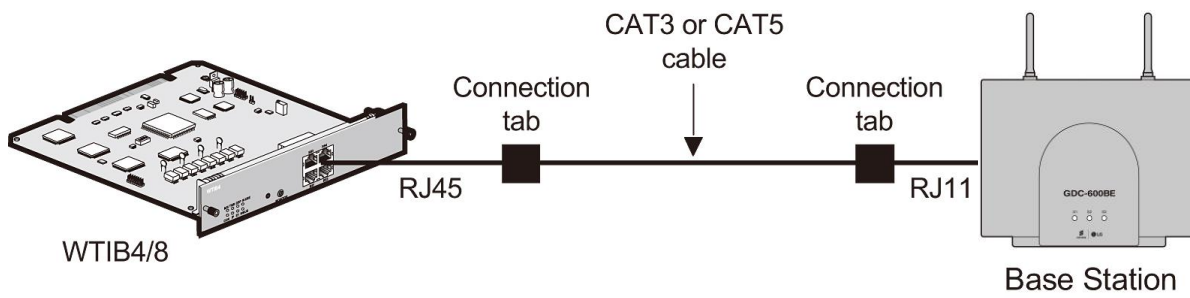

Figure 3.5.1-2 Wiring with connection tab between WTIB4 and Base Station
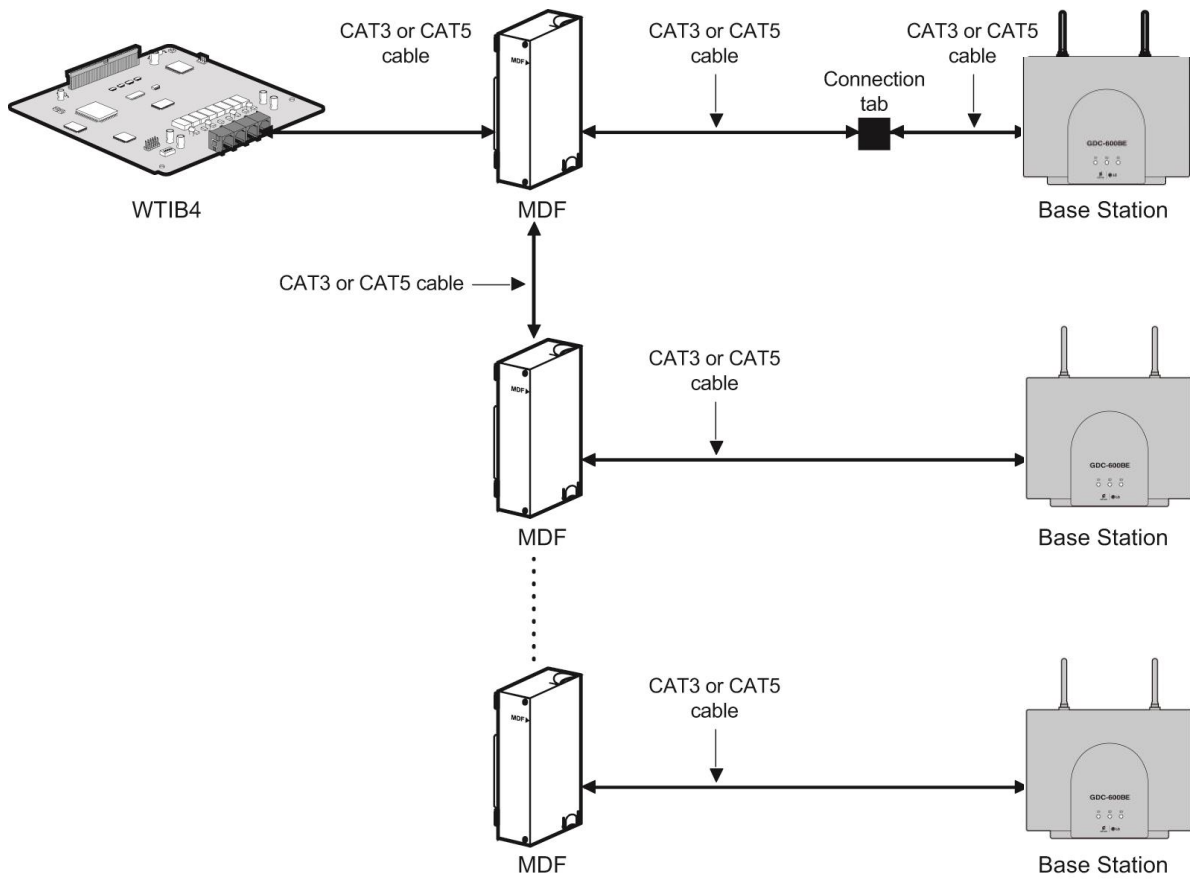
Figure 3.5.1-3 Wiring with MDF and connection tab between WTIB4 and Base Station

3.5.2   Ferrite core installation and wiring for iPECS eMG800

Figure 3.5.2-1 Cable connection with Ferrite Core between WTIB4/8 and Base Station

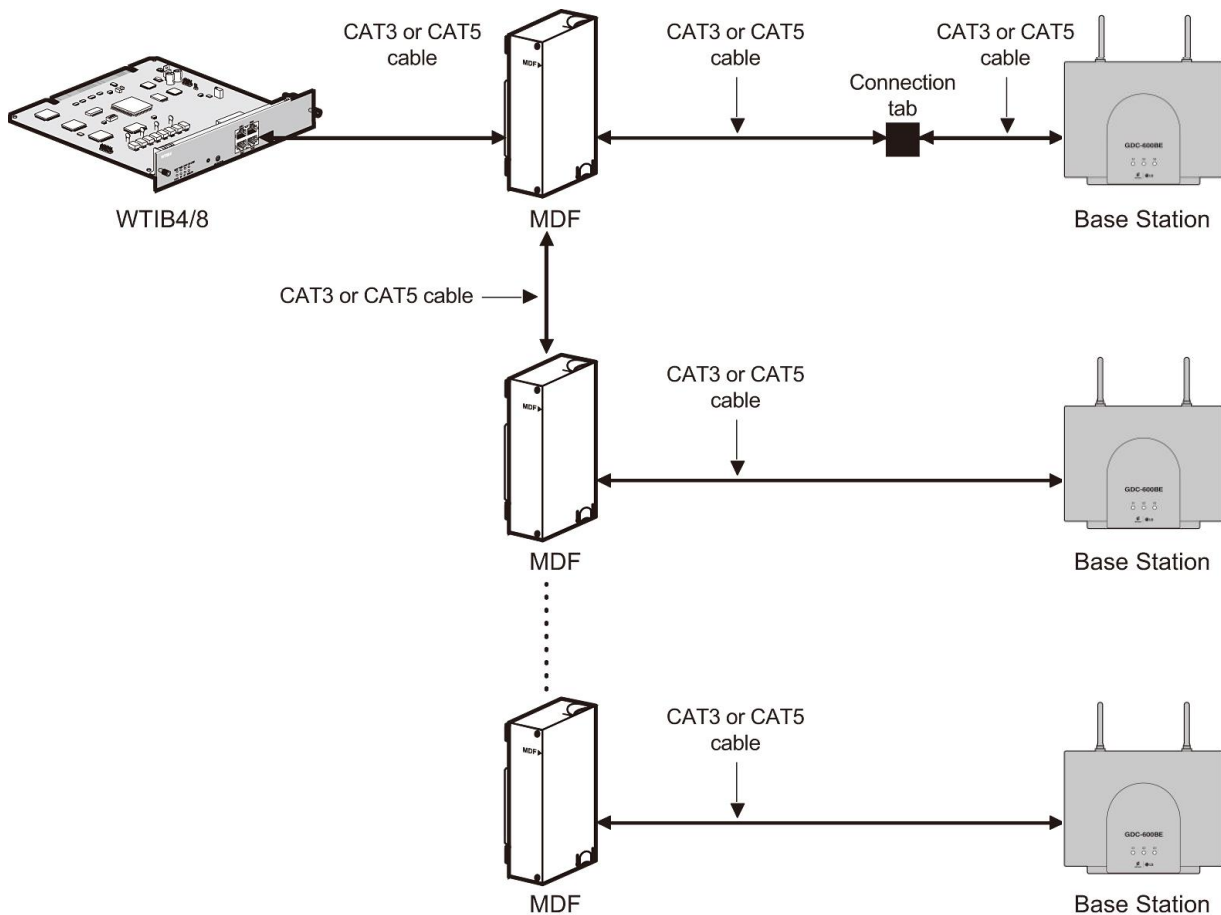**Figure 3.5.2-2 Wiring with connection tab between WTIB4/8 and Base Station**

Figure 3.5.2-3 Wiring with MDF and connection tab between WTIB4/8 and Base Station

3.5.3 Ferrite core installation and wiring for iPECS UCP
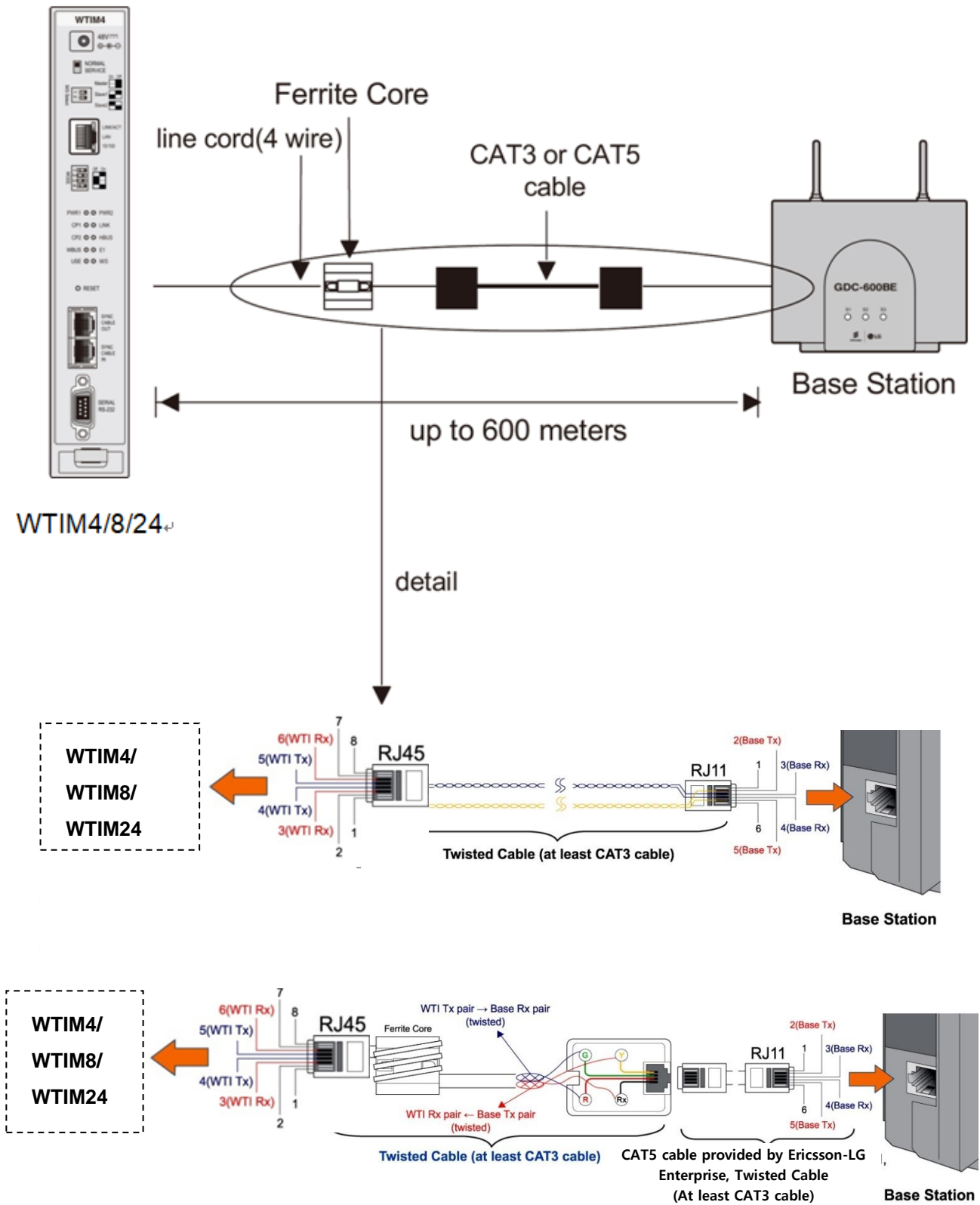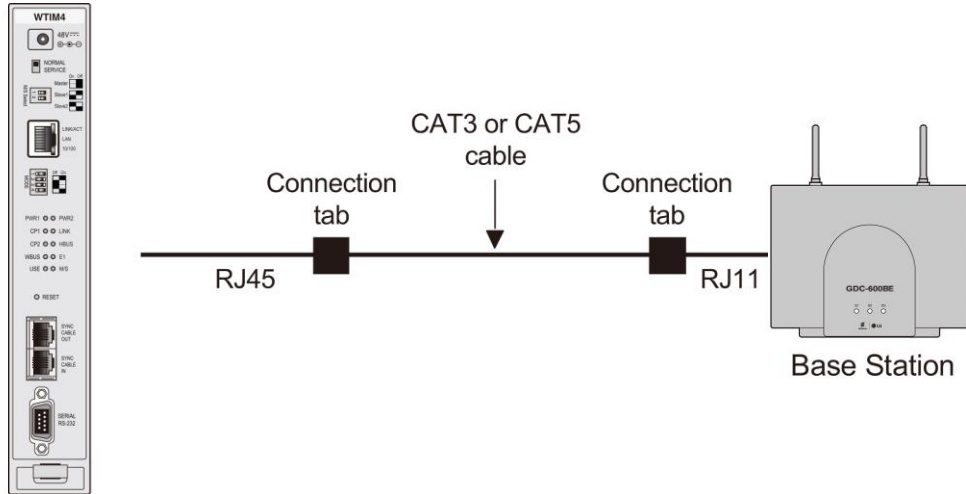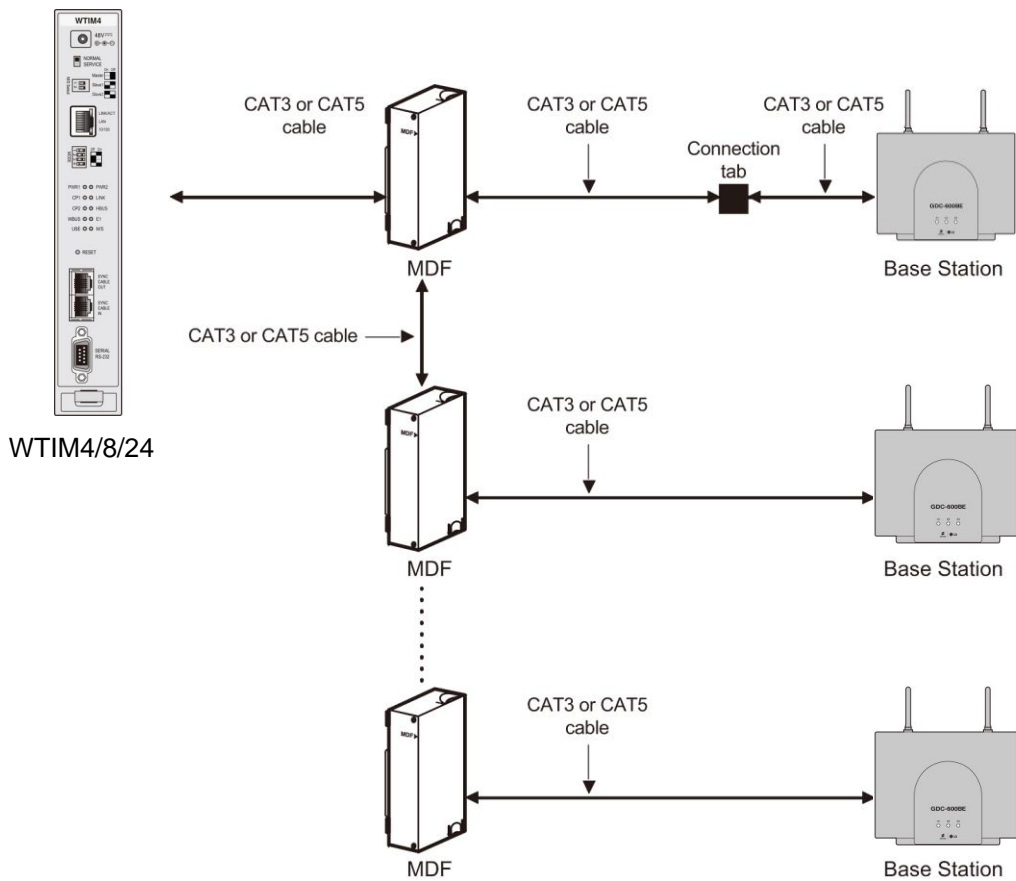

Figure 3.5.3-1 Cable connection with Ferrite Core between WTIM4/8/24 and Base Station

WTIM4/8/24

Figure 3.5.3-2 Wiring with connection tab between WTIM4/8/24 and Base Station

WTIM4/8/24

Figure 3.5.3-3 Wiring with MDF and connection tab between WTIM4/8/24 & Base Station

<u>**NOTE**</u>

Even though there are connection points such as MDF or connection tab between WTIM4/8 and Base Station, the connection points should be connected with twisted-pair cable (at least CAT3 class) each other. For example, WTIB/WTIM to MDF, MDF to MDF, MDF to connection tab, and connection tab to Base Station should be connected with twisted-pair cable.

3.6   User Subscription/Unsubscription

3.6.1   System ID

A System ID is given to iPECS system attached to the wireless GAP terminal for identification. System ID, which is the Potable Access Rights Key (PARK), is written on the system.

PARK: 31100013411741

The Authentication Code as well as System ID should be entered at only the Attendant Station, before Subscribing the wireless terminal (GAP) to iPECS system.

To display the System ID, perform the following Steps:

1)   From the Attendant station, press **[TRANS/PGM]** button.
2)   Dial 0#.
3)   Press the FLEX 4 button.

When modifying or entering the System ID:

1)   From the Attendant Station, press **[TRANS/PGM]** button.
2)   Dial 0#.
3)   Press the FLEX 6 button.
4)   Enter the System ID (PARK code, refer to key sequence description below).
5)   When finished, press the **[HOLD/SAVE]** button; a confirmation tone will be heard.

⚠ <u>CAUTION</u>

Normally you should not change the system ID. If you should change it, please contact Ericsson-LG Enterprise or the local dealer in your country.

The key sequence of the PARK= LLP_____PC

- LL: Two digits decimal representation of PARK length (Bit count)
- P_____P: 11 heximal digits representation of PARK
- C: Check digit, calculated as the sum of each digit in the input stream multiplied by its position in the input stream, module of 11; if the result is 10, this is represented by *.

<u>Conditions</u>

1)   The System ID must be programmed when the System is installed.
2)   When System ID is programmed, all previously entered data related to wireless features will be erased.
3)   The initial PARK value is 00000000000000; the value will display in LCD at first.

3.6.2 Authentication Code

The Authentication Code is entered at the Attendant station before subscribing a User wireless terminal (GAP) to iPECS system.

To display the Authentication Code, perform the following steps:

1) From the Attendant station, press **[TRANS/PGM]** button.
2) Press 0#.
3) Press the FLEX 3 button; the current AC code will display on the LCD.
4) If Authentication code is correct, exit the program mode.

If Authentication code is wrong, please follow the procedure:

1) From the Attendant station, press **[TRANS/PGM]** button.
2) Dial 0#.
3) Press the FLEX 3 button.
4) Enter the Authentication Code (up to 8 digits, refer to key sequence description below).
5) When finished, press **[HOLD/SAVE]**; a confirmation tone will be heard.

The key sequence of the AC code= D_____D

- D_____D: Up to 8 digits decimal representation

Condition

1) AC code must be programmed for User Subscription.
2) AC code must be programmed after the system was installed; if AC code is changed while under system operation, it may not operate properly (ex., subscribed terminal may not receive incoming calls or not make an outgoing call).
3) If PARK value is changed, AC code must also be entered again.
4) The initial AC code is 000000.
5) AC code change will not affect the system operation except subscribing new wireless terminals.

3.6.3 User Subscription

This procedure is for subscribing the wireless terminal to iPECS system.

To subscribe the wireless terminal to PECS system at Attendant Station:

1) From the Attendant station, press **[TRANS/PGM]** button.
2) Dial 0#.
3) Press the FLEX 1 button.
4) Enter the appropriate Station Number.
5) Enter the phone type (2=Standard GAP, 3=GDC-40x/45xH, 5=GDC-480H/500H)
6) Press the **[HOLD/SAVE]** button; a confirmation tone is heard.
7) The Attendant Station LCD should display "SUBSCRIBED: SUCCESS"; if message is not received, perform Steps again from #1

To subscribe at the wireless terminal (e.g. GDC-480H/500H):

1) Press **[MENU]** button.

2) Select **[Phone Register]** menu.

3) Select **[Subscription]** menu.

4) Select the empty base number (1-4) using **[UP/DOWN]** button, and press **[OK]** button.

5) The wireless terminal will search for the register system and 'SEARCHING...X' is displayed on the LCD. After searching the register system, PARK value is displayed on the LCD.
   - If value displayed is correct, press **[OK]** button; confirmation tone will be heard and displayed at the Attendant Station and at the wireless terminal which will then return to an idle state displaying the appropriate station number.
   - If value is not correct, press the **[NO]** button; the terminal will retry the search and display 'SEARCHING…X" on the LCD.

6) Enter AC code (up to 8 digits decimal representation) and press **[OK]** button.

7) If search fails, repeat the above steps at the Attendant Station and Wireless Terminal.

Condition

1) Wireless terminal must be subscribed to system for normal service.

2) Only Attendant can subscribe the wireless terminals (GAP).

3) Attendant can subscribe another wireless terminal after one subscribing procedure.

4) An error tone will be heard if attendant attempts to subscribe a wireless terminal that was subscribed already.

3.6.4 User Unsubscription I

This procedure will disconnect a wireless terminal from the iPECS system. To unsubscribe a wireless terminal, it should be in an idle state.

To unsubscribe a wireless terminal from the Attendant Station, perform the following:

1) At the Attendant station, press **[TRANS/PGM]** button.

2) Dial 0#.

3) Press the FLEX 2 button.

4) Enter the appropriate Station Number.

5) Press **[HOLD/SAVE]** button; a confirmation tone will be heard and displayed to the Attendant and the Wireless terminal.
   - If using GDC-480H/500H, It will attempt to synchronize the next registered system; if any available system doesn't exist, GDC-480H/500H displays "Not Subscribed" on LCD.

6) Power-Off the wireless terminal.

Condition

1) Only an Attendant can unsubscribe a wireless terminal.

2) Attendant can only unsubscribe wireless terminals that were subscribed already; if attendant attempts to unsubscribe an unsubscribed wireless terminal, an error tone will be heard.

3) Attendant can unsubscribe another wireless terminal after completing an unsubscribing procedure.

4) Attendant can perform unsubscribing procedure only when the wireless terminal is in an idle state.

3.6.5   User Unsubscription II

If you want to perform the unsubscription procedure at wireless terminal and Attendant station independently, follow the procedure described below.

To erase all subscriptions from the Attendant Station:

1)   At the Attendant station, press **[TRANS/PGM]** button.
2)   Dial 0#.
3)   Press the FLEX 7 button.
4)   Enter the appropriate password (147*).
5)   Press the **[HOLD/SAVE]** button; a confirmation tone will be heard.

To erase one subscription from the wireless terminal:

1)   From the wireless terminal, press the **[TRANS/PGM]** button.
2)   Dial 0#.
3)   Press the FLEX 8 button.
4)   Enter the appropriate Station Number.
5)   Press the **[HOLD/SAVE]** button; a confirmation tone will be heard.

Condition

1)   Wireless terminal must be unsubscribed from the system for normal service.
2)   Only an Attendant can unsubscribe a wireless terminal.
3)   Attendant can unsubscribe another wireless terminal after completing the subscribing procedure; if attendant attempts to unsubscribe an unsubscribed wireless terminal, an error tone will be heard.

3.6.6   RSSI Monitoring

Received Signal Strength Indicator (RSSI) Monitoring is a way that the dealer can install Base Stations without using the CRS tool. The RSSI level of a Base Station to which the wireless terminal is locked is displayed as a "dBm" value on the LCD (up to 80dbm.); the value is updated periodically. The handset must be subscribed for this function to work.

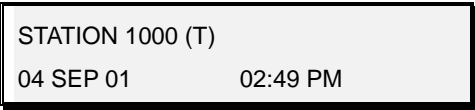*To use RSSI Monitoring when using a GDC-480H/500H wireless terminal:*

1)   From the wireless terminal.
2)   Press the **[Menu]** button.
3)   Press the * key.
4)   Enter the Technician menu by entering press PIN code (L G G A P = 5 4 4 2 7).
5)   Press **[OK]** button.
6)   Press the **[CELL TOOL]** mode to **YES** and press the **[OK]** button.
7)   The RSSI value will display on LCD of wireless terminal (automatically updated periodically).

4 Attendant Services

The Attendant can manage User subscriptions to iPECS System DECT. The Attendant enables subscriptions, can unsubscribe User data, request authentication and register a User to another networked system. In addition, the Attendant can view and modify DECT-related codes (Authentication and PARK). It is recommended these codes not be changed as subscribed handsets may perform erratically. Subscription management and code control services are available under the Attendant DECT Data program.

To access the DECT Data program from the Attendant station, perform the following procedure:

1)   Press the **[PGM]** button.

> STATION 1000 (T)
>
> 04 SEP 01   02:49 PM

2)   Dial 0 and #.
3)   Press the desired Flex button (1-9),

> WTU (UN)SUBSCRIBE
>
> PRESS FLEX BUTTON

- Flex Button 1 – Enter the station number for subscription => 4.1 Enable Subscription
- Flex Button 2 – Enter the station number for un-subscription => 4.2 Terminate a Subscription
- Flex Button 3 – Enter Authentication Code for Wireless terminal => 4.3 Authentication Code for DECT subscription
- Flex Button 4 – View the system ID (PARK Code) =>4.4 Viewing System ID (PARK code)
- Flex Button 5 – Enter Authentication Code for Desk terminal => 4.5 Authenticating a user
- Flex Button 6 – Modify the system ID (PARK Code) => 4.6 Modifying the system ID (PARK code)
- Flex Button 7 – Delete all subscriber data => 4.7 Deleting all subscriptions
- Flex Button 8 – Delete each subscriber data => 4.8 Deleting a single subscription
- Flex Button 9 – DECT zone Mobility => 4.9 Registering to Networked systems

4.1   Enable Subscription

For security and control, handset subscription must be authorized, and enabled. Once enabled, the User can subscribe the DECT handset.

To enable a subscription from the Attendant, perform the following procedure:

1)   Press the **[PGM]** button.

> STATION 1000 (T)
>
> 04 SEP 01   02:49 PM

2)   Dial 0 and #.

3)   Press Flex button 1.

> WTU (UN)SUBSCRIBE
>
> PRESS FLEX BUTTON

4)   Enter the Station number of the subscribing Station.

> WTU SUBSCRIBE ENABLE
>
> ENTER STA NO.

5)   Enter the Type of Handset.

> STATION : XXXX
>
> ENTER PHONE TYPE

- 2 – Standard DECT GAP
- 3 – GDC-400H/450H Handset
- 5 – GDC-480H/500H
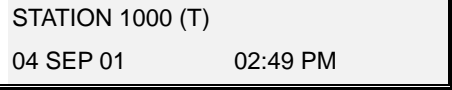
6)   Press **[HOLD/SAVE]** button and await Success message.

7)   Press Speaker to return to idle.

4.2   Terminate a Subscription

For security and control, a subscription only can be terminated by the Attendant.   Once the subscription is terminated, the wireless handset will no longer have access to iPECS services and will display an unregistered or not subscribed status. The handset must be idle to terminate the subscription.
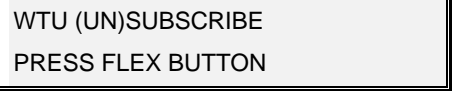
   To terminate a subscription from the Attendant, perform the following procedure:
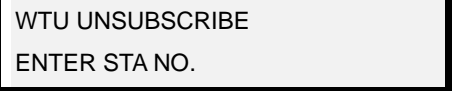
1)   Press the **[PGM]** button.

```
STATION 1000 (T)
04 SEP 01              02:49 PM
```

2)   Dial 0 and #.

3)   Press Flex button 2.

```
WTU (UN)SUBSCRIBE
PRESS FLEX BUTTON
```

4)   Enter the Station number of the subscribing Station.

```
WTU UNSUBSCRIBE
ENTER STA NO.
```
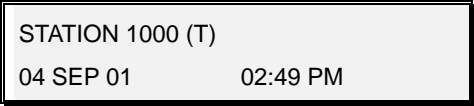
5)   Press **[HOLD/SAVE]** and await confirmation tone.

6)   Press Speaker to return to idle.

4.3   Authentication Code for DECT Subscription

When a user subscribes to iPECS System DECT, entry of the DECT Authentication code is required.   The Authentication Code entered by the User is compared to the code in the system to verify the User subscription.

To view or enter the Authentication code from the Attendant, perform the following procedure:
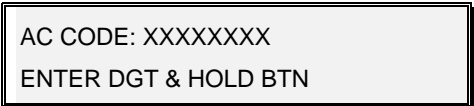
1)   Press the **[PGM]** button.

> STATION 1000 (T)
>
> 04 SEP 01   02:49 PM

2)   Dial 0 and #.

3)   Press Flex button 3.

> WTU (UN)SUBSCRIBE
>
> PRESS FLEX BUTTON

4)   Enter the new Authentication Code (up to 8 digits).

> AC CODE: XXXXXXXX
>
> ENTER DGT & HOLD BTN

5)   Press **[HOLD/SAVE]** button and await confirmation tone.

6)   **Press** Speaker to return to idle.

NOTE

1)   The Authentication Code must be assigned before a user can subscribe for services.

2)   Changing the Authentication Code after handsets have registered will cause improper operation, handsets may display erratic operation and may not be able to subscribe or de-subscribe. If the Authentication Code must be changed, first un-subscribe all handsets.

3)   If the system Id is changed, the Authentication Code must be reassigned.

4.4   Viewing the System ID (PARK code)

The system Id, also known as the PARK (Portable Access Rights Key) code, is used to identify the DECT system. During subscription, the user can verify the handset is subscribing to the correct DECT system. Each WTIB/WTIM carries a label with the PARK code as shown in the example. In a cascade of WTIB/WTIMs, the PARK code of the master WTIB/WTIM is used for the system.

> PARK: 31100013411741

To view the ID for the iPECS System DECT from the Attendant station, follow the procedure below.

1)   Press the **[PGM]** button.

> STATION 1000 (T)
>
> 04 SEP 01   02:49 PM

2)   Dial 0 and #.
3)   Press Flex button 4.

> WTU (UN)SUBSCRIBE
> PRESS FLEX BUTTON

4)   The current System ID (PARK code) displays.
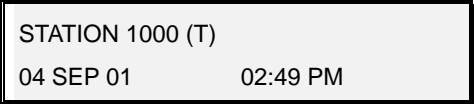
> PARK: xxxxxxxxxxxxxx

5)   Press **[HOLD/SAVE]** button.
6)   Press **Speaker** to return to idle.

4.5   Authenticating a User

The Attendant can request a User verify their identification. The Attendant requests an authentication, and in response the handset displays a request for the user to enter their Personal ID Number (PIN). The user must enter their PIN in order to receive further services from System DECT.

The PIN, which may be up to five (5) digits is assigned in the handset by the user (refer to the GDC-480H/GDC-500H User Guide).
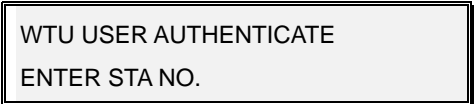
1)   Press the **[PGM]** button.

> STATION 1000 (T)
>
> 04 SEP 01   02:49 PM

2)   Dial 0 and #.

3)   Press Flex button 5.

> WTU (UN)SUBSCRIBE
>
> PRESS FLEX BUTTON

4)   Enter the desired Station number.

> WTU USER AUTHENTICATE
>
> ENTER STA NO.

5)   Press **[HOLD/SAVE]**, and await Pass/Fail display on the Attendant phone LCD along with confirmation tone.

6)   Press Speaker to return to idle.

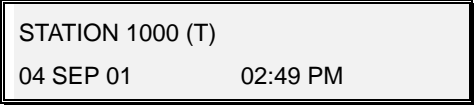## 4.6   Modifying the System ID (PARK code)

The System ID (PARK code) is a 14-digit number, which uniquely identifies the DECT system.   Each DECT System must have a unique PARK code. Should a conflict occur between an iPECS System DECT and another DECT system, the System ID can be changed.

NOTE
Changing the System ID of an operational iPECS System DECT will remove all subscription and Authentication Code data. It will be necessary to enter an Authentication Code and subscribe all wireless handsets to System DECT if the System ID is changed.
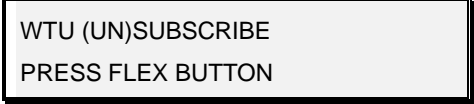
To modify System ID from the Attendant, perform the following procedure:
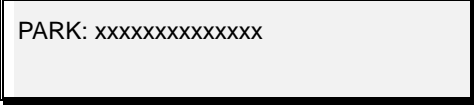
1)   Press the **[PGM]** button.

```
STATION 1000 (T)
04 SEP 01            02:49 PM
```

2)   Dial 0 and #.
3)   Press Flex button 6.

```
WTU (UN)SUBSCRIBE
PRESS FLEX BUTTON
```

4)   The current System ID (PARK code) displays; enter the new PARK code.

```
PARK: xxxxxxxxxxxxxx
```

5)   Press **[HOLD/SAVE]** button.
6)   Press Speaker to return to idle.

4.7   Deleting all Subscriptions

DECT handsets can be subscribed to an iPECS System DECT. In some situations, subscription data can be deleted from System DECT when moving a DECT Base station or iPECS. In this case, existing subscriptions are deleted and all handset subscriptions must be re-initialized for obtaining access to System DECT services:

1)   Press the **[PGM]** button.

```
STATION 1000 (T)
04 SEP 01              02:49 PM
```

2)   Dial 0 and #.
3)   Press Flex button 7.

```
WTU (UN)SUBSCRIBE
 PRESS FLEX BUTTON
```

4)   Enter 147* (password).

```
WTU SUBS ALL DATA ERASE
PRESS PASSWD & HOLD
```

5)   Press **[HOLD/SAVE]** button.
6)   Press Speaker to return to idle.

4.8   Deleting a Single Subscription

DECT handsets can be subscribed to an iPECS System DECT. In some situations, subscription data for a handset can be deleted from System DECT when replacing a handset. When the subscription is deleted, the handset must be re-initialized for access to System DECT services:

1)   Press the **[PGM]** button.

```
STATION 1000 (T)
04 SEP 01              02:49 PM
```

2)   Dial 0 **and** #.
3)   Press **Flex** button 8.

```
WTU (UN)SUBSCRIBE
PRESS FLEX BUTTON
```

4)   Enter **desired** Station number.

```
WTU SUBSCRIPTION ERASE
ENTER STA NO.
```

5)   Press **[HOLD/SAVE]** button.
6)   Press Speaker to return to idle.

4.9   Registering to a Networked System

Handset can be subscribed to the System DECT of several iPECS Systems simultaneously. If iPECS Systems are part of a network, the DECT handset can be assigned DECT Mobility and have calls to one iPECS routed over the network to the DECT handset location. To register a handset for DECT Mobility from the Attendant station, follow the procedure:

1)   Press the **[PGM]** button.

```
STATION 1000 (T)
04 SEP 01          02:49 PM
```

2)   Dial 0 and #.
3)   Press Flex button 9.

```
WTU (UN)SUBSCRIBE
PRESS FLEX BUTTON
```

4)   Enter desired Station number.

```
DECT MOBILITY
ENTER STA NO.
```

5)   Enter 1 to enable Network Mobility.

```
STATION: XXXX
(1:ON/0:OFF): ???
```

6)   Press **[HOLD/SAVE]** button.
7)   Press Speaker to return to idle.

5 Configuring Multi zone for UCP

5.1 Overview of Multi zone

A single zone can be covered with the traffic handover which is available to talk in a single zone. But the traffic handover between zones isn't available. So user finished conversation and move to the other zone.

The benefit for Multi zone is to cover the wide range compared with a single zone. User doesn't need to turn off the handset from the current zone to another zone, but talking is not available during moving to another zone.

It is important to deploy the zones into areas where there is a natural delineation area & where little or no overlap occurs. For example: where a company has two separate buildings. One building could have up to 24 base stations and the second building could have another 24 base stations on a separate multi zone. Then as users walk between buildings the DECT handsets can seamlessly change zones with next to no disruption to coverage and usability. Staff will know to complete calls before changing zones. Because of physical separation there will be next to no unintended roaming on opposing zones which can occur if zones overlap.

Because of this design principle it is recommended to avoid setting up zones where the overlap is vertical. With zones above and below each other in a multi-story building roaming can often occur between floors which may be unintended and generally not desirable. In some cases there will be no option but to design this overlap between floors (especially large buildings) but where possible consider lateral options (e.g One vertical zone covering basement, ground floor & floor 2 then the second zone covering the West Wing & other zone/s covering the other wing/s). Another design consideration could be where there is an un-populated floor with no bases this would be an opportune physical point to separate zones.
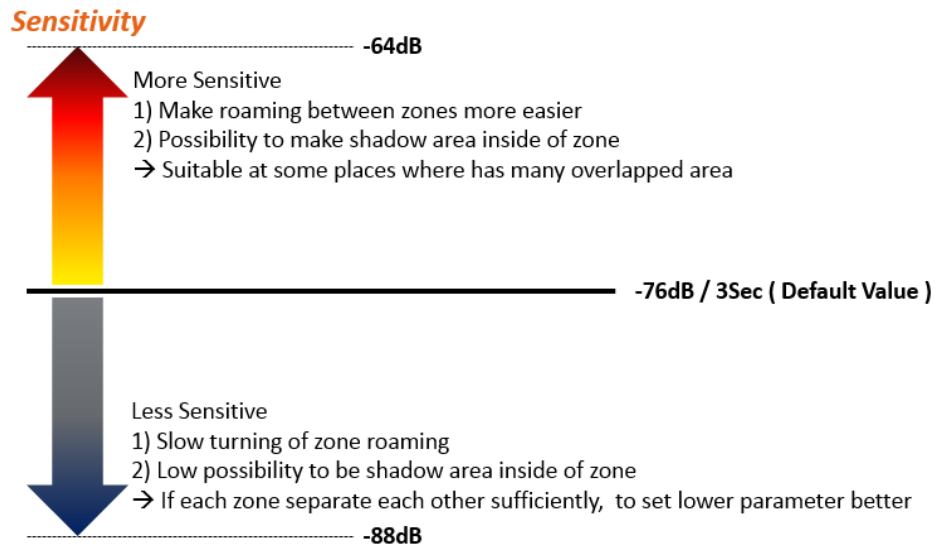
5.2 Multizone Concepts

When user moves from zone 0 to zone 1, if a RF signal level is lower than set value (ex.-72dB) then DECT Handset will be displayed in the "Searching New Zone". The RF signal of zone 1 is higher than set value, then the terminal will be displayed in the zone 1. When user moves from zone 1 to zone 0, the same information will be displayed.

> Move from Zone1 to Zone0
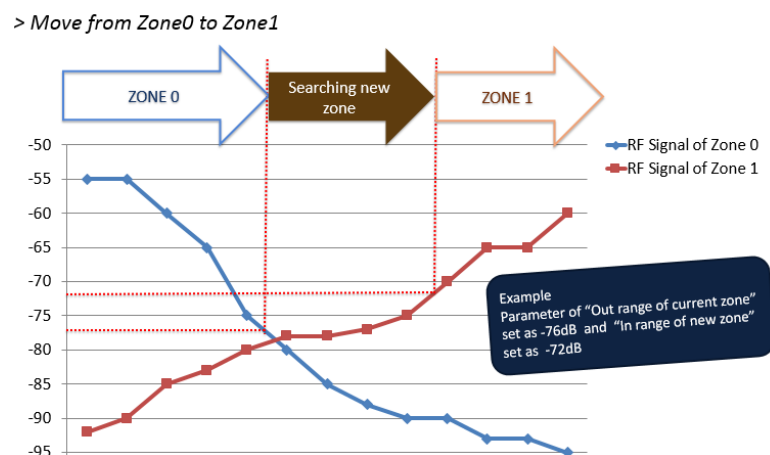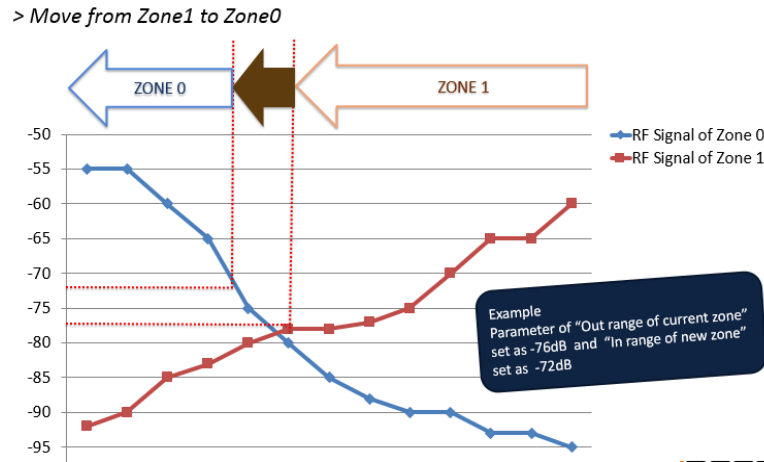
If the RF signal level set the high value, the idle handover of DECT handset will be fast between zones, but it makes the shadow area inside of zone (suitable at some places where has many overlapped area). Refer to the below.

Sensitivity

-- **-64dB**

More Sensitive
1) Make roaming between zones more easier
2) Possibility to make shadow area inside of zone
→ Suitable at some places where has many overlapped area

―――――――――――――――――――――――――――――――― **-76dB / 3Sec (Default Value)**

Less Sensitive
1) Slow turning of zone roaming
2) Low possibility to be shadow area inside of zone
→ If each zone separate each other sufficiently, to set lower parameter better

-- **-88dB**

> Impossible to support live call between zones (Idle roaming only)
> According to making roaming condition sensitive,
   base stations inside of each zone should be located close together
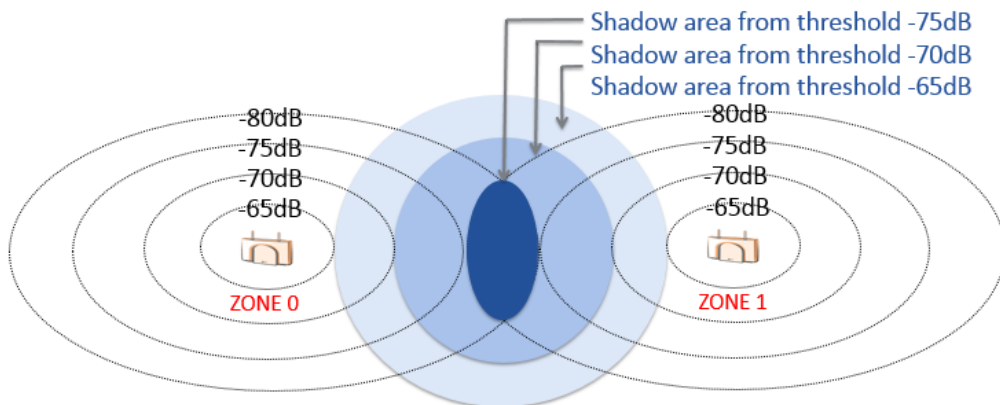
5.3 Multi zone Configuration for each WTIM

Multi zone means that several single zones are tied with one system. Each single zone has up to 3 WTIM and 24 Base station. The system has up to 10 single zones (WTIM4/8) and 3 single zones (WTIM24) and 240 Base station.

The following tables are the configuration for each WTIM:

Zone number	WTIM4/8	Base number
0	Master	0 to 7
	Slave1	8 to 15
	Slave2	16 to 23
1	Master	24 to 31
	Slave1	32 to 39
	Slave2	40 to 47
2	Master	48 to 55
	Slave1	56 to 63
	Slave2	64 to 71
3	Master	72 to 79
	Slave1	80 to 87
	Slave2	88 to 95
4	Master	96 to 103
	Slave1	104 to 111
	Slave2	112 to 119
5	Master	120 to 127
	Slave1	128 to 135
	Slave2	136 to 143
6	Master	144 to 151
	Slave1	152 to 159
	Slave2	160 to 167
7	Master	168 to 175
	Slave1	176 to 183
	Slave2	184 to 191
8	Master	192 to 199
	Slave1	200 to 207
	Slave2	208 to 215
9	Master	216 to 223
	Slave1	224 to 231
	Slave2	232 to 239

Zone number	WTIM24	Base number
0	Master	0 to 23
	Slave1	24 to 47
	Slave2	48 to 71
1	Master	72 to 95
	Slave1	96 to 119
	Slave2	120 to 143
2	Master	144 to 167
	Slave1	168 to 191
	Slave2	192 to 215
3	Master	216 to 239

NOTE

9xWTIM24 can consists of 3 multi zones (zone #0 ~ zone #2) and 1xWTIM24 for zone #3.

5.4   Functional Restriction for Configuring Multi zone with WTIM4/8 and WTIM24

You have to remember the following 2 restrictions when configuring Multi zone with WTIM4/8 and WTIM24.

1)   Registering Zone number: the priority is WTIM4/8 and then WTIM24.
2)   WTIM24 supports Only GDC-480H and GDC-500H.

Registering Zone Number

Basically WTIM24 can configure with WTIM4/8 for Multi zone. Verify that the zone number of WTIM4/8 should be prior to that of WTIM24 as the following available case:

| Case	WTIM type & Handset	Zone #0	Zone #1	Zone #2	Remarks
Case 1	WTIM type	3 WTIM8	3 WTIM24		OK
	Base No. which 480H/500H recognized	0 to 23	72 to 143		
Case 2	WTIM type	3 WTIM24	3 WTIM8		Not OK (Overlapped base number from 24 to 47)
	Base No. which 480H/500H recognized	0 to 71	24 to 47		
Case 3	WTIM type	3 WTIM8	3 WTIM8	3 WTIM24	OK
	Base No. which 480H/500H recognized	0 to 23	24 to 47	144 to 215	
Case 4	WTIM type	3 WTIM8	3 WTIM24	3 WTIM8	Not OK (Base number of zone #1 larger than zone #2)
	Base No. which 480H/500H recognized	0 to 23	72 to 143	48 to 71	
Case 5	WTIM type	3 WTIM24	3 WTIM8	3 WTIM8	Not OK (Overlapped base number from 24 to 71)
	Base No. which 480H/500H recognized	0 to 71	24 to 47	48 to 71	
Case 6	WTIM type	3 WTIM8	3 WTIM24	3 WTIM24	OK
	Base No. which 480H/500H recognized	0 to 23	72 to 143	144 to 215	
Case 7	WTIM type	3 WTIM24	3 WTIM8	3 WTIM24	Not OK (Overlapped base number from 24 to 47)
	Base No. which 480H/500H recognized	0 to 71	24 to 47	144 to 215	
Case 8	WTIM type	3 WTIM24	3 WTIM24	3 WTIM8	Not OK (Overlapped base number from 48 to 71)
	Base No. which 480H/500H recognized	0 to 71	72 to 143	48 to 71	

NOTE

Zone #3 with Master WTIM24 can be expanded from Case3 or Case6.

DECT compatibility for Zone roaming

Verify that the following DECT model is available for roaming between zones when configuring WTIM4/8 and WTIM24 for Multi zone.
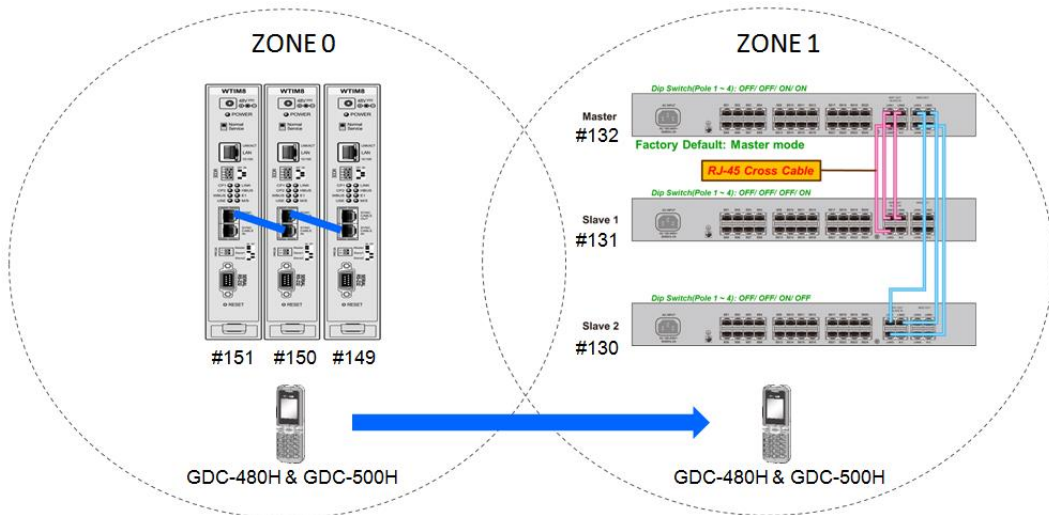
1) GDC-480H & GDC-500H: Zone roaming is available between zones.

2) GDC-400H, GDC-450H, and All of other GAP phone: do not provide in Zone #1 with WTIM24.
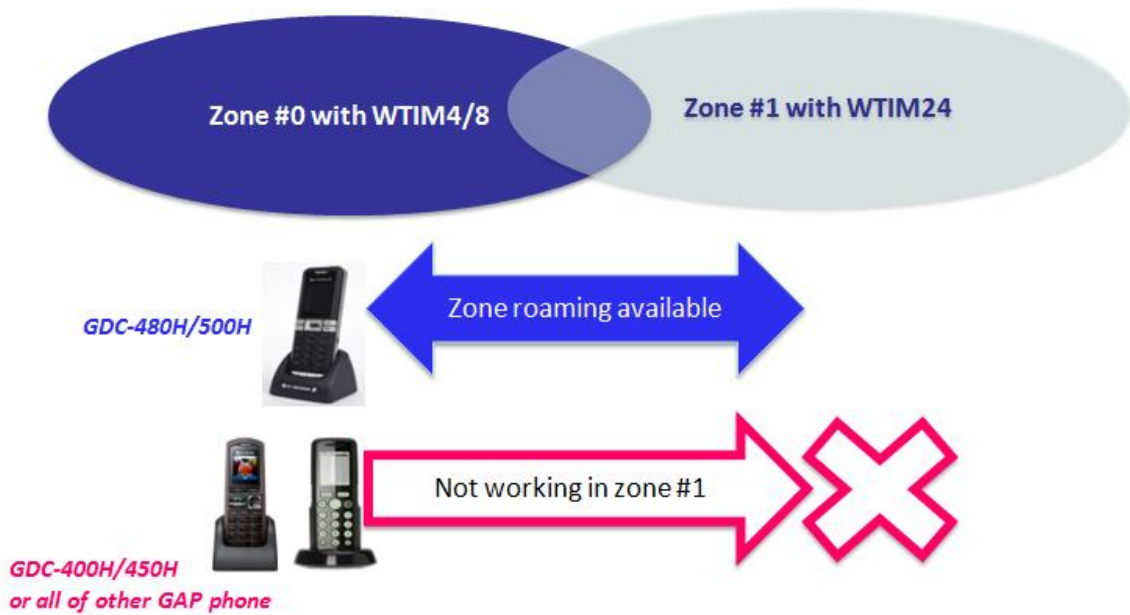
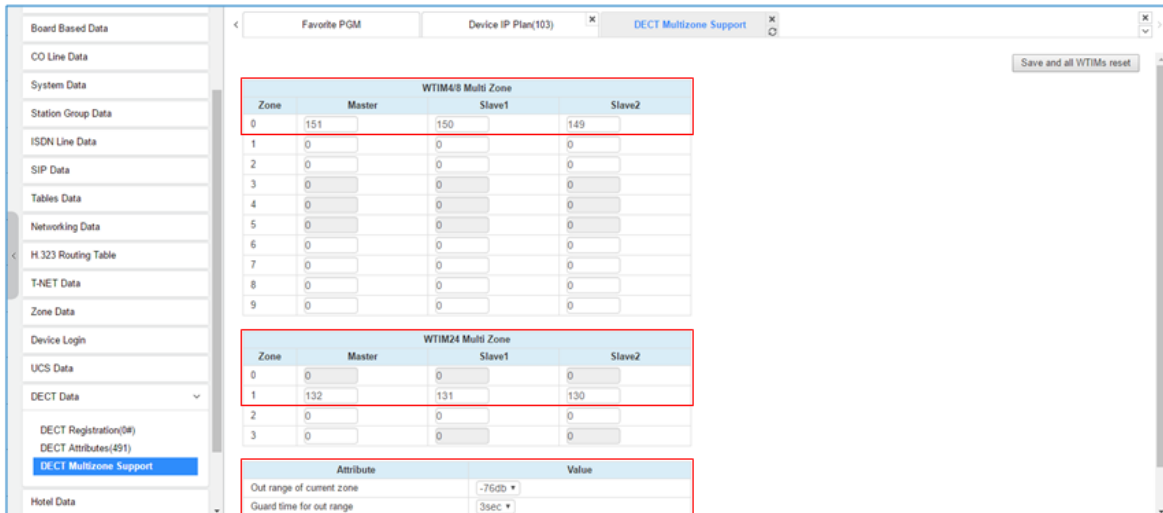## 5.5 Registering WTIM and Configuring Multi zone

You can register WTIM and configure Multi zone through Web Admin as the following procedure. The following example configures: Zone 0 (3 WTIM8), Zone 1 (3 WTIM24), and GDC-480H & GDC-500H.

1) Set M/S (Master / Slave) Mode of WTIM before turning on the power.

2) After turning on all WTIMs, wait until all WTIMs are connected to UCP.

3) Find the sequence number of WTIM4/8 and WTIM24 in **Device IP Plan (103)** as the following 1st screen.

4) Log in the system's call server > **DECT Data** > **DECT Multizone Support**.
   - Fill in **the sequence number** of all WTIMs on Zone number field.
   - **[Out range/Guard time/In range]** parameters to be Set.
   - Click **[Save and all WTIMs reset]** button to apply.

5) After all WTIMs work well, check Zone and Mode information about each WTIM in **Device IP plan (103)**.

Device IP Plan (103)

DECT Multizone Support

Zone Roaming Parameters

	Menu name			ELG Recommended Value
	UCP SW version (1.3.16/2.0.7 or older)	UCP SW version (1.3.17/2.0.8 or later)	Remarks	
1	Threshold strength for handset relocation	Out range of current zone	Same but naming changed	-76dB
2	Threshold duration for handset relocation	Guard time for out range	Same but naming changed	3 Sec
3	Reference strength for handset roaming	In range of new zone	changed from UCP	-72dB
3	Breakdown Menu	OFF	Out range+0	
		-50dB	Out range+2	
		-55dB	Out range+4	
		-60dB	Out range+6	
		-65dB	Out range+8	

* For set as -76dB/3sec/-72dB in old version,
  3rd menu selected -55dB (same meaning with Out range+4 (-72 = -76+4))
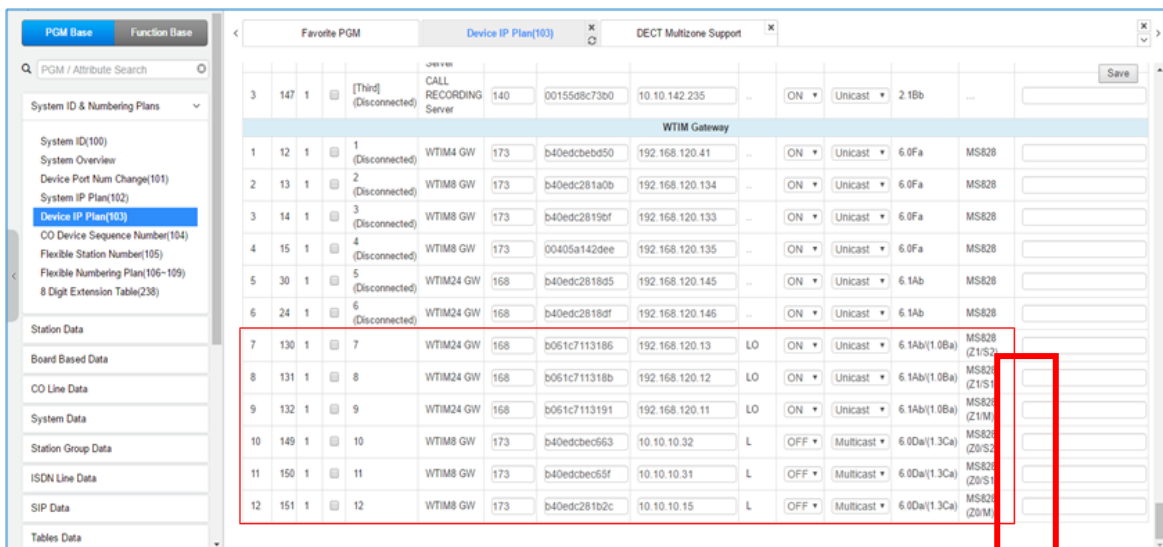
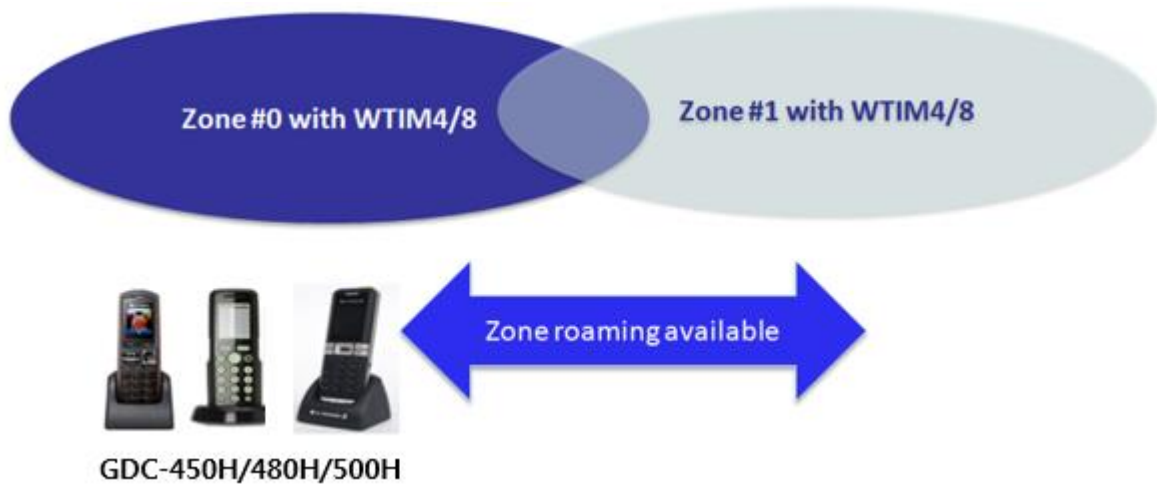

Device IP Plan (103)

NOTE

DECT Handset registration: When handset to be registered to system at first, UCP system shares this information to all WTIMs of all zones (No need to register again in each zone).
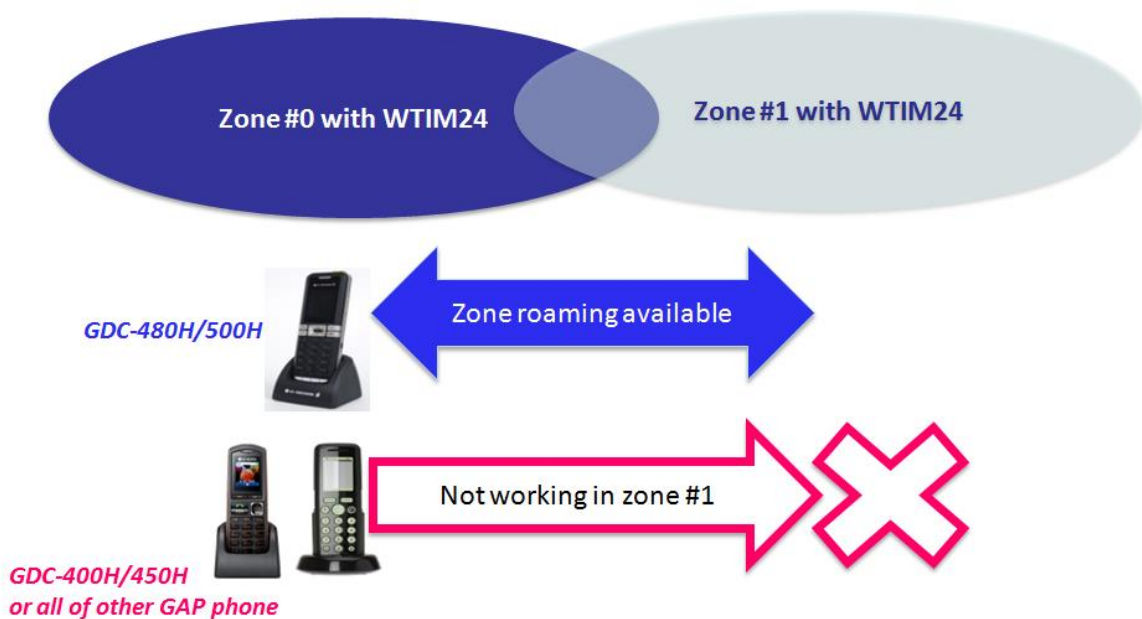
5.6   Configuring Multi zone for WTIM4/8 & WTIM24

You can configure Multi zone by registering only WTIM4/8 or WTIM24. The procedure through Web Admin is the same as the above **Registering WTIM and Configuring Multi zone** section.

Multi zone for WTIM4/8

Multi zone for WTIM24

6 Troubleshooting

Problem	Cause/Symptom	Solution
User cannot place a call using DECT handset	WTIB/WTIM issue	- Please check at least one DECT base station is properly connected to WTIB/WTIM. - Please check the WTIB/WTIM is properly connected to the IP network via LAN cable.
	DECT Handset issue	- Please check the DECT terminal is registered and subscription is completed. - Please check the DECT terminal user is located in the RF coverage area of the DECT base station.
DECT frequently drops calls	Base Station issue	- Please check cell-planning of DECT base stations. - Please check the DECT terminal user is located in the RF coverage of DECT base stations. - Please check all WTIB/WTIMs are installed on the same KSU when multiple WTIMs are used together.