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innovaphone Maritime Engineering Guide (Doc ID: IMEG | Rev: 2.00.1)

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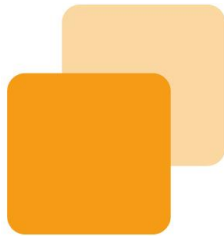
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1 Introduction

1.1 About this document

The primary scope of this document is to provide comprehensive guidelines for onboard installation procedures and programming instructions. These guidelines are designed to fulfill the requirements of the **DNV Type Approval (TA) 848.25** program.

This guide serves as a framework for a typical maritime IP-based communication ecosystem. It is designed for modularity, allowing for the easy adaptation of various endpoints, switches, and applications across different vessel classes.

Compliance Path:

- **Mandatory:** Procedures required for TA compliance.
- **Branch Standard:** Best practices for maritime engineering.
- **Optional:** "Nice-to-have" features for enhanced utility.
- **Verification:** Completion of the **Chapter 6 Checklist** is required for final system approval.

1.2 Access & Partnership

This document is available to all maritime stakeholders; however, in accordance with the **innovaphone AG B2B business model**, an approved partnership agreement is required for the procurement, installation, and certified support of the system.

For inquiries regarding partnership or licensing, please contact: sales@innovaphone.com

1.3 Revisioning History

Revision:	Date:	Document name	Description of Revision
1.00	12.06.2024	innovaphone MEG	First Release Version
2.00	13.08.2026	innovaphone MEG	IP17x hardware update

1.4 Related Documentation

Doc. nr.	Documentation	Role
TAA00003DD	System Approval	Master Certificate
TAA0000252	innovaphone HW	Component Level Approval
TAA0000054 r2	Seacom HW	Specialized Maritime Endpoints
TAA0000364	Westermo HW	Network Infrastructure Components



1.5 Regulatory Requirements (DNV-RU-SHIP Pt.6 Ch.3 Edition July 2023)

Description	Regulatory Ref.	Implementation
Two-way Voice	4.2.10.1 - 6.10.1.1 6.10.1.2 - 4.2.13	Standard PBX functionality
Paging & PA/GA	4.2.10.2 - 3.3.3	Multicast / Analog Interface
Mooring / Talk-Back	4.2.10.3 - 6.10.1.7	Command Call / PTT
Night vision	5.5.4.3	Dimmable UI / Backlight
Min 4 simultaneous calls	6.10.1.1	Performance
Distinguish ring signals	6.10.1.1	Functionality
Priority Calls / Call Intrusion	6.10.1.1 - 3.3.3	Call Filter / Emergency Bypass
Central Power / Backup	6.10.1.1	-
Redundancy	6.10.1.2	Master-Standby Failover
Noisy environment	6.10.1.3 - 4.2.10.2	-
Extension List next to stations	6.10.1.4	-
Hands-free	6.10.1.7	Functionality

1.6 Abbreviations

Abbreviation	Description	Note
iMEG	innovaphone Maritime Engineering Guide	Technical manual for this project.
TA	Type Approval	DNV Type Approval program.
PBX	Private Branch Exchange	Central telephone system
GUI	Graphical User Interface	Management interface for the users
UID	User Input Device	E.g. Keyboard, Display, etc.
ETH	Ethernet	Physical interface for network connection.
WAN	Wide Area Network	External connection (e.g., VSAT, Internet).
HF	Hands-free	Duplex or Half-duplex communication mode.
PoE	Power over Ethernet	Power supplied via Eth data cabling (IEEE 802.3af/at).
DISA	Direct Inward System Access	External dial-in to internal extensions.
IVR	Interactive Voice Response	Automated menu system.
DHCP	Dynamic Host Configuration Protocol	Automatic IP address assignment
DNS	Domain Name Server	Resolves hostnames to IP addresses.
NTP	Network Timing Protocol	Synchronize time across the network.
TLS	Transport Layer Security	Encryption for secure communication
TCP/UDP	Transmission Protocols	Core protocols for data packet delivery.
H323	P Telephony Protocol	Legacy/Standard VoIP protocol used by innovaphone.
SIP	Session Initiation Protocol	Industry-standard protocol for VoIP signaling.
Wiki	innovaphone Technical Wiki	https://wiki.innovaphone.com/
	Type Approval mark	Mandatory requirements to comply



2 Software and Hardware

2.1 Central software - innovaphone PBX-myApps Platform

The innovaphone PBX is a professional, real-time communication platform. For **Type Approval (TA)** compliance, the software must be deployed on dedicated **innovaphone IP811-maritime** appliances. (Part No. 01-00811-003)

- **PBX-Software:** Handles all telephony logic, call routing, and maritime features.
- **myApps Platform:** A secure, containerized environment for collaboration (Chat, Logbook, Admin apps).
- **Protocols:** Native support for SIP and H.323 (with TLS/SRTP encryption).

2.2 Hardware Selection & Compliance

Hardware marked with the Type Approval Check (✓) is certified for use in systems requiring DNV-compliant installation. Units marked with (X) are compatible with the innovaphone ecosystem, but are intended strictly for use in **non-essential areas** where regulatory compliance is not required.

2.2.1 Central IP Gateways

The gateway serves as the hardware appliance for the innovaphone PBX and myApps platform. For DNV-compliant installations, the **IP811-maritime** is the designated maritime standard.

Description	PBX	PBX	PBX	PBX	PBX	PBX	PBX	PBX	GW	Virtual
										
Model & Datasheet	IP311	IP411	IP511	IP811	IP0011	IP3011	IP6013	IP0013	IP1130	IPVA
Power / Ethernet	PoE/2	PoE/2	PoE/2	PoE/2	PoE/2	PoE/2	PoE+/2	PoE+/2	PoE/2	-
FXO / FXS (Analog)	4 / 2	- / 2	- / 4	-	-	-	-	-	-	-
BRI / PRI (ISDN)	-	2 / -	-	5 / -	-	- / 1	- / 2 (4)	-	- / 1	-
SIP Channels (All-IP)	75	75	120	120	120	120	240	240	120	120
Conf Channels HW/SW	- / 15	- / 15	10 / 30	10 / 30	- / 30	30 / 30	60 / 150	- / 150	30 / 30	
Recommended "All-in-one"	Up to 50	Up to 50	Up to 200	Up to 200	Up to 500	Up to 500	Up to 1000	Up to 1000	-	-
Max. registrations*	~12.500	~12.500	~25.000	~25.000	~25.000	~25.000	~25.000	~25.000	-	~100.000
 Compliant	X	X	X	✓	X	X	X	X	X	X

* Registrations only / 10 calls per user per hour / no UC / no team keys



2.2.2 IP Adapters (analog)

Analog IP Adapters are used to integrate legacy analog equipment—such as analog telephones, fax machines, sounders, etc.—into the IP network. For DNV-compliant installations, the **IP29-8 maritime** is the designated maritime standard.

Description	FXS-GW	FXS-GW	FXS-GW	FXS-GW	FXO-GW
					
Model & Datasheet	IP29-2	IP29-4	IP29-8	IP29-20	IP311
Power / Ethernet	PoE/1	PoE/1	PoE/1	PoE+/1	PoE/2
Ports	2 x a/b / RJ 11 (Jack 6P2C)	4 x a/b / RJ 11 (Jack 6P2C)	8 x a/b / RJ 11 (Jack 6P2C)	20 x a/b / 5 x RJ 45 (Jack 8P8C)	4 x a/b / RJ 11 (Jack 6P2C)
 Compliant	X	X	✓	X	X

2.2.3 IP Stations - Office & Accommodation Grade

These stations are designed for high-quality voice communication in climate-controlled area. For DNV-compliant installations, the **IP111-maritime** is the designated maritime standard.

See Chapter 5.3 for configuration options required to meet specific environmental and operational requirements (e.g. intrusion or paging).

Description	Entry	Universal	Universal	Office	Business
					
Model & Datasheet	IP101 IP102	IP111	IP112	IP222 IP232	IP270
Type/Power/Eth	IP/PoE/2	IP/PoE/2	IP/PoE/2	IP/PoE/2	IP/PoE/2
Table/Wall/Flush	✓/✓/*1	✓/✓/*1	✓/✓/*1	✓/*2/-	✓/✓/-
Speaker/Mic/Handset	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓
Display	✓	✓	✓	✓	✓
Headset	IP102	-	✓	✓	✓
Handsfree	✓	✓	✓	✓	✓
Function key's	-	8 x 2	8 x 2	8 x 2	-
Dimmable Display	✓	✓	✓	✓	✓
DnD (Do not Disturb)	✓	✓	✓	✓	✓
Wakeup / Voicemail	✓	✓	✓	✓	✓
Environments	Bridge, ECR, Crew cabins, Officers' cabins, Bedrooms, Offices, Rotary room, Conference room, Corridors, Gym, Wardrobe, Hospital, Electrical workshop, Day room, etc.				
 Compliant	X	✓	X	X	X

*1 Accessory for flat, low wall or inclined mounting. *2 Accessory.

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2.2.4 IP Stations - Intercoms & Industrial Grade

Intercom stations are built for high-durability and hands-free operation. This category includes the **IP17x Series** for modern IP infrastructure and the **SC-Series** for legacy 2-wire (analog) integration in harsh environments.

See Chapter 5.3 for configuration options required to meet specific environmental and operational requirements (e.g. Talkback (PTT), high noise or night vision).

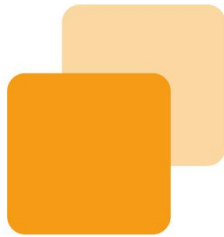
Description	Intercom	Intercom	Intercom	Intercom	Intercom	Intercom	Industrial	Intercom	Intercom	Intercom
										
Model & Datasheet	IP170	IP171	IP172	IP174 -1	IP174 -4	IP174	IP160	SC411	SC421	SC220
Type/Power/Eth	IP/PoE/1	IP/PoE/1	IP/PoE/1	IP/PoE/1	IP/PoE/1	IP/PoE/1	IP/PoE/2	AT/24V/-	AT/24V/-	AT/24V/-
Environmental class	IP-20	IP-66	IP-66	IP-66	IP-66	IP-66	IP-65	IP-20	IP-65	IP-65
Flush mount	✓	-	-	-	-	-	-	✓	-	-
Wall mount	-	✓	✓	✓	✓	✓	✓	-	✓	✓
Status indicator (LED)	✓	✓	✓	✓	✓	✓	-	-	-	-
Dimmable display	✓	✓	-	-	-	-	✓	✓	✓	-
Built-in Spk & Mic	✓	✓	-	✓	✓	✓	-	✓	✓	-
Handsfree	✓	✓	✓*	✓	✓	✓	-	✓	✓	✓*
Keypad / Speed keys	✓/3	✓/3	✓/-	-/1	-/4	✓/-	✓/-	✓/3	✓/3	✓/-
Mixed announce	✓	✓	✓	✓	✓	✓	✓	-	-	-
Multiple ring signals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External Handset	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
External Headset	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Headset PTT	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
24Vdc (Soudier Beacon)	✓	✓	✓	✓	✓	✓	-	-	-	-
External Horn (10w)	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
I/O (Dry contact)	1	1	1	1	1	1	1	1	1	1
PTT & Talkback	✓	✓	✓	✓	✓	✓	-	-	-	-
Environments	Bridge ECR	Engine- Muster- Workshops- etc.	Deck	Deck Gangway Elevator etc.	Embark- Propulsion- Mooring- etc.	Bow thrust- Generator- Pump- etc.		Bridge ECR	Engine- Room	Deck
 Compliant	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓

* Require additional audio accessory – Speaker, Handset, Headset etc.

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3 Security

3.1 General

Security is a fundamental design element of the innovaphone ecosystem, encompassing both operational resilience and protection against unauthorized access. For maritime installations, system integrity is vital to ensure that critical communication remains available during all phases of vessel operation.

Detailed Resource: [innovaphone Security Solutions](#)

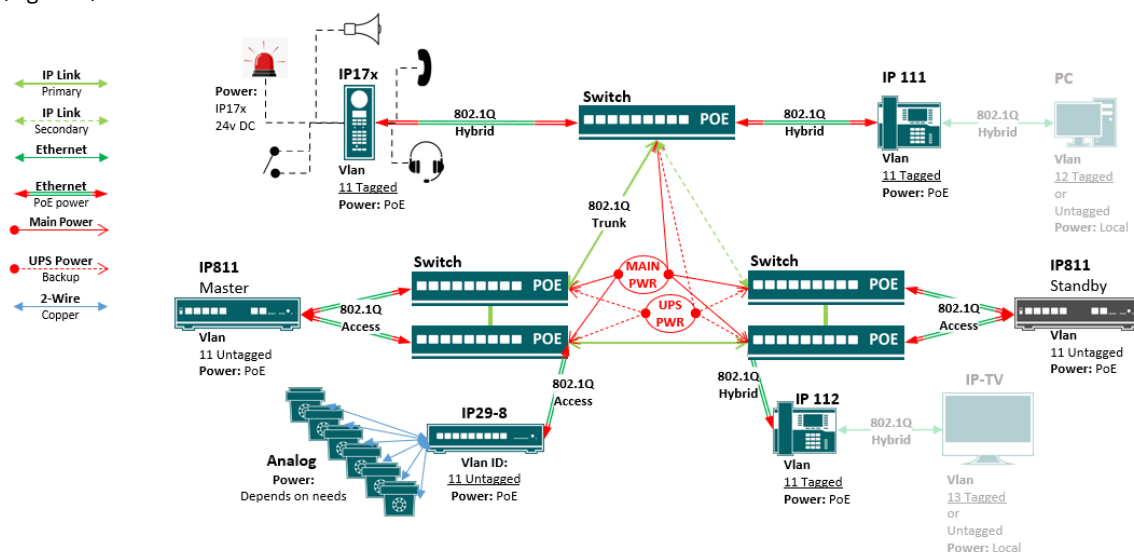
3.2 Infrastructure - Network & Switching

To comply with the Type Approval (TA) and ensure network integrity, the following infrastructure requirements must be met:

- **Physical Security:** All central active equipment (Gateways/Switches) must be housed in secure, restricted-access locations (e.g., locked server racks/ECR).
- **Network Segmentation:** Use separate physical LAN infrastructures or implement **IEEE 802.1Q VLAN** segmentation to isolate communication traffic from other vessel data.
- **Maritime Compliance:** All cabling must meet class requirements for flame retardancy and shielding.
- **Redundancy:** Dual power feeds are required for core switches, utilizing PoE (IEEE 802.3af/at) for endpoint power.

Local Network Overview (Example Topology):

(Figure 1)



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Vlan (ID)	Name	Description
11	General VoIP	Essential Communication (TA Scope)
12	Office	Administrative / non-essential
13	IPTV	Entertainment

! CAUTION: If using untagged (Access Port) configurations, you **must** implement additional access controls as defined in **Chapter 3.4** to block unauthorized network entry.

Technical References: [ETH-Vlan](#)

Checklist Reference: 1.1, 1.2, 1.5

3.3 Central Software - PBX Security

The innovaphone PBX provides multiple layers of authentication and filtering. For maritime use, the following mechanisms should be utilized based on the vessel's security profile:

- **Secure Authentication:** Support for Single Sign-on (SSO), OAuth2, and Two-Factor Authentication (2FA) via myApps.
- **Netlogon:** Integration with domain control for centralized user management.
- **IP Filtering:** Granular control to allow or block registration access based on IP range.
- **Brute Force protection:** Automatic blacklisting failed Registration & User login attempts.

Technical References: [PBX Authentication](#) | [Netlogon Concept](#) | [IP Filtering & Access](#) | [myApps \(Brute Force\)](#) | [How Security Works](#)

Checklist Reference: 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8

3.4 Hardware Security (innovaphone Stations)

For all certified stations, **Device Registration** is the mandatory deployment method.

- **Certificate-Based Security:** Stations use unique certificates to inherit passwords from the central PBX.
- **Central Management:** Once registered, local default passwords are overwritten, and direct local access is disabled.
- **Interface Hardening:** Deactivate any unused physical interfaces (e.g., secondary LAN ports) to prevent unauthorized local "piggybacking" onto the voice network.

Technical References: [Devices-Registration](#) | [ETH-Link](#)

Checklist Reference: 2.9

3.5 Hardware Security (Third-Party Stations)

When integrating third-party equipment, installers must apply the highest security settings provided by the manufacturer. Ensure that these devices are isolated and cannot be used as a gateway to access the core PBX management layer.

Checklist Reference: 2.9

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4 System design

4.1 PBX Architecture

Proper planning of the maritime PBX architecture ensures fleet-wide flexibility and simplified commissioning. When designing the system, consider the following operational requirements:

- Is the vessel part of a larger fleet organization?
- Are there recurring work patterns across multiple vessels?
- Is centralized shore-based management or landline cost-efficiency required?

References: [Location-Concept](#)

4.2 User Data

To ensure a standardized and secure installation, the following identification and credential protocols are utilized within the TA framework.

4.2.1 System Identification (Examples)

Role	PBX name	System name	Domain name
IP 811 Master	pbx	local.com	pbx.local.com
IP 811 Standby	pbx	local.com	stb-pbx.local.com
App Platform / Master	-	local.com	apps.local.com
App Platform / Standby	-	local.com	apps.local.com

4.2.2 Login Credentials (Examples)

Role	User name	User password	Emergency admin password
IP 811 Master	adminv14	Welcome2myApps	Adm: [doeHWV\$z"N1y)M PBX: Lqf<8`q oy/gwqU
IP 811 Standby	adminv14	Welcome2myApps	Adm: !"l.zb[G[4Rh`] PBX: ~^*-Al};9*Ju!^} <b>In Standby mode override by master:</b> Adm: [doeHWV\$z"N1y)M PBX: Lqf<8`q oy/gwqU
App Platform / Master	-	-	Adm: [doeHWV\$z"N1y)M
App Platform / Standby	-	-	Adm: !"l.zb[G[4Rh`] In Standby mode override by master: Adm: [doeHWV\$z"N1y)M



4.2.3 IP Network Settings (Examples)

Description	IP Address	Dhcp pool	Note
IP 811 Master-DHCP Server	10.10.10.1	10.10.10.10 - 50	2x Dhcp server is active due to redundancy, same settings except dhcp pool.
IP 811 Standby-DHCP Server	10.10.10.3	10.10.10.60 - 99	
App Platform / Master	10.10.10.2	-	
App Platform / Standby	10.10.10.4	-	
Default GW / Firewall	10.10.10.254	-	Not included in TA
NTP Server	Local (manual)	-	

For specific compliance settings refer to **Chapter 5.5**.

4.3 Numbering Plan & Operational Zones

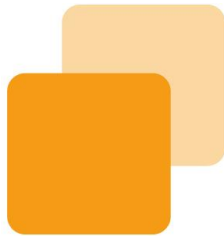
The following plan defines the mapping between operational zones and hardware. For specific compliance settings refer to **Chapter 5.3**.

User/Role	Ext	Group	Primary Hardware	Access level
Bridge	2001	2000	IP170 / IP111	Full Access
Bridge W / P	2002	2000	IP170 / IP111	Full Access
Bridge W / S	2003	2000	IP170 / IP111	Full Access
ECR	2011	2010	IP170 / IP111	Full Access
Engine Space	2021	2020	IP171 / IP74x	Restricted
Deck FWD	2031	2030	IP172 / IP74x	Restricted
Captain Office	2051	2050	IP1xx / IP2xx	Full Access
Crew/Officer Cab	2101		IP111-maritime	Restricted

4.4 System Functions & Prefixes

The following example prefixes are used to ensure consistent operation across the vessel. The "#" prefix is specifically utilized to restrict unauthorized access to system-level functions. For specific compliance settings, refer to **Chapter 5.6**.

Functions	Example Prefix	Note
DISA	2999	Used to reach each individual extension via dtmf
Paging / Intrusion	## + [Ext]	Voice Paging / Override
Paging Zone A (All)	#*100	General Announcement
Paging Zone B (x)	#*101	Selected area announcement
Moring Group	#100	Maneuvering / Talk-back
Voicemail	#99	Mailbox access
PA-Module	#96	Public Address access
Landline	0	External line



5 Commissioning

5.1 Prerequisites

All PBX configuration and programming are performed via a standard PC using a web browser.

- **Architecture:** This TA refers to a completely isolated and self-contained system. No other active central components are required for internal communication.
- **NTP Server** (Network Time Protocol):
 - **General:** Highly recommended for systems crossing time zones to maintain accurate logbook/billing timestamps.
- **Firewall (Optional):** Required for external routing, landlines, remote management, or system updates.

5.2 Central Infrastructure



Chapter 6.10.1.1 Physical security, Central Power and Backup (UPS)

5.2.1 Passive Components

All cabinets, racks, fiber, and copper cabling must meet maritime requirements.

Checklist Reference: 1.1, 1.2, 1.6

5.2.2 Active Components (TA Scope)

These components form the core of the communication system. A single-gateway setup meets the basic requirements of this TA, while a redundant configuration is recommended for higher operational safety.

Component	Power Requirement	TA Compliance Role
PoE Switches	Dual Power Source (one via UPS)	Network backbone; supports IEEE 802.1Q (VLAN) , Spanning Tree (RSTP) , and Storm Control to ensure loop-free stability and broadcast protection.
IP811-maritime Master	Dual PoE	Essential: Primary central logic.
IP811-maritime Standby	Single PoE	Recommended: High-availability backup.
IP29-8-maritime	PoE	Essential: Gateway for analog endpoints (SC411/421).

Network Topology Reference: For a detailed visual layout of the component interconnections and VLAN structures, please refer to the **Local Network Overview (Figure 1)** in **Chapter 3.2**.

Checklist Reference: 1.1, 1.2, 1.4, 1.5



5.3 Endpoint Deployment — Station Mapping

This section defines "best-practice" examples to comply with mandatory station types required for specific vessel zones as required by IMO or class rules.



Chapter 6.10.1.1 Priority Calls, Intrusion

Chapter 6.10.1.3 Noisy environment

Chapter 4.2.10.3 Mooring operations, Intercom

5.3.1 Command Centers (Bridge, Wings & ECR)

The Bridge and Engine Control Room (ECR) are the primary locations for critical communication. To ensure compliance, these stations must support the full feature set of the Type Approval, including priority intrusion and mixed announcements.

Model	Technology	Mounting	Note
IP170	IP	Flush/Console	Integrated Talkback (PTT) support. Ideal for console mounting.
IP111-maritime	IP	Desk/Wall	Flexible station for general navigation and office communication.
SC411	Analog	Flush	Alternative for 2-wire legacy installations via IP29-8 gateway.

! CAUTION: Requirement for SC411 Installations: > Because the analog SC411 does not natively support advanced announcement or intrusion features, at least one **IP-based unit** (e.g., IP111-maritime) must be co-located in the same area (Chart Table or ECR Desk) to satisfy the TA requirements for these locations.

Checklist Reference: 1.3, 4.2, 4.3, 8.1

5.3.2 Engine Spaces, Deck & Noisy Areas

Stations in these locations must provide reliable communication in environments with high ambient noise and potential exposure to water/dust.

Model	Technology	Protection	Note
IP171	IP	IP66	Display-equipped; supports PTT/Talkback . Use with external Handset, Headset, Horn, 24vdc sounder-beacon and I/O for signaling
IP174x	IP	IP66	Heavy-duty; supports PTT/Talkback . Use with external Handset, Headset, Horn, 24vdc sounder-beacon and I/O for signaling
IP172	IP	IP66	Heavy-duty; supports PTT/Talkback . Note: Requires Horn or handset, headset (no internal mic).
SC421	Analog	IP65	2-wire alternative. Supports "Auto-Answer" paging mode only.

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innovaphone® AG | Umberto-Nobile-Str. 15 | D-71063 Sindelfingen | Tel +49 7031 73009-0 | www.innovaphone.com | E-Mail: info@innovaphone.com



Installation Requirements for Noisy Areas:

- **Audio Signaling:** Due to high noise levels, stations must be equipped with accessories such as external loudspeakers, headsets, or optical sounders (beacons).
- **Talkback Functionality:** For mooring or engine maintenance, the **IP17x** series is recommended to utilize the built-in PTT behavior for hands-free "Command Calls."
- **SC421 Limitation:** Note that the SC421 does not support mixed announcement features. In engine spaces, it is primarily used for direct point-to-point calls.

Alternative Units (Non-Mandatory Locations):

For areas not covered by IMO or Class requirements (e.g., small workshops or storage lockers), the **IP160** may be used.

- **Note:** The IP160 does not support hands-free operation or headset PTT.

Station Details: See station lists in Chapter 2.2.2 and 2.2.3.

Checklist Reference: 1.3, 7.2, 7.3

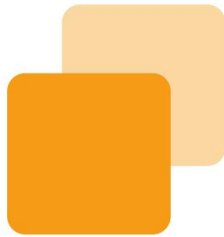
5.3.3 Accommodation (Cabins & Offices)

Stations in these locations provide essential communication for crew quarters, mess rooms, and administrative offices. While the environment is less demanding than the engine room, these units must still ensure reliable access to the vessel's critical functions.

Model	Technology	Mounting	Note
IP111-maritime	IP	Desk/ Wall	Essential: Standard unit for cabins and offices. High-contrast display and programmable keys.
IP1xx / IP2xx	IP	Various	Alternative: Any unit within these series may be used in non-mandatory locations (see Chapter 2.2.3).

Installation Requirements for Accommodation:

- **Privacy and Control:** In cabin environments, units are typically configured with a "Normal" call filter to prevent unauthorized paging or accidental intrusion into private quarters.
- **Emergency Access:** Even with privacy filters active, these units remain reachable for emergency broadcasts or "All-Call" paging as configured in the system logic (refer to Chapter 5.6.1).
- **Mounting:** For wall mounting in cabins, the use of a dedicated bracket is mandatory to ensure the handset remains secure during heavy seas.



Alternative Units (Non-Mandatory Locations):

For recreational areas or secondary offices not requiring specific Type Approval (TA) compliance:

- **Wireless/DECT:** May be integrated for mobility, provided they do not replace mandatory fixed stations.
- **Analog Adapters:** Existing analog cabin phones can be integrated via the **IP29-8** gateway.

Station Details: See station lists in Chapter 2.2.3.

Checklist Reference: 1.3, 7.2, 9.1, 9.3, 9.4

5.4 Software



Chapter 4.2.10.1, 6.10.1.1, 6.10.1.2 Two-way voice communication system

Chapter 6.10.1.1 Minimum 4 simultaneous calls, 6.10.1.2 Redundancy

Install and commission the innovaphone platform in accordance with the site documentation (sample data can be found in **Chapter 4.2**).

Design Note: We always recommend commissioning a redundant system for increased operational safety, even though it may not be a mandatory class requirement for every installation.

Technical References: [Master - Standby](#) | [App Platform Replication](#)

Checklist Reference: 1.6, 2.0-2.9Optional

5.5 Optional LAN Settings

In order to complete the basic network setup, specific environment adjustments are required.

5.5.1 NTP (Network Time Protocol)

Set NTP credentials according to vessel needs. Accurate timekeeping is critical for synchronized log files and call-trace auditing.

Best Practice: Combine an external NTP source (e.g., Vessel Master Clock) with the redundant PBX unit as a secondary source. A local manual default time serves as a fallback to ensure the system maintains a consistent timeline even if all external sources are lost.

Role	Primary NTP	Secondary NTP	Fallback
Master	Master Clock	Standby PBX	Local (Fixed time upon reboot)
Standby	Master Clock	Master PBX	Local (Fixed time upon reboot)



Configuration Notes:

- **Fixed Fallback:** Ensure a default manual time is set in the configuration. This prevents the system from defaulting to a factory epoch (e.g., 01.01.2026-00:00) during a cold reboot without Master clock access.
- **Drift Prevention:** Cross-syncing the Master and Standby ensures that even if the Vessel Master Clock drifts, both PBX units remain on the same internal timeline.
- **Update Interval:** To ensure high time precision for e.g. wake-up applications, audit trails, etc., it is recommended to keep the NTP update interval **low (e.g. 120 seconds)**.

Detailed Reference Links: [NTP-Settings](#) | [NTP-Default \(Static\)](#)

Checklist Reference: 3.2

5.5.2 DHCP Server

Configure all required DHCP credentials according to the site documentation (see **Chapter 4.2** for examples), including site-unique parameters such as language and provisioning strings.

Configurations must be identical on both the Master and Standby units (if applicable). When a Standby unit is used, the **DHCP pool ranges must be unique** to each unit to prevent IP address conflicts.

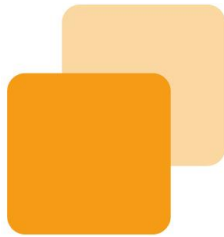
Role	Range (dhcp)	Shared options
Master	10.10.10.10-50	Language, NTP, VoIP protocol, System identifiers etc.
Standby (Optional)	10.10.10.60-99	Language, NTP, VoIP protocol, System identifiers etc.

Configuration Notes:

- **Pool Uniqueness:** To maintain network integrity if both units are online simultaneously, the IP address ranges must be strictly separated.
- **Functional Parity:** All additional DHCP options (e.g., VLAN tags, provisioning URLs) must be mirrored exactly to ensure devices maintain full functionality regardless of which unit provides the lease.

Detailed Reference Link: [DHCP Server \(IPv4\)](#) | [DHCP Server \(IPv6\)](#)

Checklist Reference: 3.1



5.5.3 DNS

To support the system's redundancy concept, it is recommended to utilize DNS lookups for device identification and registration. This enables endpoints to resolve the PBX address dynamically, ensuring seamless connectivity regardless of which unit is active.

Activate and configure the DNS server in accordance with the site documentation (refer to **Chapter 4.2** for examples).

Role	DNS-Implementation	Primary Function
Master	Enabled	Primary resolution for all network endpoints
Standby (Optional)	Enabled	Redundant resolution source during failover

Configuration Notes:

- **Hostname Registration:** Using hostnames (e.g., *pbx.vessel.local*) instead of static IPs allows stations to automatically re-register to the Standby unit if the Master becomes unavailable.
- **Host Table Synchronization:** Ensure that all manual entries in the Host Table are mirrored between both units to maintain a consistent resolution environment.

Detailed Reference Link: [DNS/Hosts Service](#)

Checklist Reference: 3.3

5.5.4 Dual Ethernet power



Chapter 6.10.1.1 Central Power backup

Chapter 6.10.1.2 Redundancy

In cases where dual Ethernet (PoE) power sources are required to support seamless power failover, **RSTP (Rapid Spanning Tree Protocol)** must be enabled on both ends (the network switches and the PBX, e.g., IP811).

Configuration Notes:

- **Loop Prevention:** RSTP is mandatory when both ETH1 and ETH2 are connected to the network. It prevents broadcast loops while allowing the second port to take over instantly if the primary link or power source fails.
- **Switch Configuration:** You must find and apply the corresponding RSTP settings specified by the switch manufacturer (e.g., Cisco, Hirschmann) to ensure protocol compatibility.
- **Power Path:** This setup ensures that if one PoE switch loses power, the PBX remains operational via the second link without rebooting.

Detailed Reference Link: [Interfaces/ETH/RSTP](#)

Checklist Reference: 1.4



5.6 System Settings

This section defines feature configurations, best practices, and mandatory requirements to achieve Type Approval (TA)

5.6.1 Dtmf Feature (Announcement)



Chapter 4.2.10.2 - 3.3.3 - 6.10.1.1

By defining a DTMF Object with an **Announcement** prefix, we enable critical maritime functions such as **Direct-In**, **Single Paging**, and **Call Intrusion**.

In this TA, the feature prefix is defined as **##**.

Security Behavior: Devices answer using this prefix in Hands-Free (HF) mode with the **microphone muted**.

Operational Note: Press the microphone button or lift the handset to enable full-duplex communication.

Important Hardware Exception: The **##** prefix logic does **not** apply to the **IP17x DIR (Direct-In)** feature, which utilizes dedicated hardware signaling.

Detailed Reference: [Announcement Calls & Intrusion](#)

Checklist Reference: 8.1, 9.1

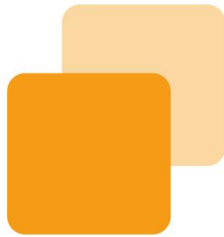
5.6.2 Call Filter

Call filters are essential for managing operational integrity by restricting access to specific number ranges or system features.

Redundancy Requirement: To ensure consistent behavior during a failover, identical filter settings must be configured on both the **Master** and **Standby** platforms.

For this Type Approval (TA), a minimum of two distinct filters is required:

Filter Name	Description / Logic	Common Restrictions
Normal	Standard user access with restricted outbound/feature dialing.	Blocks prefixes: # (Features), * (Codes), and 0 (External/Landline).
Full Access	Unrestricted administrative/priority access.	No blocks applied; all destinations and features permitted.



Configuration Notes:

- **Security Baseline:** The "Normal" filter prevents accidental activation of system-wide features or unauthorized external calls from common area stations.
- **Emergency Access:** High-priority stations (e.g., Bridge) should typically be assigned the "FullAccess" filter to ensure no delays during critical operations.

Detailed Reference Link: [PBX Config Filter](#)

Checklist Reference: 5.1

5.6.3 Config Templates

Config templates provide an efficient and powerful mechanism for distributing standardized settings across groups of users. For this Type Approval (TA), we employ a hierarchical inheritance model to ensure consistency while allowing for role-specific overrides.

The Inheritance Logic:

- **Base Template:** The default "**Config User**" template serves as the foundation for all other roles.
- **Role Templates:** Secondary templates (e.g., Bridge, ECR) incorporate the "Config User" base and add or overwrite parameters with unique settings.

Template Name	Key Configurations & Overrides
Config User (Base)	Set: Default Language, Call Filter "Normal" (default restrictions).
Config Bridge	Inherit: Config User, Enable: Call Intrusion & Visibility, Set: Call Filter to "Full Access". Custom: Individual Function Keys and Ringtones.
Config ECR	Inherit: Config User, Enable: Call Intrusion & Visibility, Set: Call Filter to "Full Access". Custom: Individual Function Keys and Ringtones.

Operational Note: You may create additional templates as required for other vessel areas (e.g., Galley, Cabins) by following this inheritance method to keep the configuration "clean" and manageable.

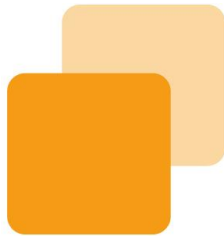
Detailed Reference Link: [PBX Objects: Config Template](#)

Checklist Reference: 6.1

5.6.4 Function Keys

Integrated within the Config Templates, function keys are highly recommended to enhance operational efficiency. A well-structured key layout is the foundation of a user-friendly and successful communication system on board.

This configuration is applicable to the **IP11x**, **IP2xx**, **IP170**, and **IP171** series.



Implementation Best Practices:

- **Consistency:** Map critical locations (e.g., Bridge, ECR, Captain) to the same key positions across all phones to build muscle memory for the crew.
- **Role-Specific Keys:** Use templates to push specific keys to relevant groups—for example, "Mooring Stations" should be prominently featured on Bridge and Deck phones.
- **Status Visibility (BLF):** Ensure keys are configured to show the busy/idle status of the target extension, which is essential for the Call Intrusion features mentioned in Chapter 1.1.7.

Key Type	Recommended Function	Benefit
Speed Dial	Direct Extension Dialing	Single-press connection to critical stations
Partner Key	Direct Extension Dialing	Provides visual Busy Lamp Field (BLF) indication.
Intercom/DIR	Hands-free Announcement	Immediate voice summon to substations (Direct-In).
Intercom/PTT	Talkback - Command call	Standardized PTT behavior for IP17x series.

Detailed Reference Link: [Phone User: Function Keys](#)

5.6.5 Ring filter



Chapter 6.10.1.1 Distinguish ring signals

In operational environments where multiple identical phone models are positioned in close proximity (e.g., the Bridge or ECR consoles), it is required to distinguish between them using unique ring signals.

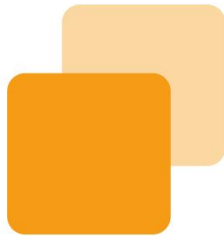
Implementation Methods:

- **Local Configuration:** Individual ring melodies can be set manually on each phone's local interface.
- **Centralized Management:** Melodies can be assigned via a **Config Template** to ensure standardized acoustic signaling for specific roles.

Operational Note: Ring filters allow the system to differentiate between internal calls, external calls, and priority announcements. For maritime safety, ensure that high-priority calls (e.g., Emergency or Bridge-to-Bridge) utilize a distinct and easily recognizable tone.

Detailed Reference Link: [Phone User: Preferences & Ring Filter](#)

Checklist Reference: 4.2



5.6.6 Handsfree operation



Chapter 6.10.1.7

Most innovaphone stations support multiple call initialization modes, including **Hands-free (HF)**, **Handset**, and **Headset**. The operational mode is determined by the dialing sequence and the interface action chosen by the user.

Operational Methods:

- **Standard Execution:** Dial the extension or number followed by pressing the **Speaker button** to initiate an HF call immediately.
- **Switching Modes:** During an active handset call, pressing the Speaker button toggles the device into Hands-free mode (provided the model supports full-duplex HF).
- **Direct-In Behavior:** For incoming priority calls (as defined in **Chapter 5.6.7**), the station may automatically open in HF mode for immediate communication.

Selection Guide: Hardware capabilities vary by model (e.g., degree of acoustic echo cancellation and duplex support). Please refer to **Chapter 2.2.3** to identify the most suitable station model for specific acoustic environments on the vessel.

Checklist Reference: 5.2

5.6.7 Call intrusion (Priority call)



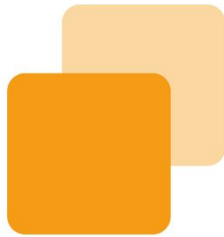
Chapter 6.10.1.1

Priority intrusion is **mandatory** for communication between the **Bridge** and **Engine Control Room (ECR)**. Implementation varies by hardware series to ensure immediate, failsafe connectivity during critical operations.

1. Method: Universal Prefix (IP11x / IP2xx Series)

This software-based method allows priority access from any standard desk phone.

- Dial: ## + Extension Number.
- Effect: Forcibly disconnects existing third-party calls to establish an immediate link to the busy station.
- Safety Note: If the target station is idle, the call enters Hands-free (HF) mode with the microphone muted to prevent unauthorized eavesdropping.



2. Method: IP17x DIR (Direct-In) Key

This method utilizes the dedicated hardware buttons found on the IP17x Intercom series.

- **Operation:** Press the dedicated **DIR** key for instant access.
- **Native Logic:** This is a hardware-integrated feature; it does **not** require the ## DTMF prefix.
- **Behavior:** When performing an idle barge-in to non-IP17x units, the system defaults to half-duplex (mic muted) to maintain privacy standards.

3. Method: Function Keys (IP11x / IP2xx / IP170 / IP171)

This method relies on visual feedback (Busy Lamp Field) for intuitive priority management.

- **State:** The **Partner Key** (Destination) is flagged as **Busy** on the display or LED, indicating an ongoing call.
- **Action:** Press the busy key regardless of its status to initiate the priority request.
- **Result:** The call connects immediately. An **Intrusion Tone** is broadcast to all parties to announce the entry of the priority user into the conversation.

Checklist Reference: 8.1

5.6.8 Command call - Talkback (PTT)



Chapter 4.2.10.3 Mooring operations, Intercom

Vessels require robust voice command utilities for high-noise environments where "Talkback" capability is essential. The **IP17x Intercom series** natively supports Talkback, fulfilling Type Approval (TA) requirements within a single IP-based system. It also offers the flexibility to integrate with external wireless technologies (e.g., UHF, VHF, 5G).

IP17x Operation Logic

- **Talkback Behavior (Point-to-Point):** By default, the PTT button on an IP17x unit acts as a toggle for the audio path to a single substation.
- **Group PTT (Broadcast):** To enable 1-to-Many communication (e.g., Bridge to all Mooring stations), units must dial into a **PBX-BC (Broadcast Conference)** object.

Technical Requirements for Group Operations

A **PBX Conference Bridge** is mandatory to support simultaneous broadcasting to multiple units:

- **IP811:** Features built-in support for the Talkback functionality.



Group Configuration (BC Object)

To ensure Talkback stability the **PBX-BC** object must be configured with the following parameters:

Parameter	Setting	Function
Object Number	e.g., #100	The group extension number.
Object Name	e.g., TB-Mooring	Mandatory: The name field must start with the TB- prefix to trigger specific Talkback/PTT behavior on IP17x hardware
Device Settings	Dynamic ID	Mandatory: The "Create Dynamic Conference ID" must be active to allow flexible multi-user entry.
Config: Mode	First	Mandatory: The first caller initiates as the primary owner; only the owner can terminate all substation links at once.
Config: Disconnect	Last	Mandatory: The link remains active until the final user disconnects.
Config: Announce	Always	Mandatory: Automatically triggers "Auto-Answer" at the substations (group members).
Config: Members	Only	Optional: Restricts access so only defined group members are accepted into the call.
Key Property	Prepare	Mandatory for Speed Dials: Ensures the PTT trigger is primed before the audio path is established.

Detailed Reference Link: [PBX Objects: Call Broadcast Conference](#)

Checklist Reference: 8.2

5.6.9 Night vision (Dimming)



Chapter 5.5.4.3 / Applicable to bridge.

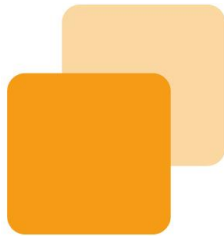
To maintain bridge safety during night operations, all User Interface Devices (UIDs) must be dimmable to prevent interference with night vision. The system supports various dimming profiles depending on the hardware series.

-IP170 (Console) & IP171 (Wall) Series

These models are purpose-built for maritime bridge environments. Unlike standard desk phones, these units feature hardware-integrated dimming controls.

- **Red Backlight:** The silicone rubber keyboard features a dedicated **red backlight** specifically designed for night vision preservation.
- **Automatic:** An integrated ambient light sensor adjusts the OLED display and keyboard backlight based on bridge lighting.
- **Manual:** Levels can be set manually via the phone's local menu to meet specific officer preferences.

Detailed Reference: [Datasheet IP170](#)



-IP11x & IP2xx Series (Desk Models) **Note:** Keypad backlight is **not** supported on these series.

1. Manual Adjustment (On-Device)

- Navigate to: **Settings > Phone settings > Device settings.**

2. Display Dimming & Fallback Logic The display automatically drops to the "Idle State" level **30** seconds after the last action.

- **Active Level:** Default 8 | Range 0–15
- **Idle Level:** Default 2 | Range 0–15)
- **Blackout Tip:** To ensure the display goes completely dark on the bridge when not in use, set the **Idle Level to 0.**

3. Energy Saving (Scheduled Blackout) Instead of just dimming, the display can be programmed to switch off entirely during a specific 24h time-frame.

- **Command:** vars create PHONE/ENERGY-SAVING-TIME p 22-06
- **Logic:** In this example, the display will turn off completely between 22:00 (10 PM) and 06:00 (6 AM).
- **Wake-up:** The screen restores instantly upon any activity or incoming call.
- **Disable:** Set to 00-00 to prevent the display from ever switching off.

Detailed Reference: [Device Settings](#)

Checklist Reference: 4.3

5.6.10 Extension list

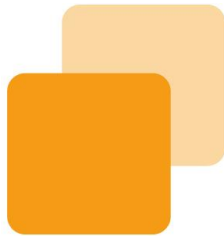


Chapter 6.10.1.4 (Extension List next to stations)

To ensure rapid communication during emergency or operational scenarios, a reference list of extensions must be maintained at every station.

- **Requirement:** A physical extension list shall be **permanently posted** near each telephone.
- **Legibility:** The list must be positioned and sized so that it is clearly readable by the operator while dialing.
- **Content:** The list should include all critical bridge, ECR, mooring, and emergency stations as defined in the vessel's communication plan.

Checklist Reference: 4.1



5.6.11 Paging

Paging is the primary method for establishing contact or broadcasting information to individuals and groups. In a maritime environment, this encompasses various configurations—including single, zone, and voice/text paging—often integrated with PA/GA systems.

This section details the voice paging required for Type Approval (TA).

5.6.11.1 Singel paging (Voice Summon)



Chapter 4.2.10.2 - 3.3.3 (default half duplex)

Single paging refers to a voice summon directed at a specific unit, such as a cabin phone or a loudspeaker station. This is also commonly referred to as "Direct-In."

- **General Operation:** A "Trusted User" initiates the page by dialing the **##** prefix followed by the extension number (e.g., **##2011**). This forces the destination into Speaker Announce Mode.
- **IP17x Specialized Hardware:** For the **IP170 and IP171 Intercom series**, the **DIR (Direct)** key is purpose-designed for this function.
 - Pressing the **DIR** key automatically triggers the announce prefix logic.
 - This allows for immediate, one-touch voice summoning to a pre-configured or dialed substation without manual prefix entry.
- **Configuration:** Established per the logic in **Chapter 5.6.1**.

Checklist Reference: 9.1

5.6.11.2 PA & GA Paging Integration

The innovaphone system acts as a versatile gateway, bridging modern IP telephony with legacy and specialized shipboard systems.

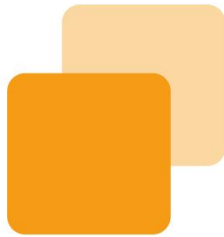
Supported Protocols & Use Cases

- **SIP / H.323:** Standardized VoIP protocols used to integrate with 3rd-party IP-PA systems or modern network-based loudspeakers.
- **Analog (FXS/FXO):** Essential for connecting to "Legacy" analog PA amplifiers or traditional telephone exchange lines.
- **ISDN (BRI/PRI):** Provides robust digital trunking for legacy PBX interconnection or specialized marine communication links.
- **IP Audio Adapters:** Specialized hardware (IP17x) that serves as the physical bridge between the IP network and analog shipboard infrastructure.

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Note: PA/GA integrations are not a mandatory requirement for this Type Approval; however, they are widely adopted to streamline emergency response while maintaining strict system separation.

Checklist Reference: 9.2

5.6.11.3 Zone Paging



Chapter 4.2.10.2 – 3.3.3 (Half duplex)

For larger summoning needs, various endpoints (IP speakers, phones, and intercoms) are grouped into functional announcement zones.

Configuration via MCast Objects

The system utilizes **Multicast (MCast)** for efficient broadcasting without network congestion.

MCast Announce objects are created to define target areas:

- **Zone A (All):** Broadcasts to every configured endpoint on the vessel.
- **Zone B (Engine Room / Deck):** Broadcasts to targeted operational zones (e.g., ECR, Bow, Stern).
- **Zone C, D,** etc.

Detailed Reference Links: [MCast Announce Object](#) | [MCast Announce](#)

Checklist Reference: 9.3, 9.4

5.7 More system features

This section lists commonly used features that are beyond the core Type Approval (TA) requirements but provide the system with an extra level of maritime functionality and operational convenience.

5.7.1 Disa

A cost-effective and proven method for reaching all shipboard extensions from a single external landline/satellite number.

- **Operation:** Combined with a simple **IVR (Interactive Voice Response)**, this is managed via a **Waiting Queue (WQ)** object.
- **Logic:** External callers hear a pre-recorded welcome message: *'Welcome to M/S [Vessel Name], enter the desired extension or hold to be transferred.'*

Reference: [Waiting Queue](#)



5.7.2 Conferencing

The system includes embedded virtual meeting and video conferencing capabilities, providing a secure and user-friendly environment for ship-to-shore or departmental briefings.

- **Requirements:** This is a software-based feature; only a license is required to activate.

Reference: [innovaphone Conferencing Software](#)

5.7.3 Wake-Up

Essential for crew shift management, several variants of wake-up features are available depending on the vessel's needs, ranging from simple PBX tasks to dedicated Partner Apps.

Reference: [Simple Wake-UP Service](#) | [Partner App: Wakemeup](#)

5.7.4 DnD (Do Not Disturb)

Available on all individual extensions (though typically not suitable for IP17x endpoints), DnD is particularly useful for crew cabins during rest periods to ensure undisturbed sleep.

- **Override: A Trusted User** (e.g., Bridge or Captain) can be configured with a "Priority Call" status to bypass the DnD setting in case of urgent matters.

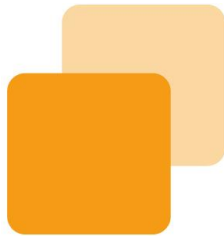
Reference: [Function Keys / Do Not Disturb](#)

5.7.5 Emergency group call

A highly requested feature for rapid response. The system can initiate an automatic call to a group of selected personnel (e.g., Fire Team, Medical Team) upon a specific trigger.

- **Trigger:** Typically activated by a **Relay Input** (e.g., from a Fire Panel) or an IoT trigger.
- **Execution:** The PBX utilizes a **Call Broadcast Conference** object to ring all members simultaneously and bridge them into an immediate audio session.

Reference: [Reference: Call Broadcast Conference](#) | [Howto: Integrating IoT Devices](#)



6 Testing & Reports

6.1 Checklist

To have a fully compliant approved system according to TA 848,25 requirements to the following checklist need to comply.

1.0	Infrastructure:		Test result
Ref	Feature	Test procedure	OK/NOK/NA
1.1	Hardware Placement	Verify central hardware is in a secure, climate-controlled rack according to Site Docs.	
1.2	Cabling Standards	Verify use of Marine Grade cabling	
1.3	Station Location	Verify correct station types (e.g., Heavy Duty in ER, Dimmable on Bridge) are installed.	
1.4	Dual Power / UPS	Verify dual power feeds or UPS backup is functional by cutting primary power.	
1.5	Network Isolation	Verify PBX/Phones are on a dedicated VLAN (802.1Q). PC behind phone must NOT reach PBX GUI.	
1.6	Site Documentation	Verify As-Built drawings, Extension Lists, and Admin passwords are in the onboard manual.	



2.0 Cyber Resilience & Security Management			Test result
Ref	Feature	Test procedure	OK/NOK/NA
2.1	Login account: Master password for system "admin" user	Check system login to PBX GUI with admin credentials according to site documentation.	
2.3	Login account: PBX myApps admin login	Check myApps login with admin username and password according to site documentation.	
2.4	Separated infrastructure: (In case of IEEE 802.1Q VLAN tagging)	Connect a PC behind a phone with VLAN tag. Try to access the PBX. No access should be possible.	
2.5	Master PBX access	Check web access to IP ETH0 on master PBX. Web GUI should be accessible.	
2.6	Master App platform access	Check web access to IP ETH2 on master AP. Web GUI should be accessible.	
2.7	Standby PBX, Back-up telephone system access (not applicable if standby PBX is not installed)	Check web access to IP ETH0 standby PBX. Web GUI should be accessible.	
2.8	Standby PBX, Back-up telephone system (not applicable if standby PBX is not installed)	Disconnect Master and check new registration on Standby for all phones during 2-3 minutes after DHCP, NTP and DNS service is up again.	
2.9	Station access / Device registration (only applicable to innovaphone devices)	Check and verify that default credential is changed, documented and unwanted access is blocked in free open LAN ports.	

3.0 Network Features			Test result
Ref	Feature	Test procedure	OK/NOK/NA
3.1	DHCP Server	Connect a PC to the phone LAN; verify it receives the correct IP/VLAN settings.	
3.2	Time Server (NTP)	Cycle power on a phone; verify correct time is displayed (synced from PBX/NTP).	
3.3	DNS Server	Verify that internal DNS names can be resolved via a PC on the service LAN.	



4.0	Special Features		Test result
Ref	Feature	Test procedure	OK/NOK/NA
4.1	Extension list	Verify there is a reference list of extensions posted near each telephone being readable while dialing.	
4.2	<i>Distinguish ringing melody:</i> Different ringing melody on phones (Only applicable if different phones are located near each other)	Set up two calls to two phones configured with different ringing melody. Verify different ring signals.	
4.3	<i>Dimmable phone backlight</i> Only applicable on bridge. If not auto adjusting manually	Verify that illumination is properly adjusted.	

5.0	Call filter		Test result
Ref	Feature	Test procedure	OK/NOK/NA
5.1	Prefix Blocking	Dial a paging/intrusion prefix (e.g., #) from an untrusted cabin phone. Call must be rejected.	
5.2	Trusted Paging	Dial same prefix from Bridge station. Verify successful paging/handsfree activation.	

6.0	Config Template		Test result
Ref	Feature	Test procedure	OK/NOK/NA
6.1	Default language	Check menu language on a phone. Is it OK?	
6.2	Handsfree announcement call allowed	Set up a call from Bridge or other phone with announcement rights. Verify that test phone automatically goes in handsfree mode	



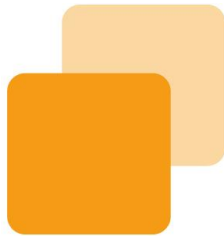
7.0 Call Features (2-way communication)			Test result
Ref	Feature	Test procedure	OK/NOK/NA
7.1	<i>Minimum 4 simultaneous calls</i> Note: PBX does not include any limits in number of simultaneous VoIP calls.	Simultaneous calls from minimum four phones to other phones or to ex DISA (or other non-blocking queue message). Verify media and call completion.	
7.2	<i>Direct call</i> Repeat at least in 4 places/numbers	Call from any phone to any number according to site documentation. Verify phone ringing. Answer to verify media. Hang-up, Verify call completion.	
7.3	<i>Direct call noisy environment</i> Ex, Engine room with headset sounder beacon, etc	Call from any phone to any number according to site documentation. Verify phone ringing, Sounder ringing or flashing. Answer to verify media in handsfree, handset or headset. Hang-up, Verify call completion.	
7.4	<i>Group calls:</i> Ex, All Bridge and/or ECR phones	Call from any phone to Bridge group nr according to site documentation Verify that all phones ringing. Answer to verify media. Hang-up, Verify call completion.	

8.0 Special Call Features			Test result
Ref	Feature	Test procedure	OK/NOK/NA
8.1	<i>Call intrusion (Priority calls), DnD override:</i> Mandatory between Bridge-ECR-Bridge	Call a "busy" station from Bridge or other trusted station with any "intrusion" option depending on station Ex, Partner key or call flow handling from IP111 or intrusion prefix + number from any station according to site documentation Verify calls breaks in, call is put on hold and media is established.	
8.2	<i>Command call (e.g. mooring situations)</i> Alternatively, a separate portable radio system can be used	Call from any trusted station (e.g. Bridge wing) to the mooring group, either via number or speed dial key. Verify all stations auto-answer, Verify media. Hang-up, Verify call completion.	



9.0	Paging (Voice)		Test result
Ref	Feature	Test procedure	OK/NOK/NA
9.1	<i>Direct In, DnD override, (default half duplex)</i> (Applies only to IP stations)	Call any "free" station from any station with rights to use the "paging prefix" according to site documentation. (Prefix + Extnr) Verify phone ringing's once, goes of hook in hands-free mode, Verify media, Hang-up, Verify call completion.	
9.2	<i>PA/GA (Half duplex)</i> Interface to PA/GA system via PA module. (not applicable if no PA/GA integration)	Call to "PA Module" from any station with rights to use the "PA Module prefix" according to site documentation. Verify audio in PA/GA. Verified that call to PA/GA is only possible from trusted stations, others are blocked. Verify call completion.	
9.3	<i>IP multicast (Half duplex)</i> (Applies to IP stations/IP speakers, analogue stations require auto answer)	Call to any Zone "Prefix" from any station with rights to use desired zone "Prefix" according to site documentation. Verify audio in IP stations/speakers Verified that call to "Zones" is only possible from trusted stations, others are blocked. Verify call completion.	
9.4	<i>Mixed Zones IP + PA/GA (All) (Half duplex)</i> (not applicable if no PA/GA integration)	Call to All zone "Prefix" from any station with rights to use desired zone "Prefix" according to site documentation. Verify audio in ALL stations/speakers Verified that call to "Zones" is only possible from trusted stations, others are blocked. Verify call completion.	

10.0	Deviations:	Test result
Ref	Statement	OK/NOK/NA
10.1	Is the system fully intact and commissioned according to TA?	
10.2	List any 3rd party products added (e.g., switch):	



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Company Name:		Signature and date:
Full name:		
Position:		

Company Name:		Signature and date:
Full name:		
Position:		

Company Name:		Signature and date:
Full name:		
Position:		