PETROBRAS	TECHNICAL SPECIFICATION	Nº:	I-ET-3010.00-5516-762-PPT-001
	CLIENT: SRGE		SHEET: 1 of 10
	JOB: TELECOMMUNICATION VOICE		
	AREA: -		
TIC	TITLE: INMARSAT VOICE AND DATA SYSTEM		INTERNAL
			OI/CS

MICROSOFT WORD / V.2016 / I-ET-3010.00-5516-762-PPT-001_A.docx

REVISION INDEX

REV.	DESCRIPTION AND/OR REVISED SHEETS
0	ORIGINAL ISSUE
A	REVISED WHERE INDICATED

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE	ABR/01/22	OCT/22/2022							
DESIGN	TIC	TIC							
EXECUTION	Y3S7	Y3S7							
CHECK	CY22	CY22							
APPROVAL	X187	X187							

INDEX

1. SUBJECT

1.1 The subject of this document is to establish the criteria and basic characteristics for the detail project, supply, installation and commissioning of INMARSAT VOICE AND DATA SYSTEM that shall be installed in PETROBRAS FPSO Unit, to provide Emergency Telephony and Communication.

1.2 This INMARSAT VOICE AND DATA SYSTEM shall enable voice and data communications in case of main communication link fault, between the FPSO Unit and PETROBRAS Operational Base.

2. ABBREVIATIONS

ABNT	Associação Brasileira de Normas Técnicas (Brazilian Association of Technical Standards)
AC	Alternating Current
ANSI	American National Standards Institute
ANATEL	Agência Nacional de Telecomunicações (National Telecommunications Agency)
ART	Anotação De Responsabilidade Técnica (Technical Responsibility Note)
ASTM	American Society for Testing and Materials,
AWG	American Wire Gauge
CAB	Cable
CAT	Category
CCR	Central Control Room
CODEC	Codifier & Decodifier
CREA	Conselho Regional de Arquitetura e Urbanismo (Brazilian Engineering Counsel)
DIO	Dispositivo Intermediário Óptico (Optical Distribution Drawer)
EIA	Electronic Industries Alliance
FPSO	Floating, production, storage and offloading
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
Hz	Hertz
IEC	International Electrotechnical Commission
IEEE	Institute of Electric and Electronic Engineers
IMO	International Maritime Organization
INMETRO	Instituto Nacional de Metrologia (National Institute of Metrology)
IP	Internet Protocol
IS	Intrinsec Safe
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
LAN	Local Area Network
LED	Light-Emitting Diode
LSZH	Low Smoke Zero Halogen
MODU	Mobile Offshore Drilling Unit
OLED	Organic Light-Emitting Diode
OSI	Open Systems Interconnection

PoE	Power Over Ethernet
RF	Radio Frequency
SOLAS	Safety Of Life At Sea
SPL	Sound Pressure Level
TIA	Telecommunications Industry Association
TV	Television
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus
UTP	Unshielded Twisted Pair
WAN	Wide Area Network

3. REFERENCE DOCUMENTS, CODES AND STANDARDS

3.1 International Standards

a. IEC 1000-4-2: Electrostatic discharge (ESD) requirements

b. IEC 60079: Electrical apparatus for explosive gas atmospheres - all parts

c. IEC 60092-502: Electrical installations on ships

d. IEC 60331: Tests for electric cables under fire conditions - circuit integrity – all parts

e. IEC 60529: Degrees of protection provided by enclosures (IP code)

f. IEC 60533: Electrical and electronic installations in ships - electromagnetic compatibility

g. IEC 60945: Maritime navigation and radiocommunication equipment and systems – general requirements – methods of testing and required test results

h. IEC 61000: Electromagnetic compatibility (EMC) series - all parts

i. IEC 61892-7: Mobile and fixed offshore units - electrical installations - part 7: hazardous area

j. IEC 61892-1: Mobile and fixed offshore units - electrical installations - part 1: general requirements and conditions

k. CISPR 22: Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

l. CEI CLC/TR 50427: Assessment of inadvertent ignition of flammable atmospheres by radiofrequency radiation - Guide

m. EN 55022: Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

n. IMO MODU Code: Code for the Construction and Equipment of Mobile Offshore Drilling Units.

o. IMO Resolution A.1021: Codes on Alerts and Indications.

p. IMO Resolution A.801: Provision of Radio Services for the Global Maritime Distress and Safety System.

q. IMO SOLAS: International Convention for the Safety of Life at Sea.

r. Harmonization of GMDSS requirements for radio installations on board SOLAS ship, issued by IMO and IEC standards.

s. IEEE 802.1Q™-2005: "IEEE standard for Local and metropolitan area networks: Virtual Bridged Local Area Networks".

t. IEEE 802.2™-1989: "Information Processing Systems - Local Area Networks - Part 2: Logic link control".

3.2 Brazilian Standards

a. Inmetro portaria nº 115 (21/março/2022): Regulamento de avaliação da conformidade de equipamentos elétricos para atmosferas potencialmente explosivas, nas condições de gases e vapores inflamáveis e poeiras combustíveis.

b. NR-10: Segurança em instalações e serviços em eletricidade

c. NR-37: segurança e saúde em plataformas de petróleo

d. ANATEL: Resolutions from Agência Nacional de Telecomunicações.

e. NORMAM-01/DPC: Normas da Autoridade Marítima para Embarcações Empregadas na Navegação em Mar Aberto.

3.3 Classification Society

3.3.1. The detailed design shall be submitted to approval by Classification Society. The design and installation shall take into account their requirements and comments.

4. GENERAL REQUIREMENTS

4.1 CONTRACTOR shall provide all materials to a complete installation of all equipment, accessories, cables and infrastructure that compose the INMARSAT SYSTEM.

4.2 The INMARSAT SYSTEM shall be installed as following:

4.2.1. The INMARSAT Communication Unit shall be installed inside VSAT Rack in Telecommunication Upper Room.

4.2.2. The INMARSAT handset shall be installed in Radio Room.

4.3 For all RF cables, before them ingress to Telecommunication Upper Room, they shall be protected by Coaxial RF Surge Protector/Lighting Arrestor.

4.4 CONTRACTOR shall consider the main source of GPS signal GPS compass antenna installed on the VSAT System Rack.

4.5 The INMARSAT SYSTEM shall be powered by DC power from battery charger of Radio Operational console.

4.6 For more technical requirements details to antennas mounting and cables launching, CONTRACTOR shall consider, at least, the guideline on item 5 of “Harmonization of GMDSS requirements for radio installations on board SOLAS ship”, issued by IMO and IEC standards.

4.7 For more technical requirements details to electromagnetic and electrical, the CONTRACTOR shall consider, at least, the guideline on items 6 an 8 of “Harmonization of GMDSS requirements for radio installations on board SOLAS ship”, issued by IMO and IEC standards.

4.8 For PETROBRAS detailed design requirements for installation, configuration, tests training and commissioning, CONTRACTOR shall comply with the DESCRIPTIVE MEMORANDUM I-MD-3010.00-5510-760-PPT-001 – GENERAL CRITERIA FOR TELECOMMUNICATIONS DESIGN.

4.9 For telecommunications symbols, the Detailed Design shall comply with the Technical Specification: I-ET-3000.00-0000-940-P4X-002 – SYMBOLS FOR PRODUCTION UNITS DESIGN.

4.10 For telecommunications TAGs, the Detailed Design shall comply with the Technical Specification: I-ET-3000.00-1200-940-P4X-001– TAGGING PROCEDURE FOR PRODUCTION UNITS DESIGN.

4.11 All electrical requirements for telecom package shall be in accordance with I-ET-3010.00-5140-700-P4X-003 – ELETRICAL REQUIREMENTS FOR PACKAGES FOR OFFSHORE, I-ET-3010.00-5140-700-P4X-001 - SPECIFICATION FOR ELECTRICAL DESIGN FOR OFFSHORE UNITS, I-DE-3010.00-5140-700-P4X-003 - GROUNDING INSTALLATION TYPICAL DETAILS and I-ET-3010.00-5140-700-P4X-005 - REQUIREMENTS FOR HUMAN ENGINEERING DESIGN FOR ELECTRICAL SYSTEMS OF OFFSHORE UNITS.

4.12 Equipment and accessories installed in outdoor or industrial areas shall be suitably rugged and their external bodies shall be made in non-metallic material, suitable for harsh environments and in accordance with IEC and ABNT standards, apart from the ones whose classification area require to be metallic as Ex-d junction boxes.

4.13 Brackets, bolts, nuts, washers and any other mechanical fixing elements shall be made in stainless steel.

4.14 In case of difficulty for supplying some accessory with external body made with non-metallic materials, it will be necessary to submit them for analysis and approval of PETROBRAS.

4.15 It shall be avoided equipment and accessories with their external bodies built in aluminum alloy. Anything different shall be submitted to PETROBRAS approval. In case of approval, this alloy shall not contain in its composition more than 0.25 % of copper and shall comply with the ASTM-B-179 standard (ANSI alloy 356.1).

4.16 In outdoor areas, exposed to marine atmosphere, CONTRACTOR shall avoid the galvanic corrosion of junction boxes supports, horns supports and bolts. Galvanic insulation shall be implemented wherever contact between different metallic materials is needed.

4.17 Equipment and accessories shall attend the ingress protection degree, protection type, classifications zone and groups established by IEC / ABNT.

4.18 All radios equipment shall be homologated by ANATEL (Brazilian Government Authority).

4.19 All equipment that will make part of technical proposal shall have type approval certificate by Classifying Society and technical conformity with the International and National standardization organism: ABNT, IEC, INMETRO and ANATEL.

4.20 Equipment and materials shall be supplied packed suitable for long periods of storage and be protected against mechanical impact and adverse weather conditions.

4.21 CONTRACTOR shall submit the calculation reports with the total loss for RF cables that will be used for this system before the purchase order for analysis and approval by PETROBRAS. These calculation reports shall have information about distances between the communication unit and antenna, the quantity connections, the datasheet of the RF cables and connectors, the RF power output in the communication unit and RF power output in the antenna.

4.22 PETROBRAS will be responsible for contracting the service provider.

4.23 Equipment and accessories shall attend the ingress protection degree standard IEC 60529, protection type defined in IEC 61892 and IEC 60079 for electrical devices installed in hazardous areas.

4.24 Electrical installations, equipment and materials shall comply with the requirements of CLC/TR 50427, IEC 60079, IEC 61892-1, IEC 61892-7 and Classification Society.

4.25 CONTRACTOR shall design, install and commissioning the INMARSAT system antenna, at antennas deck above the accommodation module, without obstruction in line of sight to the satellite.

5. SYSTEM DEFINITIONS

5.1 The Inmarsat voice and data equipment is supposed to work in Brazil operation site and it figures as an emergencial an operational telephone extension line and as an internet LAN access in case of main Telephony System and/or WAN link and data equipment fail.

5.2 Such telephone extension lines and data outlet shall be made easily available for prompt use.

5.3 Provider contract will be done by PETROBRAS, to be informed during Commissioning phase.

6. TECHNICAL REQUIREMENTS

6.1 The INMARSAT SYSTEM shall have the following features and interfaces:

6.1.1. Simultaneous voice and data communication;

6.1.2. Full duplex, single or multi-user;

6.1.3. Support for streaming IP;

6.1.4. ISDN (Integrated Services Digital Network) service;

6.1.5. Voice: Standard Voice (4 kbps) or 3.1 kHz audio;

6.1.6. Optional multi-voice feature: up to 9 concurrent voice calls;

6.1.7. 04 (four) LAN ports with PoE;

6.1.8. 02 (two) standard Phone/Fax ports for standard phones.

7. SCOPE OF SUPPLY

7.1 CONTRACTOR shall supply, install, test and commissioning 01 (one) complete INMARSAT FleetBroadband 250 SYSTEM or superior in accordance with this Technical Specification.

7.2 The minimum INMARSAT equipment list:

a) Communication unit;
b) Antenna unit;
c) IP handset;
d) Analogue Telephones.

7.3 **Communication unit (Terminal)**

a) The terminal that contains the primary electronic parts shall be designed for 19” rack installation standard.

b) The terminal supplies 18-29 V DC to the antenna through a single coaxial cable.

c) The terminal shall be designed for both 24 V DC and 12 V DC power supply.

7.4 Antenna unit

a) The Antenna unit is a mechanical tracking antenna, consisting of a stabilized antenna with RF-unit, antenna control unit and GPS antenna. The antenna unit shall be protected by a fiberglass dome.

b) All communication between the antenna and communication unit shall be done through a single coaxial cable.

c) Antenna shall contain all functions for satellite tracking, including a GNSS (Global Navigation Satellite System).

7.5 IP Handset

a) The IP handset that connects to the LAN interface of the terminal shall be powered by Power over Ethernet (PoE) through the LAN interface.

b) The IP handset base serves as a holder for the IP handset. The cradle is connected to the handset with a coil cord and to the terminal with a standard LAN cable.

c) This device shall be installed in the Radio Room, fixing the cradle close to the radio operational console.

7.6 Telephone

7.6.1. It shall be supplied 02 (two) analogue extension lines to be installed in CCR – Central Control Room and another one in the Telecommunication Upper Room from Inmarsat transceiver.

8. COMMISSIONING

8.1 CONTRACTOR shall be responsible to realize a technical commissioning activity, check, test and evaluate the operation of equipment, panels, installations, protections and RF covering, in order to permit or authorize their use under normal operating conditions.

8.2 The following verifications, at least, shall be verified as scope of commissioning activities in accordance with Contract and this Technical Specification.

a. Check hardware and network environments;

b. Basic commissioning: after checking the physical environment of the products, check whether, the basic information such as software system, license, and system time is correct, ensuring that the system is running properly;

c. After checking physical environments, check basic information for accuracy. The basic information includes the software system, licenses, and system time. This ensures that the local equipment works properly and suits interconnection commissioning;

d. Device check: Check devices to ensure that the device status meet deployment requirements and prepare for access commissioning and basic service commissioning;

e. Check and record values of VSWR, return loss and distance to fail obtained from properly calibrated Anritsu Cell Master Tool or similar for each device installed.

f. Telephone extension lines: configure all devices and make a local call.

g. Data interface: configure all devices and access the internet through data interface.

9. SHUTDOWN TELECOMMUNICATIONS SYSTEM

9.1 To meet the requirements of IEC 60079-0 and CENELEC CLC / TR 50427, CONTRACTOR shall provide a shutdown telecommunication system to avoid ignition risks whenever flammable gases leak are detect in the antenna deck.

9.2 The INMARSAT antenna shall be turned off when the fire and gas panel detect flammable gases in the antenna deck.

9.3 This automation can be done in the electrical panel or inside the VSAT cabinet.

10. LEGALIZATION REQUIREMENTS

10.1 CONTRACTOR shall provide to PETROBRAS all documents and forms required properly filled to legalize System to be installed in PETROBRAS FPSO Unit, subject of this technical specification, according to Brazilian legislation, including the payment of the ART (technical responsibility term) to CREA and assigned report of non-ionizing radiation.

10.2 These documents shall be delivered to PETROBRAS at minimum 200 days before the FPSO sails away from the shipyard.

10.3 CONTRACTOR shall provide the requested signed report of ANATEL resolution number 700 about Evaluation of Human Exposure to Electric, Magnetic and Electromagnetic Fields Associated with the Operation of Radiocommunication Transmitting Stations.