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INTERIM GUIDANCE ON TECHNICAL REQUIREMENTS FOR FLEET SAFETY

1 The Maritime Safety Committee, at its 101st session (5 to 14 June 2019), approved the *Interim guidance on technical requirements for Fleet Safety*, as set out in the annex, prepared by the Sub-Committee on Navigation, Communications and Search and Rescue, at its sixth session (16 to 25 January 2019).

2 Member States are invited to use the annexed Interim guidance pending its inclusion in the *Revised International SafetyNET Manual* (MSC.1/Circ.1364/Rev.1, as amended by MSC.1/Circ.1364/Rev.1/Corr.1), as may be revised; and to bring it to the attention of all parties concerned.

ANNEX

TECHNICAL REQUIREMENTS FOR FLEET SAFETY ENHANCED GROUP CALL RECEIVERS FOR SOLAS-COMPLIANT MOBILE EARTH STATIONS (MES)

1 SafetyNET receivers for SOLAS installations

1.1 Background

1.1.1 The Global Maritime Distress and Safety System (GMDSS) is a radiocommunication system based on satellite and terrestrial technology, designed to improve communications relating to distress and safety of life at sea. It was adopted by the Organization in 1988, in the form of Amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, and came into effect on 1 February 1992. Implementation was completed on 1 February 1999.

1.1.2 The Maritime Safety Committee, at its ninety-ninth session (16 to 25 May 2018), recognized the maritime mobile satellite service provided by the Inmarsat Fleet Safety Service for use in GMDSS. Although Fleet Safety works globally, it is as yet only recognized for use in GMDSS in the coverage area under the Inmarsat-4 Middle East and Asia (MEAS) region satellite as shown in figure 1.

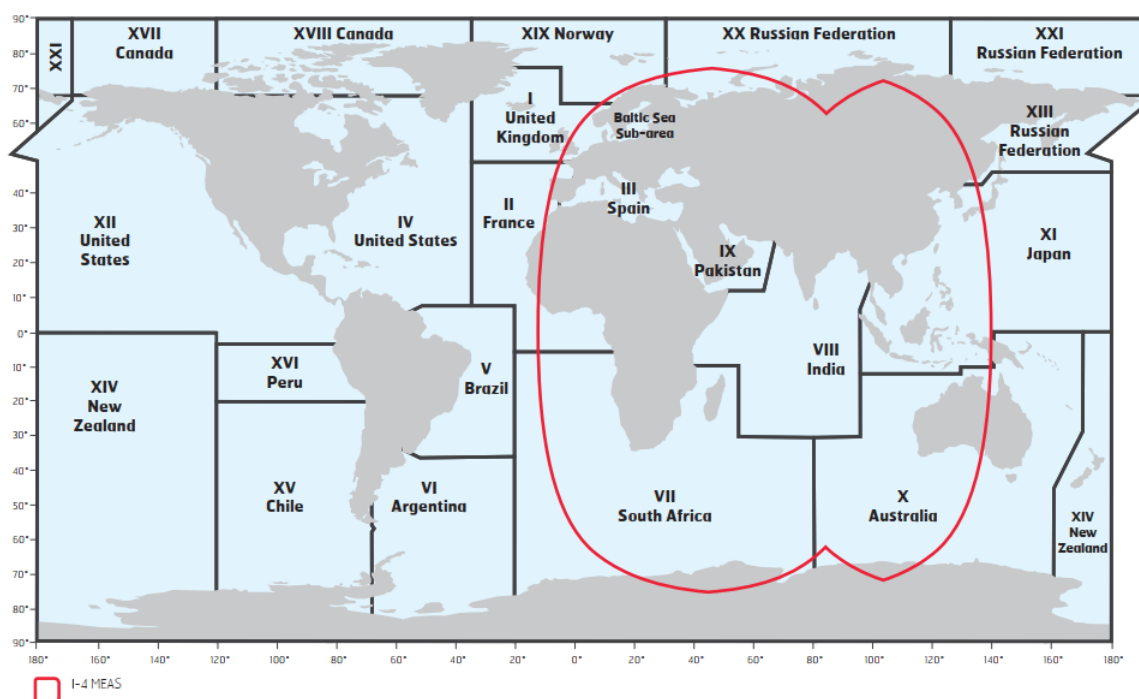


Figure 1 – Fleet Safety GMDSS approved area until Inmarsat 6 satellite constellation deployed

1.1.3 It is the responsibility of national Administrations to determine whether a radio installation on board a ship meets the SOLAS requirements. This is done by national Type Acceptance or Approval testing of the sub-systems included in the installation and by inspection of the complete installation by a radio surveyor.

1.1.4 National Type Acceptance testing for SOLAS equipment is usually based on GMDSS specifications and procedures prepared by IMO and the International Electrotechnical

Commission (IEC) on their behalf, although other national or regional specifications may be invoked as well.

1.1.5 The IMO and IEC documents identified in section 1.2 summarize not only the general requirements for GMDSS equipment, but also the special requirements for EGC receivers for use in SOLAS installations, as specified by IMO/IEC.

1.1.6 A number of the Inmarsat specifications have been completely revised to reflect the latest IMO/IEC requirements, for example, electromagnetic compatibility and environmental requirements.

1.2 Principal relevant documents

For Inmarsat Fleet Safety GMDSS SES with EGC capability, the principal relevant documents in addition to the Inmarsat Broadband Global Area Network (BGAN) System Definition Manual (SDM) are:

- .1 *Performance standards for enhanced group call equipment – annex: Recommendation on performance standards for enhanced group call equipment* (resolution A.664(16), as amended);
- .2 *Amendments to the Revised Performance standards for enhanced group call (EGC) equipment* (resolution MSC.431(98), as amended);
- .3 *General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids* (resolution A.694(17));
- .4 *Performance standards for a ship earth station for use in the GMDSS* (resolution MSC.434(98), as amended);
- .5 Shipborne Radio Equipment forming part of the Global Maritime Distress and Safety System and Marine Navigational Equipment (IEC 60945 standard);
- .6 Global Maritime Distress and Safety System (GMDSS) – Part 4: Inmarsat-C Ship Earth Station and Inmarsat Enhanced Group Call Equipment – Operational and Performance Requirements, Methods of Testing and Required Test Results (IEC 61097-4 standard); and
- .7 Maritime Design and Installation Guidelines (DIGs), Annex B, issue 6 of April 2008 published by Inmarsat at: <http://www.inmarsat.com/Maritimesafety/DIGs.pdf>

2 Introduction

2.1 Enhanced group call (EGC)

Enhanced group call (EGC) is the broadcast of coordinated maritime safety information and search and rescue related information to a defined geographical area using a recognized mobile satellite service. The Inmarsat SafetyNET (II) system allows terrestrial information providers to broadcast messages or data to an approved Inmarsat SES with EGC receivers.

2.2 EGC receiver

An EGC receiver is defined as a receiver function in the Maritime Safety Terminal (MST) connected to the FleetBroadband Terminal via the MST interface (MSTI). This MST provides an EGC capability in addition to ship-to-ship and ship-to-shore messaging capabilities.

2.3 Inmarsat type approval

The Inmarsat BGAN SDM presents the technical requirements and recommendations for MST. These requirements should be satisfied before the equipment can be utilized in the Inmarsat system. Procedures for type approval by Inmarsat of a manufacturer's design are provided in a complementary document, entitled FleetBroadband Alpha Beta Testing, produced by Inmarsat.

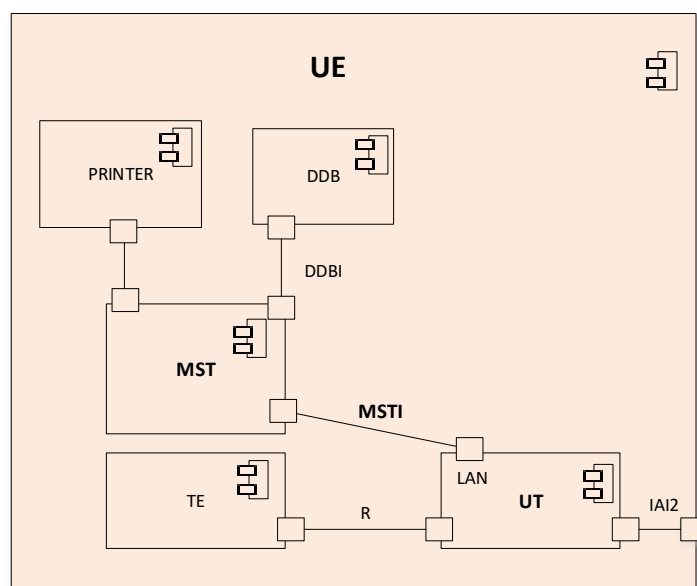


Figure 2 – Extended architecture of the user equipment (FleetBroadband Terminal)

3 General requirements

3.1 Mandatory capabilities

The mandatory capabilities of EGC receivers for SOLAS applications are:

- .1 continuous reception of broadcast channel and processing of the information according to the EGC message protocol;
- .2 automatic recognition of messages directed to fixed and defined absolute geographical areas and service codes as selected by the receiver operator or based upon input(s) from navigational equipment;
- .3 SafetyNET receivers which meet the requirements of IEC 61097-4 and IEC 60945 standards; and
- .4 where automatic updates are not available, provision is made for a visual indication if the ship's position has not been updated during the last 12 hours. It is only possible to reset this indication by revalidating the ship's position.

4 Broadcast channel selection

4.1 General

EGC receivers are a function of the MST that is connected to a FleetBroadband terminal. FleetBroadband terminals permanently monitor the broadcast system information based on a dynamic allocation of channel frequencies.

4.2 Global broadcast scanning

Automatic scanning of the system information and automated satellite selection is a mandatory feature of all FleetBroadband User Terminals (UTs). In the event of loss of forward carrier connectivity from the satellite exceeding 30 s, the UT attempts to retune to another satellite and re-establish the link to the ground automatically.

5 Message-processing requirements

5.1 General

Acceptance or rejection of the EGC service code types is under operator control, except that receivers always receive: navigational warnings; meteorological warnings and forecast; SAR-related information and shore-to-ship distress alerts; directed to a fixed or defined geographical area within which the receiver is situated. The user can also select additional areas (see section 5.9 below).

5.2 Display devices

5.2.1 Message display

The display is capable of presenting at least 40 characters per line of text. The EGC receiver ensures that if a word cannot be accommodated in full on one line it is transferred to the next line.

5.2.2 Status display

MST is able to provide indication on the link status, i.e. various level of connectivity to the Inmarsat network, which could trigger alarms to the users.

5.3 Printer requirements

5.3.1 A printer is required for an EGC receiver. Received EGC messages may be stored for later printing with an indication to the operator that the message has been received. However, distress or urgency priority calls are directly printed as well as stored. Means are also provided not to print or store the same EGC message after it has been received error-free and printed.

5.3.2 Messages are not printed until completely received.

5.3.3 A local audible alarm is sounded to give advance warning of a printer "paper-low" condition.

5.3.4 All EGC messages are annotated with the date and time (UTC) of reception. This information is displayed or printed with the message.

5.4 Character codes

For the EGC service, the International Reference Version of the International Alphabet 5 (IA5), also known as ASCII (a standard alphanumerical character set based on 7-bit codes), is used.

5.5 Operator control

5.5.1 The following control functions and displays are provided as a minimum:

.1 selection of EGC carrier frequency;

and for SafetyNET receivers:

.2 means of inputting the following information:

.1 MES's position coordinates;

.2 current and planned (additional) NAVAREA(s)/METAREA(s);

.3 current and planned coastal warning area (B1 Code); and

.4 coastal warning subject indicator character (B2 Code).

5.5.2 Receivers are fitted with operator controls to allow the operator to select desired geographical areas and message categories. Details of the geographical areas and message categories which have been selected for reception by the operator are readily available.

5.6 EGC receiver memory capacity requirements

5.6.1 The EGC receiver should be capable of storing safety-related activity and messages. Information stored should include:

.1 date/time of activity;

.2 activity type (message received, etc., plus priority);

.3 message header information;

.4 message size and contents;

.5 date/time of operator acknowledgement for received Distress and Urgency messages;

.6 date/time when operator read received messages (no date/time means not read); and

.7 message history.

5.6.2 The database can record at least 500 messages of average length 500 characters (printable and non-printable). It should not be possible for the user to erase messages from the memory. If the database becomes full the oldest messages are overwritten by new messages.

5.6.3 The user can tag individual messages for permanent retention. These messages may occupy up to 25% of the available database and should not be overwritten by new messages. When no longer required, the user should be able to remove the tag on these "saved" messages, which may then be overwritten in the normal manner.

5.7 EGC receiver addressing

5.7.1 The five basic methods of addressing EGC receivers are:

- .1 all-mobiles call (Inmarsat only);
- .2 Inmarsat system message addressing (Inmarsat only);
- .3 fixed geographical area (NAV/METAREA);
- .4 defined geographical area determined by the information provider – circular or rectangular; and
- .5 coastal warning area.

5.7.2 The type of address used in the header of the information provided is uniquely determined by the "C₂" service code field.

5.8 Message identification

All messages are transmitted with a unique reference number and originating ID. Each subsequent transmission of the message contains the original sequence number. This facility allows multiple printing of repeated messages to be inhibited.

5.9 Geographical area addressing

5.9.1 Geographical area addressing refers to messages transmitted to EGC receivers in a particular area. The area may be expressed in terms of a fixed, pre-defined area such as the NAVAREA/METAREA, or satellite coastal warning area, or in terms of a defined geographical address expressed as latitude and longitude coordinates on the surface of the earth. A defined geographical area address is a representation of a closed boundary on the surface of the earth given in the address field of the message header. The EGC receiver recognizes two forms of defined geographical addressing: rectangular and circular. Each form is specified in terms of an absolute position in latitude and longitude and further parameters that completely specify the boundary.

5.9.2 In order to process a geographical area address, the EGC receiver should be provided with its current position. The position may be entered automatically from an integrated or external navigation aid or entered manually. The EGC receiver provides notification to the operator when the position has not been updated for four hours. If the position has not been updated for more than 12 hours or is unknown, all EGC messages will be printed or stored in the memory.

5.9.3 A geographical area address is considered valid for a particular EGC receiver if its current position falls inside or on the boundary specified by the address. It is a mandatory requirement that the operator be able to select more than one area, so that messages directed to other area(s) of interest can be provided. It is recommended that the operator be able to select at least four areas.

6 Link performance monitoring

The EGC receiver continuously monitors the received bulletin board whenever it is tuned and synchronized to the Satellite Access Station (SAS). The EGC receiver stores at least 500 messages of average length 500 characters (printable and non-printable) in this database. It should not be possible for the user to erase messages from the memory. If the database becomes full, the oldest messages should be overwritten by new messages.

7 Alarms and indications

The following alarms and indications are provided at an EGC receiver and meet the operational requirements for alarms stated in IEC 61097-4 standard.

7.1 *Distress/urgency priority call alarm*

For EGC receivers:

Provision is made for a specific audible alarm and visual indication at the position from which the ship is normally navigated to indicate receipt of EGC messages with distress or urgency priority. It is not possible to disable this alarm and it is only possible to re-set it manually, and then only from the position where the message is displayed or printed.

7.2 *Other alarms and indications*

- .1 User's SIM card not present
- .2 Registration failure
- .3 Loss of signal
- .4 Packet switch connection failure
- .5 Circuit switch connection failure
- .6 Distress voice call failure
- .7 Printer failure

Additional alarms and indications may be provided at the manufacturer's discretion.

8 Electromagnetic compatibility

The interference and electromagnetic compatibility requirements of IEC 60945 standard apply.

9 Environmental conditions

EGC receivers should operate satisfactorily under the environmental conditions specified in SDM. The latest issues of IEC 61097-4 and IEC 60945 standards apply.

10 Navigational interface

In order that an EGC receiver's position may be automatically updated, receivers may be equipped with an interface to navigational instruments. A suggested standard interface is in IEC 61162 standard, Part 1 (NMEA 0183) Standard for Interfacing Electronic Marine Navigational Devices.

Note: All FleetBroadbands have an integrated navigational receiver.

APPENDIX

TECHNICAL REQUIREMENTS FOR FLEET SAFETY RADIO INSTALLATIONS ON BOARD SOLAS SHIPS

1 Satellite communication antennas

1.1 In general, satellite antennas should be located so that they have a 360° free view for the satellite at all times. In practice this can be difficult to achieve due to shadow sectors from nearby structures.

1.2 For Fleet Safety (BGAN antenna) it is recommended that communication should be maintained with the satellite down to an elevation of minus 5° in the fore and aft direction and minus 15° in the port and starboard direction.

2 Satellite communication antenna installation

The following guidelines should be observed in order to fulfil the above recommendations:

- .1 the antenna should be located at the top of the radar mast or on a pedestal, in the radar mast, or on the top deck so that:
 - .1 for directive antennas: shadows from constructions, especially within a distance of 10 metres, are maximum 6°; and
 - .2 for omnidirectional antennas: shadows from constructions, especially within a distance of 1 metre, are maximum 2°;
- .2 the antenna should be installed in a readily accessible location;
- .3 the satellite antenna should not be located in an area where it can be damaged by heat and smoke;
- .4 the satellite antenna should not be located on the same plane as the ship's radar antenna;
- .5 the GNSS antenna should not be located close to or on the same plane as the Inmarsat antenna; and
- .6 consideration should be given to installing the Inmarsat antenna on a suitable pedestal.

(Resolutions A.663(16), A.698(17), A.807(19), as amended, A.808(19) and MSC.130(75) and the Inmarsat Design and Installation Guidelines)

Note: The mast or pedestal should be constructed so that vibrations are reduced as much as possible.

3 Safe antenna distances

The following "safe distance" from Inmarsat antennas to other antennas and to the compass are recommended:

- .1 distance to the HF antenna should be more than 5 metres;
- .2 distance to VHF antennas should be more than 4 metres; and
- .3 distance to the magnetic compass should be more than 3 metres.

4 Fleet Safety

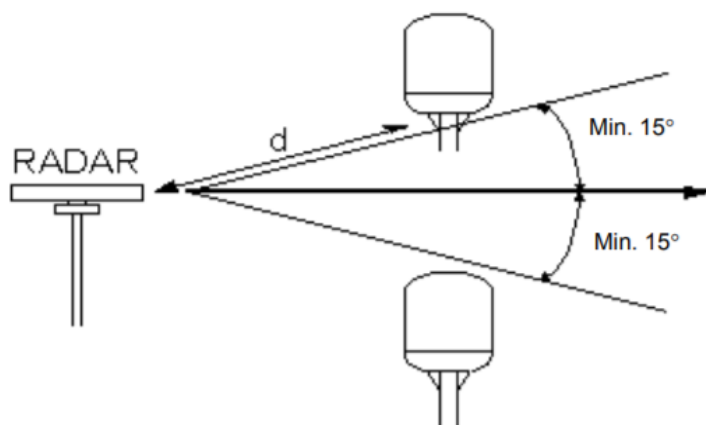
4.1 Antenna

4.1.1 Fleet Safety antennas are 2-axis stabilized BGAN antennas varying in size and throughput: FleetBroadband 150, FleetBroadband 250, FleetBroadband 500 and Fleet One.

4.1.2 All FleetBroadband antennas rotate 360° and down to -25° in pitch and roll, to allow for continuous pointing even in heavy sea conditions. Any obstructions within this volume can cause signal degradation.

4.2 Obstructions

4.2.1 The antenna should be mounted as far away as possible from the ship's radar and high-power radio transmitters (including other Inmarsat-based systems), because they may compromise the antenna performance. RF emission from radars might actually damage the antenna. Since a radar radiates a fan beam with a horizontal beam width of a few degrees and a vertical beam width of up to +/- 15°, the worst interference can be avoided by mounting the antenna at a different level, i.e. the antenna is installed minimum 15° above or below the radar antenna.



4.2.2 The FleetBroadband antenna itself may also interfere with other radio systems. Other Inmarsat systems and GNSS receivers with poor frequency discrimination are especially vulnerable to the radiation generated by the FleetBroadband antennas.

4.3 Antenna cable

A coaxial cable for connection between the antenna and terminal is delivered with the system. The manufacturers specifications regarding total attenuation and maximum DC resistance (short-circuit in one end) should be complied with. The maximum allowed RF-loss in the antenna cable is 20 dB at 1660 MHz. This is to ensure the performance of the system.

5 Antennas for voluntary radio equipment

Antennas for voluntary radio equipment may be located on deck, provided that their use does not interfere with antennas of mandatory radio equipment. When mobile telephones are installed on board ships, special attention should be made to the facts that some types of mobile telephones (especially GSM telephone equipment) may interfere with the ship's navigational equipment (especially GNSS) and other electronic equipment.
