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| Agenda item 1.8 |

1.8 to consider possible regulatory actions to support Global Maritime Distress Safety Systems (GMDSS) modernization and to support the introduction of additional satellite systems into the GMDSS, in accordance with Resolution **359** (**Rev.WRC-15**);

# 1 Background

The Global Maritime Distress and Safety System (GMDSS) was adopted as part of the 1988 Amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS). It was fully implemented in 1999. It has served the mariner and the maritime industry well since its inception, but some of the GMDSS technologies used have not reached their full potential, and some GMDSS functions could be performed by more modern technologies. The plan for modernization of the GMDSS was adopted by the Maritime Safety Committee of the IMO on June 2017. The GMDSS modernization plan consists of various components which could be part of the GMDSS, among them some items are identified in relation to the studies on agenda item 1.8 for the WRC-19, such as additional satellite service in GMDSS, VDES, NAVDAT and HF communications.

Resolution **359 (Rev.WRC-15)** invites the WRC-19 to take necessary actions to support GMDSS modernization (*resolves*1) and to consider regulatory provisions related to the introduction of additional satellite system into the GMDSS while ensuring the protection of all incumbent services from harmful interferences (*resolves*2).

This document focuses on the contribution by multiple Administrations in relation to *resolves*2***.*** The IMO’s Maritime Safety Committee (MSC) meeting in May 2018 formally recognized an additional satellite system as the new GMDSS satellite service provider.

To this effect there is a need that outstanding issues and concerns with respect to operational implementation should be addressed (see Section 5/1.8/3.2.1.1 in the CPM Report in this regards).

## 1.1 Key Elements

There are three main issues for consideration for addition of a new GMDSS provider:

1 The first issue relates to the regulatory approach to identify the frequencies planned to be used by Iridium for the GMDSS in the Radio Regulations (RR). In particular, there is debate about whether Iridium service downlinks operating in the band 1 616-1 626.5 GHz may continue to operate as part of the secondary MSS space-to-Earth allocation, or whether the downlinks require a primary allocation status as we are dealing with safety of life services for ocean going vessels;

2 The second issue relates to potential interference from MSS terminals operating in the band 1 626.5-1 660.5 MHz to Iridium MSS terminals used on ships, operating in the band at 1 616-1 626.5 GHz. Iridium and Inmarsat terminals could be used in close proximity to one another, either on the same ship or on different ships. Inmarsat terminals transmit to GSO satellites and have a typical e.i.r.p. of around 20 dBW. There is potential for Iridium terminals to receive interference from Inmarsat terminals, which could be due to blocking of the Iridium receiver or due to unwanted emissions from Inmarsat terminals. However, as per Resolution 359 (Rev.WRC-15), a number of measures can be taken by Iridium to mitigate such interference, including careful siting of the terminals on the same ship and inclusion of filtering in the Iridium terminal receivers.

3 The third issue relates to the protection of the radio astronomy service from the unwanted emissions of Iridium satellites.

Resolution **359 (Rev.WRC-15)**, in setting the scope and conditions of this agenda item, determined in *considering e)*: ***“that GMDSS satellite systems need to provide protection of incumbent services in accordance with the Radio Regulations, including those in adjacent frequency bands, from harmful interference, and such GMDSS satellite systems should operate within the interference environment of existing systems,”***.

**It is important that Iridium continues to operate in the existing interference environment, and should not put any additional constraints on GSO MSS operations, which are also used for GMDSS service to ships.**

## 1.2 Progress of ITU-R studies

ITU-R Working Party (WP) 5B was the responsible group for agenda item 1.8, and WP 4C and WP 7D were concerned groups. The *resolves* 2 was under review in WP 4C. To satisfy *resolves* 2, four methods are described in section 5/1.8/4.2 of the CPM Report.

A The potential impact of possible modifications to the provisions of the Radio Regulations on sharing and compatibility with other services

I Since 1998 Radio Astronomy Service (RAS) in the 1 610.6-1 613.8 MHz band worldwide has experienced harmful interference from Iridium MSS operations in the adjacent band 1 613.8-1 626.5 MHz, despite the application of RR No. **5.372**.

a) This interference has been reported to the ITU and documented in Electronic Communications Committee (ECC) Reports (171 and 226).

b) As long as this harmful interference persists, Resolution **359 (Rev.WRC‑15)** invites WRC-19 to consider the protection of the RAS in accordance with RR No. **5.372** as provided in *recognizing* *e) quote “that GMDSS satellite systems need to provide protection of incumbent services in accordance with the Radio Regulations, including those in adjacent frequency bands, from harmful interference, and such GMDSS satellite systems should operate within the interference environment of existing systems”*

II The band, 1 626.5-1 645.5 MHz, is used within the GMDSS in RR Appendix **15** **(Rev.WRC-15)** (see Table **15-2)** by Inmarsat and is afforded priority through RR No. **5.353A** in accordance with IMO requirements.

III The band 1 626.5-1 660.5 MHz is used in the maritime community for GSO MSS, which could be a potential source of interference to non-GSO ship earth stations which receive in the adjacent band 1 613.8-1 626.5 MHz. Interference could be caused due to the unwanted emissions of the transmitting GSO MES (in the uplink) being received by the non-GSO ship earth station, or by the emissions of the transmitting GSO MES operating in adjacent bands which could result in signal overload to the non-GSO ship earth station receiver.

IV Given such an interference scenario, it is therefore important that non-GSO MES terminals planning to offer GMDSS services in the 1 616-1 626.5 MHz band must be designed and installed in such a manner as to tolerate the potential for interference from existing GSO terminals operating in the band 1 626.5-1 660.5 MHz. Iridium GMDSS terminals should be in compliance to Resolution **359 (Rev.WRC-15)** which states in *considering* *e)*; *“...GMDSS satellite systems should operate within the interference environment of existing systems*”.

V There are measures available for Iridium to ensure compatible operations with existing GSO MES terminals operating in adjacent bands by including

(a) provision of adequate system link margin in the design of non-GSO GMDSS compliant terminals,

(b) ensuring the non-GSO GMDSS receivers are not desensitized from operation of GSO- MES terminals operating in adjacent bands,

(c) including adequate carrier separation of the non-GSO MSS system to 1 626.5 MHz if necessary, and

(d) measures taken by the terminal manufacturer to mitigate any interference through design and through equipment performance standards, and

(e) Guidelines for the installation of non-GSO terminals on ships.

VI Iridium’s approval as a GMDSS provider introduces the risk of overload interference to Iridium GMDSS terminals from Inmarsat terminals on the same ship. In line with *considering e)* of Resolution **359 (Rev.WRC-15)**, **it would be Iridium’s responsibility to manage this type of interference**.

VII If the new GMDSS provider does not implement suitable measures, Iridium receivers could receive interference from Inmarsat terminals, in particular due to Iridium receiver overload. This type of interference has been reported in the past for land mobile terminals. Iridium and Inmarsat maritime terminals have co-existed for many years in adjacent bands within the existing interference environment and this situation can continue in the future provided that the regulatory framework is not changed regarding potential interference from GSO MESs to Iridium terminals.

B Systems in the frequency bands of interest and adjacent frequency bands.

The main RR addressing the GMDSS frequency bands are in RR Appendix **15** **(Rev.WRC-15).** “Frequencies for distress and safety communications for the Global Maritime Distress and Safety System (GMDSS)” Table **15-2.**

RR Appendix **15** identifies all spectrum/frequencies used by the GMDSS; Table **15-2** shows all spectrum/frequencies above 30 MHz, including some used to provide satellite GMDSS. Currently, this table does not include the Iridium band 1 616-1 626.5 MHz.

## 1.3 List of relevant ITU-R Recommendations and Reports

*resolves* 2**:**

– Recommendation ITU-R M.1184-3: Technical characteristics of mobile satellite systems in the frequency bands below 3 GHz for use in developing criteria for sharing between the mobile-satellite service (MSS) and other services;

– Recommendation ITU-R M.1188-1: Impact of propagation on the design of non-GSO mobile-satellite systems not employing satellite diversity which provide service to handheld equipment;

– Recommendation ITU-R M.1583-1: Interference calculations between non-geostationary mobile-satellite service or radionavigation-satellite service systems and radio astronomy telescope sites;

– Recommendations ITU-R RA.1631-0: Reference radio astronomy antenna pattern to be used for compatibility analyses between non-GSO systems and radio astronomy service stations based on the epfd concept;

– Report ITU-R M.2369-0: Use of non-geostationary orbit mobile satellite systems to enhance maritime safety;

– Draft new Report ITU-R M.[GMDSS‑SATREG]-Introduction of additional mobile-satellite service systems into the GMDSS;

– Working document towards a preliminary draft new Report ITU-R M.[RAS‑COMPAT] – Unwanted emissions in the RAS band from space-to-Earth transmissions from MSS Satellites.

# 2 Summary

Samoa supports upgrading the MSS (space-to-Earth) relating to the allocation in the frequency band 1 621.35-1 626.5 MHz to primary due to the fact that all services providing safety-of-life are of primary status and all services and frequency bands are primary allocations and ensure that the upgrading to primary status should not impose additional constrains to the emission of MSS and RDSS earth stations in the frequency band 1 610-1 626.5MHz for which complete coordination information has been received by the Radiocommunication Bureau before formal commencement of the service.

## 2.1 Administration view

It is the view of this Administration to support the introduction of additional satellite systems to support GMDSS for enhancement of safety-of-life in accordance with the Resolution **359 (Rev.WRC-15)**, while protecting the services within the frequency band and the adjacent bands and ensuring that no undue constraints are imposed on these existing services. This Administration therefore supports Method B2 (b) or B4 of the CPM Report with the conditions as outlined in accordance with Resolution **359 (Rev.WRC-15)**.

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