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| **World Radiocommunication Conference (WRC-15)Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| **PLENARY MEETING** | **Addendum 1 toDocument 9(Add.22)-E** |
|  | **25 June 2015** |
|  | **Original: English** |
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| European Common Proposals |
| Proposals for the work of the conference |
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| Agenda item 9.1(9.1.1) |

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

9.1 on the activities of the Radiocommunication Sector since WRC‑12;

9.1(9.1.1) Resolution **205 (Rev.WRC-12)** − Protection of the systems operating in the mobile-satellite service in the band 406-406.1 MHz

Introduction

The 406-406.1 MHz frequency band is exclusively allocated to the mobile-satellite service, which is currently used by the Cospas-Sarsat system, the purpose of which is to provide distress alert and location data to assist search and rescue operations, using spacecraft and ground facilities to detect and locate the signals of distress beacons operating on 406 MHz. This international system encompasses three space segment components:

– a Low Earth Orbit (LEO) component with satellites embarking Search and Rescue Processor and Search and Rescue Repeater instruments on polar sun‑synchronized orbit (METOP, NOAA);

– a Geostationary Satellite Orbit (GSO) component with different satellites (MSG, GOES, Insat‑3A, Electro and Luch) embarking a Search And Rescue (SAR) Repeater;

– a Medium Earth Orbit (MEO) component with three main radio-navigation systems (GPS, Galileo, Glonass) embarking on their satellites a Search And Rescue Repeater.

According to Resolution **205 (Rev.WRC-12),** the frequency band 406-406.1 MHz is monitored and several noise measurements have been conducted using all the three space components. In particular, measurements performed by the LEO component show that the level of noise over certain years (measured in the 406-406.1 MHz band) has increased by 15 to 20 dB above the interference level in some areas, due to out of band emissions from some services allocated to adjacent bands. This noise level is especially high over Europe and also in part of Asia. For most of the areas on the Earth (mainly over oceans), a distress beacon can be correctly received and processed by the Search And Rescue Processor even for low levels. However, a general concern is raised on the reception and processing of weak distress signals, in certain areas, caused by an increase of noise especially in Europe and Asia.

In view of these observations and further detailed calculations, the following mitigation techniques are proposed for the revision of the Resolution **205 (Rev.WRC-12)**.

Space receivers in the three space segment components described above could be designed with improved filters, which are planned for future generation of satellites.

Administrations should consider applying guardbands from 405.9 MHz to 406 MHz and from 406.1 MHz to 406.2 MHz for the mobile and fixed services, which improve the protection of Search And Rescue receivers. These guardbands apply to new frequency assignments and are not applicable to existing stations/networks. In addition and where practical, administrations are encouraged to authorise new stations/systems to mobile and fixed services to frequency bands further away from these guardbands.

Below 406 MHz, regarding radiosondes in the meteorological aids service, it is acknowledged that a frequency drift of older, less stable radiosondes could be a cause of narrowband interference to the Search And Rescue receiver from radiosondes that are operating above 405 MHz. It is therefore proposed that administrations have to take into account frequency drift characteristics of radiosondes when selecting their operating frequencies above 405 MHz to avoid transmitting in the 406-406.1 MHz frequency band.

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations
(See No. 2.1)

MOD EUR/9A22A1/1

335.4-410 MHz

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| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 403-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile ADD 5.A911 |
| 406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.266 5.267 ADD 5.A911 |
| 406.1-410 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 ADD 5.A911 |

ADD EUR/9A22A1/2

5.A911 In the frequency band 403-410 MHz, Resolution **205 (Rev.WRC 15)** applies.

MOD EUR/9A22A1/3

RESOLUTION 205 (Rev.WRC‑15)

Protection of the systems operating in the mobile-
satellite service in the band 406-406.1 MHz

The World Radiocommunication Conference (Geneva, 2015),

considering

*a)* that WARC‑79 allocated the frequency band 406-406.1 MHz to the mobile-satellite service (MSS) in the Earth-to-space direction;

*b)* that No. **5.266** limits the use of the frequency band 406-406.1 MHz to low-power satellite emergency position-indicating radiobeacons (EPIRBs);

*c)* that WARC Mob-83 made provision in the Radio Regulations for the introduction and development of a global distress and safety system;

*d)* that the use of satellite EPIRBs is an essential element of this system;

*e)* that, like any frequency band reserved for a distress and safety system, the frequency band 406-406.1 MHz is entitled to full protection against all harmful interference;

*f)* that Nos. **5.267** and **4.22** and Appendix **15** (Table **15-2**) require the protection of the MSS within the frequency band 406-406.1 MHz from all emissions of systems, including systems operating in the lower and upper adjacent bands;

*g)* that Recommendation ITU‑R M.1478 provides protection requirements for the various types of instruments mounted on board operational satellites receiving EPIRB signals in the frequency band 406‑406.1 MHz against both broadband out-of-band emissions and narrowband spurious emissions;

*h)* that the PDN Report ITU-R M.[AGENDA ITEM 9.1.1] provides the results of studies covering various scenarios between the MSS and other relevant active services operating in the frequency bands 390-406 MHz and 406.1-420 MHz or in separate parts of these frequency bands;

*i)* that unwanted emissions from services outside 406-406.1 MHz have the potential to cause interference to the MSS receivers within 406-406.1 MHz;

*j)* that long-term protection against harmful interference to the Cospas-Sarsat satellite system operating in the MSS in the frequency band 406-406.1 MHz is vital to the response times of emergency services;

*k)* that in most cases, the frequency bands adjacent or nearby to Cospas-Sarsat will continue to be used for various service applications,

considering further

*a)* that some administrations have initially developed and implemented an operational low-altitude, near-polar orbiting satellite system (Cospas-Sarsat) operating in the frequency band 406-406.1 MHz to provide alerting and to aid in the locating of distress incidents;

*b)* that thousands of human lives have been saved through the use of spaceborne distress-beacon detection instruments, initially on 121.5 MHz and 243 MHz, and subsequently in the frequency band 406‑406.1 MHz;

*c)* that the 406 MHz distress transmissions are relayed through many instruments mounted on geostationary, low-Earth and medium-Earth satellite orbits;

*d)* that the digital processing of these emissions provides accurate, timely and reliable distress alert and location data to help search and rescue authorities assist persons in distress;

*e)* that the International Maritime Organization (IMO) has decided that satellite EPIRBs operating in the Cospas-Sarsat system form part of the Global Maritime Distress and Safety System (GMDSS);

*f)* that observations of the use of frequencies in the frequency band 406-406.1 MHz show that they are being used by stations other than those authorized by No. **5.266**, and that these stations have caused harmful interference to the MSS, and particularly to the reception of satellite EPIRB signals by the Cospas-Sarsat system;

*g)* that the results of spectrum monitoring and ITU‑R studies contained in the PDN Report ITU-R M.[AGENDA ITEM 9.1.1] indicate that emissions from stations operating in the frequency bands 405.9-406 MHz and 406.1-406.2 MHz have the potential to severely impact the performance of the MSS systems in the frequency band 406-406.1 MHz;

*h)* that the results of ITU‑R studies indicate that increased deployment of land mobile systems operating in the vicinity of the 406-406.1 MHz frequency band may degrade the receiver performance of the mobile-satellite systems operating in the frequency band 406-406.1 MHz;

*i)* that the maximum permissible level of interference in the frequency band 406-406.1 MHz may be exceeded due to frequency drift of older, less stable radiosondes operating above 405 MHz,

recognizing

*a)* that it is essential for the protection of human life and property that frequency bands allocated exclusively to a service for distress and safety purposes be kept free from harmful interference;

*b)* that the deployment of mobile systems near the frequency band 406-406.1 MHz is ongoing and more systems are envisaged;

*c)* that this increased deployment raises significant concerns on the reliability of future distress and safety communications due to increases in the noise level measured in many areas of the world in the frequency band 406-406.1 MHz;

*d)* that it is essential to preserve the MSS frequency band 406-406.1 MHz free from out-of-band emissions that would degrade the operation of the 406 MHz satellite transponders and receivers, with the risk that satellite EPIRB signals would go undetected,

noting

*a)* that the 406 MHz search and rescue system will be enhanced by placing 406‑406.1 MHz transponders on global navigation satellite systems such as Galileo, GLONASS and GPS, relaying search and rescue emissions at 406 MHz, in addition to already operational and future low-Earth orbiting and geostationary satellites, thus providing a large constellation of satellites relaying search and rescue messages;

*b)* that this enhanced constellation of spaceborne search and rescue instruments was designed to improve geographic coverage and reduce distress-alert transmission delays because of larger uplink footprints, increased number of satellites and improvements in the accuracy of the location of the distress signal;

*c)* that the characteristics of these spacecraft with larger footprints, and the low power available from satellite EPIRB transmitters, means that aggregate levels of electromagnetic noise, including noise from transmissions in adjacent frequency bands, may present a risk of satellite EPIRB transmissions being undetected, or delayed in reception, or lead to reduced accuracy of the calculated location, thereby putting lives at risk,

noting further

*a)* that the mobile-satellite systems contributing to the emergency location system Cospas-Sarsat provide a worldwide emergency location system to the benefit of all countries, even if those mobile-satellite systems are not operated by their country;

*b)* that many Cospas-Sarsat satellites implement efficient out-of-band filtering, which would be further improved in upcoming satellites,

resolves

1 to request administrations not to make new frequency assignments within the frequency bands 405.9-406.0 MHz and 406.1-406.2 MHz under the mobile and fixed services;

2 that administrations take into account frequency drift characteristics of radiosondes when selecting their operating frequencies above 405 MHz to avoid transmitting in the 406‑406.1 MHz frequency band and take all practical steps to avoid frequency drifting close to 406 MHz,

instructs the Director of the Radiocommunication Bureau

1 to continue to organize monitoring programmes in the frequency band 406-406.1 MHz in order to identify the source of any unauthorized emission in that frequency band;

2 to organize monitoring programmes on the impact of the unwanted emissions from systems operating in the frequency bands 405.9-406 MHz and 406.1-406.2 MHz on the MSS reception in the frequency band 406‑406.1 MHz in order to assess the effectiveness of this Resolution and to report to subsequent world radiocommunication conferences,

encourages administrations

to make new assignments to stations in the fixed and mobile services in priority in channels with greater frequency separation from the 406-406.1 MHz frequency band and to ensure that the e.i.r.p. of new fixed and mobile systems is kept to a minimum required level as well as to a minimum required elevation angle,

urges administrations

1 to take part in monitoring programmesreferred to in the *instructs the Director of the Radiocommunication Bureau* above;

2 to ensure that stations other than those operated under No. **5.266** abstain from using frequencies in the frequency band 406-406.1 MHz;

3 to take the appropriate measures to eliminate harmful interference caused to the distress and safety system;

4 to take all practical steps to limit the levels of unwanted emissions of stations operating within the 403-406 MHz and 406.1-410 MHz frequency ranges in order not to cause harmful interference to mobile-satellite systems operating in the 406-406.1 MHz frequency band;

5 when providing Cospas-Sarsat satellite receiver payloads in the 406-406.1 MHz frequency band, to make possible improvement of out-of-band filtering of such receivers, in order to reduce constraints to adjacent services while preserving the ability of the Cospas-Sarsat system to detect all kinds of emergency beacons and to maintain an acceptable rate of detection, which is vital to search and rescue missions;

6 to actively cooperate with the administrations participating in the monitoring programmes and the Bureau to resolve reported cases of interference to the Cospas-Sarsat system.

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