

RESOLUTION 205 (REV.WRC-19)

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

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

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 frequency 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 Report ITU-R M.2359 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 the frequency band 406-406.1 MHz have the potential to cause interference to MSS receivers within 406-406.1 MHz;
- j)* that long-term protection against harmful interference of 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 near to those used by Cospas-Sarsat will continue to be used for various applications in the services to which they are allocated,

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 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 Radiocommunication Sector (ITU-R) studies contained in Report ITU-R M.2359 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 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 frequency band 406-406.1 MHz may degrade the receiver performance of mobile-satellite systems operating in the frequency band 406-406.1 MHz;
- i) that the maximum permissible level of interference to the MSS in the frequency band 406-406.1 MHz may be exceeded due to frequency drift of the 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 such systems are envisaged;
- c) that this increased deployment raises significant concerns on the reliability of future distress and safety communications due to the increases in the noise level measured in many areas of the world for 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 by means of larger uplink footprints, an increased number of satellites and improvement 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 locations, thereby putting lives at risk;

d) that Recommendation ITU-R SM.1051 provides a methodology to monitor the electromagnetic environment in the adjacent frequency bands 405.9-406 MHz and 406.1-406.2 MHz,

noting further

a) that the MSS systems contributing to the Cospas-Sarsat emergency location system 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;

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2 to organize monitoring programmes on the impact of unwanted emissions from systems operating in the frequency bands 405.9-406 MHz and 406.1-406.2 MHz on 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 take measures such as authorizing new assignments to stations in the fixed and mobile services with priority given to selecting channels with greater frequency separation from the frequency band 406 to 406.1 MHz and ensuring that the equivalent isotropically radiated power of new fixed and mobile systems at all but low elevation angles is kept to the minimum required level,

urges administrations

1 to take part in monitoring programmes referred to in *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 when designing Cospas-Sarsat satellite receiver payloads in the frequency band 406-406.1 MHz, to improve, to the extent possible, out-of-band filtering of such receivers, in order to reduce constraints on 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;

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

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