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| **World Radiocommunication Conference (WRC-23) Dubai, 20 November - 15 December 2023** | A close up of a sign  Description automatically generated |
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|  | **19 August 2023** |
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| Asia-Pacific Telecommunity Common Proposals | |
| Proposals for the work of the conference | |
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| Agenda item 10 | |

to recommend to the ITU Council items for inclusion in the agenda for the next world radiocommunication conference, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the ITU Convention and Resolution **804 (Rev.WRC-19)**

Resolution **804 (Rev.WRC-19)** - Principles for establishing agendas for world radiocommunication conferences

**Introduction**

APT Members support an item on technical and regulatory measures to ensure coexistence between spaceborne SAR and RDS in the frequency band 9.2-10.4GHz be included in the agenda of WRC-27.

**Proposals**

ADD ACP/xxA24A13/1

RESOLUTION [ACP/AI10\_WRC-27\_Agenda] (WRC‑23)

Agenda for the 2027 World Radiocommunication Conference

The World Radiocommunication Conference (Dubai, 2023),

…

resolves

to recommend to the Council that a WRC be held in 2027 for a maximum period of four weeks, with the following agenda:

1 on the basis of proposals from administrations, taking account of the results of WRC‑23 and the Report of the Conference Preparatory Meeting, and with due regard to the requirements of existing and future services in the frequency bands under consideration, to consider the following items and take appropriate action:

1.x to study and develop technical and regulatory measures to ensure coexistence between spaceborne synthetic aperture radars (SAR) operating in the Earth exploration-satellite service (active) and radiodetermination service in the frequency band 9 200-10 400 MHz, in accordance with Resolution **[ACP/AI10 SAR RDS COEXISTENCE] (WRC-23)**.

….

ADD ACP/xxA24A13/2

RESOLUTION [ACP/AI10 SAR RDS COEXISTENCE] (WRC-23)

**Studies on technical and regulatory measures to ensure coexistence between spaceborne synthetic aperture radars operating in the Earth exploration-satellite service (active) and radiodetermination service in the frequency band 9 200-10 400 MHz**

The World Radiocommunication Conference (Dubai, 2023),

*considering*

1. that the Earth exploration-satellite service (active) is used for various active spaceborne sensor applications, among which synthetic aperture radar (SAR) is the most widely used application;
2. that following the decisions of WRC-07 and WRC-15, the allocation of the Earth exploration-satellite service (active) in X band was extended from 9 500-9 800 MHz to 9 200-10 400 MHz, which is shared with the radiodetermination service, including radiolocation and radionavigation services;
3. that under the assumptions and system parameters before WRC-15, the ITU-R studies concluded that the time percentage of the occurrence of the interference to the radiodetermination service would be low, and based on these conclusions the two WRCs made the extended allocations to Earth exploration-satellite service (active) successively;
4. that in recent years, with the advancement of technology and the reduction of cost, the number of SAR satellites in the frequency band 9 200-10 400 MHz increased significantly through the world, which is far beyond the assumptions made in the past ITU-R studies;
5. that the system parameters of SAR satellites also changed from the past ITU-R studies during recent years;
6. that the growing usage of spaceborne SAR transmitters, as referred in the situations in *considering d)* and *e),* will increase the probability of interference between radiodetermination radars and SAR satellites, and there is a need to review technical measures and regulatory provisions to ensure the coexistence between these two systems;

*noting*

1. that No. **5.474A** stipulates that the use of the frequency bands 9 200-9 300 MHz and 9 900-10 400 MHz by the Earth exploration-satellite service (active) is subject to agreement to be obtained under No. **9.21** from a number of administrations;
2. that No. **21.16** provides power flux-density limit at the Earth’s surface produced by emissions from Earth exploration-satellite service (active) in the frequency band 9 900-10 400 MHz with respect to the protection of fixed service;

*recognizing*

1. that the importance of the continuing operation of SAR satellites and the need for protection for the radiodetermination systems operating in the frequency band 9 200-10 400 MHz;
2. that No. **5.476A** states that “In the band 9 300-9 800 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and radiolocation services. (WRC‑07)”;
3. that No. **5.474D** states that “stations in the Earth exploration-satellite service (active) shall not cause harmful interference to, or claim protection from, stations of the maritime radionavigation and radiolocation services in the frequency band 9 200-9 300 MHz, the radionavigation and radiolocation services in the frequency band 9 900-10 000 MHz and the radiolocation service in the frequency band 10.0-10.4 GHz.  (WRC‑15)” ;
4. that the aeronautical radionavigation service operating in the frequency band 9 000-9 200 MHz and the maritime radionavigation service operating in the frequency band 9 200-9 500 MHz are used by safety service systems, in accordance with Nos. **1.59** and **4.10**;
5. that Recommendation ITU-R M.1796 contains the technical characteristics and protection criteria for radars operating in the radiodetermination service in the frequency range 8 500-10 680 MHz;

*resolves to invite ITU Radiocommunication Sector*

1 to identify technical characteristics of the spaceborne synthetic aperture radars (SAR) in the Earth exploration-satellite service (active) in the frequency band 9 200-10 400 MHz;

2 to study the required protection criteria for radiodetermination service in the frequency band 9 200-10 400 MHz from pulsed type interference, in particular the time percentage or probability of interference which could be acceptable by radiodetermination service;

3 to conduct studies, in time for consideration by WRC-27, on the technical and regulatory measures to ensure coexistence between spaceborne synthetic aperture radars (SAR) operating in the Earth exploration-satellite service (active) and radiodetermination service in the frequency band 9 200-10 400 MHz;

4 to identify, in time for consideration by WRC-27, possible changes to relevant regulatory provisions of the Radio Regulations.

*invites the 2027 World Radiocommunication Conference*

to consider the results of the above ITU-R studies and take actions, including possible changes to regulatory provisions of the Radio Regulations,

*invites administrations*

to participate in the studies by submitting contributions to ITU‑R.

**Reasons:** See the following Table that has been prepared using the template given in Annex 2 to Resolution **804 (Rev.WRC-19)**.

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| **Subject:**  Measures to ensure coexistence between spaceborne synthetic aperture radars (SAR) operating in the Earth exploration-satellite service (active) and radiodetermination service in 9 200-10 400 MHz frequency bands | |
| **Origin:** Asia-Pacific Telecommunity (APT) | |
| ***Proposal*:**  *To study and develop technical and regulatory measures to ensure coexistence between spaceborne synthetic aperture radars (SAR) operating in the Earth exploration-satellite service (active) and radiodetermination service in the frequency band 9 200-10 400 MHz.* | |
| **Background/reason:**  The Earth exploration-satellite service (active) is mainly used for active spaceborne sensors, including synthetic aperture radar (SAR), Altimeter, Scatterometer, Precipitation radar and Cloud profile radar. Amongst these applications, SAR is the most widely used spaceborne sensors. WRC-07 and WRC-15 successively extended the allocations to Earth exploration-satellite service (active) from 9 500-9 800 MHz to 9 200-10 400 MHz, which is shared with the radiodetermination service, including radiolocation and radionavigation services. During past years in ITU-R, especially in the WRC-07 and WRC-15 study cycles, numerous studies have been performed regarding the sharing between Earth exploration-satellite service (active) and radiodetermination service. Under the assumptions and system parameters at that time, the ITU-R studies concluded that, although the radars would be affected by spaceborne SAR with interference levels significantly exceeding the specified I/N threshold value of I/N = -6 dB, the time percentage of the occurrence of the interference would be low. However, there are some deficiencies in the studies. One is not mentioning what the time percentage should be to ensure the radiodetermination service will not be adversely impacted by the pulsed type interference like spaceborne SAR emissions. The second is the conclusion was based on the assumptions that the expected number of the actually operated SAR satellites would be very limited, but which is not the case nowadays.  In recent years, with the advancement of technology and the reduction of manufacturing costs, more and more SAR satellites have been launched and operated by many countries. According to publicly available information, the number of current and future SAR satellites operated in X band have already exceeded 300, which is far beyond the expectations in WRC-07 and WRC-15 study cycles. In addition, the system parameters of SAR satellites also changed from the past study cycles during recent years. These changing situations would lead the coexistence between SAR satellites and radiodetermination service becomes more difficult than before. And it will increase the possibility of mutual interference between radiodetermination radars and SAR satellites which may become a significant problem among administrations in the future.  Therefore, it is necessary to conduct studies on the technical and regulatory measures to ensure coexistence between spaceborne synthetic aperture radars (SAR) in the Earth exploration-satellite service (active) and radiodetermination service in the frequency band 9 200-10 400 MHz with the aim to facilitate the operation of both side systems. | |
| ***Radiocommunication services concerned*:**  Earth exploration-satellite service (active), radiolocation service and radionavigation service | |
| ***Indication of possible difficulties*:** | |
| ***Previous/ongoing studies on the issue*:**  *Studies during the study periods towards WRC-07 and WRC-15.* | |
| ***Studies to be carried out by*:**  ITU-R WP 5B/7C as responsible group | ***with the participation of*:**  Other relevant WPs, Administrations, Sector Members |
| ***ITU‑R study groups concerned*:**  SG 5, SG 7 | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  No direct financial implications have been identified to date. | |
| ***Common regional proposal*:** TBD | ***Multicountry proposal*:** TBD  ***Number of countries*:** TBD |
| ***Remarks*** | |