|  |  |  |  |
| --- | --- | --- | --- |
| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23) Dubai, 20 November - 15 December 2023** | |  |
|  | |  | |
|  | |  | |
|  | | **Addendum 27 to Document 111-E** | |
|  | | **29 October 2023** | |
|  | | **Original: Chinese** | |
|  | | | |
| China (People's Republic of) | | | |
| |  | | --- | | PROPOSALS FOR THE WORK OF THE CONFERENCE | | | | |
|  | | | |
| Agenda item 10 | | | |

10to 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)**,

# 1 Introduction

Agenda item 10 of WRC-23 is intended to recommend to the ITU Council items for inclusion in the agenda of the next world radiocommunication conference and the preliminary agenda of future conferences, in accordance with Article 7 of the ITU Convention and Resolution **804** **(Rev.WRC‑19)**.

The Administration of China puts forward the following four types of proposal under WRC-23 agenda item 10:

– Category I: Comments on how to deal with WRC Resolutions **811 (WRC-19)** and **812 (WRC-19)** and the adoption of a new resolution on the agenda of WRC-27;

– Category II: Proposals for inclusion of an item in the agenda of WRC-27;

– Category III: Proposals for inclusion of an item in the preliminary agenda of WRC-31;

– Category IV: Comments on proposals made by regional organizations on new agenda items of WRC-27.

These proposals will be detailed in the annexes to this document. In each annex, in accordance with Resolution **804** **(Rev.WRC-19)**, corresponding explanatory tables and other materials are also provided. For ease of viewing, the table below provides a cross-reference index of information such as the objective of each annex and the corresponding proposal number.

Table: A cross-reference index of information such as objectives of each   
annex and corresponding proposal numbers

| Annex number | Objective | Keyword | Proposal number | Category |
| --- | --- | --- | --- | --- |
| Annex 1 | Proposal for the suppression of Resolutions **811** **(WRC‑19)** and **812 (WRC-19)**;  Proposal for a newResolution **[AI-10] (WRC‑23)** | SUP OLD  ADD NEW | SUP CHN/6486A27/1  SUP CHN/6486A27/2  ADD CHN/6486A27/3 | I |
| Annex 2 | Proposal for WRC-27 agenda item 1.AA | IMT  (for WRC-27) | **ADD CHN/6486A27/4** | II |
| Annex 3 | Proposal for WRC-27 agenda item 1.BB | Non-GSO-framework  (for WRC-27) | **ADD CHN/6486A27/5** | II |
| Annex 4 | Proposal for WRC-27 agenda item 1.CC | IMT-MSS  (for WRC-27) | **ADD CHN/6486A27/6** | II |
| Annex 5 | Proposal for WRC-27 agenda item 1.DD | SAR  (for WRC-27) | **ADD CHN/6486A27/7** | II |
| Annex 6 | Proposal for WRC-27 agenda item 1.EE | 2.12  (for WRC-27) | **MOD CHN/6486A27/8** | II |
| Annex 7 | Proposal for WRC-27 agenda item 1.FF | 2.6  (for WRC-27) | **MOD CHN/6486A27/9** | II |
| Annex 8 | Proposal for WRC-27 agenda item 1.GG | 2.8  (for WRC-27) | **MOD CHN/6486A27/10** | II |
| Annex 9 | Proposal for WRC-27 agenda item 1.HH | 2.10  (for WRC-27) | **MOD CHN/6486A27/11** | II |
| Annex 10 | Proposal for WRC-27 preliminary agenda item 2.XXX | 2.2  (for WRC-31) | **ADD CHN/6486A27/12**  **MOD CHN/6486A27/13** | III |
| Annex 11 | Proposals for other WRC-27 agenda items | Not supported | **CHN/6486A27/14**  **CHN/6486A27/15**  **CHN/6486A27/16** | IV |

# 2 Proposals

Proposals relating to the agenda of WRC-27 and the preliminary agenda of WRC-31 are detailed in the annexes attached below.

Annexes: **11** in total.

Annex 1

Comments on how to deal with WRC Resolutions 811 (WRC-19) and 812 (WRC‑19) and the adoption of a new resolution on the agenda of WRC-27

SUP CHN/111A27/1

RESOLUTION 811 (WRC‑19)

Agenda for the 2023 world radiocommunication conference

**Reasons:** This resolution will no longer be needed after WRC-23.

SUP CHN/111A27/2

RESOLUTION 812 (WRC-19)

Preliminary agenda for the 2027 World Radiocommunication Conference

**Reasons:** This resolution will no longer be needed after WRC-23.

ADD CHN/111A27/3

Draft new resolution [AI-10] (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 and take appropriate action in respect of the following items:

1.AA to consider identification of the frequency band 6 425-7 025 MHz in Region 3 for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution **[AI-10-IMT] (WRC‑23)**;

1.BB to conduct studies towards the development of a regulatory framework for non-GSO satellite systems to ensure the long-term sustainability of, as well as equitable access to and rational and compatible use of, non-GSO spectrum and orbit resources, in accordance with Resolution **[AI-10-non-GSO\_FRAMEWORK] (WRC‑23)**;

1.CC to conduct studies on possible new primary allocations to the mobile-satellite service for non-GSO systems operating in frequency bands below 7 GHz, in accordance with Resolution **[AI-10-IMT MSS-BELOW 7GHz] (WRC‑23)**;

1.DD to study and develop 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, in accordance with Resolution **[****ACP-AI10-7] (WRC‑23)**;

1.EE to study the removal of the limitation regarding aeronautical mobile for the use of IMT user equipment by non-safety applications within the frequency range 3 400-3 600 MHz, in accordance with Resolution **251 (Rev.WRC‑23)**;

1.FF to consider regulatory provisions for space weather sensors, including a definition of space weather, designation of corresponding radiocommunication service, and possible new allocations to the designated radiocommunication service (e.g., MetAids) in the frequency ranges around 30 MHz and 38.2 MHz and other additional frequency bands to be decided by WRC‑23, in accordance with Resolution **657 (Rev.WRC‑23)**;

1.GG to study the technical and operational matters, and regulatory provisions, for inter-satellite links in the frequency bands 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz and in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 613.8-1 626.5 MHz, 2 483.5-2 500 MHz among non-geostationary and geostationary satellites operating in the mobile-satellite service, in accordance with Resolution **249 (Rev.WRC‑23)**.

1.HH to consider improving the utilization of the maritime radiocommunications and channel arrangements, in accordance with Resolution **363** **(Rev.WRC‑23)**;

...

**Reasons:** Proposals to include relevant new agenda items in the agenda of WRC‑27.

Annex 2

Proposal for WRC‑27 agenda item 1.AA

# 1 Background

Since the introduction of IMT-2000 systems in around 2000, IMT systems have evolved approximately every 10 years, leading to systems known as IMT-Advanced and IMT-2020. IMT systems have been widely deployed around the world, which fill the digital gap and contribute to overall socio-economic development. Spectrum harmonization through identification of specific frequency bands for use by IMT through the WRC procedure provides a firm foundation for the success of IMT development.

In ITU-R, several studies relevant to IMT evolution have been undertaken, including future technology trends, framework and overall objectives of the future development of IMT. The spectrum for future IMT should cover various frequency ranges to support different applications and usage scenarios, and full access to the low, middle and high spectrum would be essential. Among all the frequency ranges, the middle frequency band, which could provide a very good balance between coverage and capacity, is essential to fulfil the objectives of IMT to provide high data rate communications at anytime and anywhere.

Adequate mid-band spectrum for IMT is important for APT countries in order to support further development of the digital economy. During the last study cycle, some APT Members submitted a joint contribution to WRC‑19 (WRC‑19/C110) to support a new WRC‑23 agenda item to consider IMT identification in the frequency band 5 925-7 125 MHz, which contributed to the establishment of WRC‑23 agenda item 1.2, which considers the possible identification of the frequency bands 3 600-3 800 MHz and 3 300-3 400 MHz (Region 2), 3 300-3 400 MHz (modification of footnote for Region 1), 7 025-7 125 MHz (globally), 6 425-7 025 MHz (Region 1), and 10.0-10.5 GHz (Region 2) for IMT. While the 3 GHz band or portions thereof are widely adopted for IMT deployment, the frequency band 6 425-7 125 MHz is another potential band which also enables a good balance between capacity and coverage. Under WRC‑23 AI 1.2, ITU-R Working Party (WP) 5D has conducted studies of sharing and compatibility between IMT and incumbent services for the frequency band 6 425-7 125 MHz. Most of the studies conducted in ITU-R WP5D found that sharing between IMT and incumbent services is feasible, especially between IMT and FSS uplinks.

Global/regional IMT spectrum harmonization is essential for the IMT industry’s economies of scale and device roaming. The frequency band 6 425-7 025 MHz in WRC‑23 agenda item 1.2 is mainly considered by Region 1, but there is interest from some countries in Region 3 to consider identification in this range through country footnote at WRC‑23. There is great potential for continued exploitation of this band for the entire Region 3 by adopting a new agenda item at WRC‑27 to further harmonize spectrum use.

# 2 Proposal

The Administration of China supports the inclusion of the following item 1.AA in the Agenda of WRC‑27. The corresponding draft new Resolution **[AI-10-IMT]** (WRC‑23) is proposed below.

*1.AA to consider identification of the frequency band 6 425-7 025 MHz in Region 3 for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution****[AI-10-IMT]*** *(WRC‑23).*

ADD CHN/111A27/4

Draft New Resolution [AI-10-IMT] (WRC-23)

Studies on frequency-related matters for identification for the terrestrial component of International Mobile Telecommunications in the frequency band 6 425-7 025 MHz in Region 3

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that International Mobile Telecommunications (IMT) is intended to provide telecommunication services on a worldwide scale, regardless of location and type of network or terminal;

*b)* that IMT systems have contributed to global economic and social development;

*c)* that IMT systems are now being evolved to provide diverse usage scenarios such as enhanced mobile broadband, massive machine-type communications and ultra-reliable and low-latency communications, and applications including fixed broadband;

*d)* that the development of future IMT is to continue improving quality of life for all and to expand its goals towards societal, environmental, cultural and economic sustainability;

*e)* that, compared with lower and higher frequency bands, the mid-band spectrum can provide better balance for meeting needs for both coverage and capacity;

*f)* that adequate and timely availability of spectrum and corresponding regulatory provisions are essential to support the future development of IMT;

*g)* that global/regional harmonized frequency bands and harmonized frequency arrangements for IMT are highly desirable in order to achieve roaming and the benefits of economies of scale;

*h)* that identification of additional frequency bands for IMT may change the sharing situation regarding applications of all services to which the frequency band is already allocated, and may require additional regulatory actions;

*i)* the need to protect existing services and to allow for their continued development when considering frequency bands for possible additional allocations to any service;

*j)* there is a great potential for continued exploitation of some of the frequency bands already identified for IMT in other regions or countries through studies of the ITU Radiocommunication Sector (ITU-R),

noting

*a)* that Resolution ITU-R 65 addresses the principles for the process of development of IMT for 2020 and beyond;

*b)* that IMT encompasses IMT‑2000, IMT‑Advanced and IMT‑2020 collectively, as described in Resolution ITU-R 56-2;

*c)* that Question ITU-R 77-8/5 considers the needs of developing countries in the development and implementation of IMT;

*d)* that Question ITU-R 229-5 seeks to address the further development of IMT;

*e)* that Question ITU-R 262-5 addresses the study of usage of IMT systems for specific applications;

*f)* that Report ITU-R M.2516-0 addresses future technology trends of terrestrial IMT systems,

recognizing

*a)* that there is a lead time between the allocation of frequency bands by world radiocommunication conferences and the deployment of systems in those bands, and that timely availability of wide and contiguous blocks of spectrum is therefore important to support the development of IMT;

*b)* that in order to ensure the future development of IMT it is important to ensure the timely identification of additional spectrum;

*c)* that any identification of frequency bands for IMT should take into account the use of the frequency bands by other services and the evolving needs of these services,

resolves to invite the ITU Radiocommunication Sector

1 to conduct and complete in time for WRC‑27 the appropriate studies of technical, operational and regulatory issues pertaining to the possible use of the terrestrial component of IMT in the frequency band listed in *resolves to invite the ITU Radiocommunication Sector*2, taking into account:

– evolving needs to meet emerging service demand for IMT;

– technical and operational characteristics of terrestrial IMT systems that would operate in these specific frequency bands, including the evolution of IMT through advances in technology and spectrally efficient techniques;

– the deployment scenarios envisaged for IMT systems and the related requirements of balanced coverage and capacity;

– the needs of developing countries;

– the time-frame in which spectrum would be needed;

2 to conduct and complete in time for WRC‑27 the sharing and compatibility studies[[1]](#footnote-1)1, with a view to ensuring the protection of services to which the frequency band is allocated on a primary basis, without imposing additional regulatory or technical constraints on those services, and also, as appropriate, on services in adjacent bands, in the frequency band:

– 6 425-7 025 MHz (Region 3),

further resolves

1 to invite the first session of the Conference Preparatory Meeting for WRC‑27 to define the date by which technical and operational characteristics needed for sharing and compatibility studies are to be available to ensure that studies referred to in *resolves to invite the ITU Radiocommunication Sector* can be completed in time for consideration by WRC‑27;

2 to invite WRC‑27 to consider, based on the results of the above studies, additional spectrum allocations to the mobile service on a primary basis and to consider identification of the frequency band for the terrestrial component of IMT, with the frequency band to be considered being limited to the frequency band listed in *resolves to invite the ITU Radiocommunication Sector*2,

invites administrations

to participate actively in these studies by submitting contributions to the ITU Radiocommunication Sector.

Attachment to Annex 2

|  |  |
| --- | --- |
| **Subject:** to consider identification of the frequency bands 6 425-7 025 MHz in Region 3 for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution **[AI-10-IMT] (WRC‑23)** | |
| **Origin:**China (People’s Republic of) | |
| ***Proposal:***  Proposed WRC‑27 agenda item 1.AA with corresponding draft new Resolution **[AI-10-IMT]** **(WRC‑23)**.  1.AA to consider identification of the frequency bands 6 425-7 025 MHz in Region 3 for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution **[AI-10-IMT] (WRC‑23)**. | |
| ***Background/reason:***  Since the introduction of IMT-2000 systems in around 2000, IMT systems have evolved approximately every 10 years, leading to systems known as IMT-Advanced and IMT-2020. IMT systems have been widely deployed around the world, which fill the digital gap and contribute to overall socio-economic development. Spectrum harmonization through identification of specific frequency bands for use by IMT through the WRC procedure provides a firm foundation for the success of IMT development.  In ITU-R, several studies relevant to IMT evolution have been undertaken, including future technology trends, framework and overall objectives of the future development of IMT. The spectrum for future IMT should cover various frequency ranges to support different applications and usage scenarios, and full access to the low, middle and high spectrum would be essential. Among all the frequency ranges, the middle frequency band, which could provide a very good balance between coverage and capacity, is essential to fulfil the objectives of IMT to provide high data rate communications at anytime and anywhere.  Adequate mid-band spectrum for IMT is important for APT countries in order to support further development of the digital economy. During the last study cycle, some APT Members submitted a joint contribution to WRC‑19 (WRC‑19/C110) to support a new WRC‑23 agenda item to consider IMT identification in the frequency band 5 925-7 125 MHz, which contributed to the establishment of WRC‑23 agenda item 1.2, which considers the possible identification of the frequency bands 3 600-3 800 MHz and 3 300-3 400 MHz (Region 2), 3 300-3 400 MHz (modification of footnote for Region 1), 7 025-7 125 MHz (globally), 6 425-7 025 MHz (Region 1), and 10.0-10.5 GHz (Region 2) for IMT. While the 3 GHz band or portions thereof are widely adopted for IMT deployment, the frequency band 6 425-7 125 MHz is another potential band which also enables a good balance between capacity and coverage.  Global/regional IMT spectrum harmonization is essential for the IMT industry’s economies of scale and device roaming. The frequency band 6 425-7 025 MHz in WRC‑23 agenda item 1.2 is mainly considered by Region 1, but there is great potential for continued exploitation of this band through ITU-R studies in Region 3.  Making identifications under the WRC framework is the most effective way to protect incumbent services. This Administration proposes a new agenda item on studies to consider identification of the frequency band 6 425-7 025 MHz in Region 3 for the terrestrial component of IMT. | |
| ***Radiocommunication Services concerned:***  6 425-6 700 MHz: fixed service, fixed-satellite service (Earth-to-space), mobile service  6 700-7 025 MHz: fixed service, fixed-satellite service (Earth-to-space), fixed-satellite service (space-to-Earth), mobile service | |
| ***Indication of possible difficulties:***  The proposed band is widely used for terrestrial and space services on a co-primary basis. The coexistence of IMT and incumbent services needs to be considered. | |
| ***Previous/ongoing studies on the issue:***  The following studies have been conducted in ITU-R Working Party 5D:   * new Report ITU-R M. 2516-0; and * working document on sharing and compatibility studies of IMT systems in the frequency bands 6 425-7 025 and 7 025-7 125 MHz. | |
| ***Studies to be carried out by:***  ITU-R SG 5/WP 5D | ***with participation of:***  Administrations and Sector Members |
| ***ITU-R Study Groups concerned:***  SG 4 and other groups | |
| ***ITU resource implications, including financial implications (refer to CV 126):***  This proposed agenda item will be studied within the normal ITU-R procedures and planned budget. As the responsible group on IMT matters, ITU-R WP 5D usually has meetings three times a year which last around 10 days each. | |
| ***Common regional proposal:***  No | ***Multicountry Proposal: No***  ***Number of countries:*** |
| ***Remarks*** | |

Annex 3

Proposal for WRC‑27 agenda item 1.BB

# 1 Background

In recent years, the number of non-GSO satellites launched and operated has grown significantly. The current Radio Regulations can barely keep up with the rapid deployment of large-scale non-GSO satellite systems since more non-GSO satellites are being deployed than envisaged when rules and provisions on interference were adopted. This poses great challenges to the long-term sustainability of the radio-frequency spectrum and associated orbit resources used by space services, especially for non-GSO satellite systems.

Although part of the problems provoked by non-GSO systems could be studied and resolved by adding new topics under WRC standing agenda item 7, considering the complex and urgent nature of the non-GSO-related issues, agenda item 7 cannot systematically solve all the technical and regulatory issues.

The Plenipotentiary Conference noted the urgency and complexity of addressing such issues and adopted Resolution 219 (Bucharest, 2022), on the sustainability of the radio-frequency spectrum and associated satellite orbit resources used by space services.

To further implement Resolution 219 (Bucharest, 2022), a new agenda item is proposed for the 2027 World Radiocommunication Conference, aiming to conduct studies and develop technical measures and a regulatory framework to ensure compatibility among non-GSO satellite systems, as well as equitable access to and rational use of limited spectrum and orbit resources by all countries.

# 2 Proposal

The Administration of China proposes to include agenda item 1.BB described below into the WRC‑27 agenda with the corresponding text of Resolution **[AI-10-non-GSO\_FRAMEWORK] (WRC‑23)**. Details are as follows:

*1.BB**to conduct studies towards the development of a regulatory framework for non-GSO satellite systems to ensure the long-term sustainability of, as well as equitable access to and rational and compatible use of, non-GSO spectrum and orbit resources, in accordance with Resolution****[AI-10-non-GSO\_FRAMEWORK] (WRC‑23)****;*

ADD CHN/111A27/5

DRAFT new Resolution [AI-10-NON-GSO\_framework] (WRC-23)

Studies towards the development of a regulatory framework for non-geostationary satellite systems to ensure the long-term sustainability of the non-geostationary spectrum and orbit resources, as well as equitable access to and rational and compatible use of these resources

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that No. 196 of the ITU Constitution (Article 44), on the use of the radio-frequency spectrum and of the geostationary-satellite (GSO) and other satellite orbits, states that “…*radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries*”;

*b)* that Resolution 219 (Bucharest, 2022) of the Plenipotentiary Conference, on sustainability of the radio-frequency spectrum and associated satellite-orbit resources used by space services, instructs the Radiocommunication Assembly, as a matter of urgency, to perform the necessary studies through relevant ITU Radiocommunication Sector (ITU-R) study groups on the issue of the increasing use of non-geostationary (non-GSO) radio-frequency spectrum and associated orbit resources, and on the long-term sustainability of, as well as on equitable access to and rational and compatible use of, GSO and non-GSO radio-frequency spectrum and associated orbit resources, consistent with the objectives of Article 44 of the Constitution;

*c)* that No. 195 of the Constitution (Article 44) states that Member States shall endeavour to limit the number of frequencies and the spectrum used to the minimum essential to provide in a satisfactory manner the necessary services;

*d)* that in recent years, the Radiocommunication Bureau witnessed an increased number of non-GSO satellite system filings that proposed to deploy constellations comprising tens to hundreds of thousands of satellites; in addition, some filings are complex in terms of orbital configurations, associated beams and carriers;

*e)* that, taking into account equitable access to and rational use of the non-GSO spectrum and orbit resources, concerns have emerged about the occupation of the limited non-GSO spectrum and orbit resources by a small number of large-scale non-GSO satellite systems;

*f)* that the current Radio Regulations can barely keep up with the rapid deployment of large-scale non-GSO satellite systems since more non-GSO satellites are being deployed than had been anticipated when rules and provisions on interference were adopted;

*g)* that actions should be taken to address the emerging issues to ensure equitable access to and rational and compatible use of the limited radio-frequency spectrum and associated orbit resources by developing countries intending to deploy non-GSO satellite systems;

*h)* that developing countries have the right to access the relevant resources and deploy their own non-GSO satellite systems – due to the cost and complexity of non-GSO satellite systems, medium/small-scale non-GSO satellite systems may be a realistic option for developing countries,

noting

*a)* that there are problems such as filings used by non-GSO satellite systems submitted by multiple administrations, the unclear use of filings by non-GSO satellites systems and inconsistencies between the actual deployed non-GSO satellite systems and their filings, creating difficulties in addressing harmful interference among satellite systems;

*b)* that some administrations have made substantial modifications to filings multiple times, including adding orbital configurations (e.g., add planes with different altitudes and modify the number of satellites per plane, etc.), transmitting and receiving beams, and new frequency assignments; interference analysis with hundreds of pages were provided to demonstrate that these modifications would not cause higher levels of interference than the original, thus requiring that the original date of protection be maintained; and currently, there exist great technical difficulties in verifying the submitted interference analysis, which increases the risk of potential interference and difficulty in coordination;

*c)* that there is an increased reliance on No. **4.4** of the Radio Regulations by administrations and operators as a means to secure access to non-GSO spectrum and orbit resources that they wish to use, in particular for operating fixed-satellite service (FSS) and mobile-satellite service (MSS) satellite networks or systems that plan to provide commercial services on a long-term basis;

*d)* that the miniaturization and portability of earth station terminals in FSS and MSS non-GSO satellite systems are progressing rapidly; and satellite monitoring and positioning capabilities and related technical personnel in some countries, especially in developing countries, are insufficient to meet the needs of comprehensive supervision of satellite network or system operations;

*e)* that the service areas of non-GSO satellite systems are usually global or covering multiple countries and that the ITU Constitution recognizes the sovereign right of each Member State to regulate its telecommunications and, in accordance with Article **18** and Resolution **22 (WRC‑19)**, the operation of transmitting earth stations within the territory of an administration shall be carried out only if authorized by that administration; therefore, appropriate provisions should be developed to constrain the radiation level of non-GSO systems within the unauthorized territories, and reduce potential harmful interference while avoiding ineffective occupation of spectrum and orbit resources;

*f)* that multiple non-GSO satellite systems which consist of hundreds to thousands of satellites are operating or planned to operate in adjacent frequency bands allocated to the radio astronomy service (RAS) and could severely affect RAS; therefore, it is necessary to develop, as soon as possible, regulatory measures to protect RAS from large-scale non-GSO satellite systems,

recognizing

*a)* that existing practical experience shows that the current equivalent power flux density limits stipulated in Article **22** and Resolution **76 (Rev.WRC‑15)** are effective in protecting GSO systems;

*b)* that, however, it is urgent to develop new technical measures and regulatory provisions in the Radio Regulations to ensure compatibility among non-GSO satellite systems, as well as the equitable and rational use of related spectrum and orbit resources;

*c)* that large-scale non-GSO satellite systems have multiple coverages and greater flexibility, enabling them to take a variety of interference mitigation measures to achieve compatibility with medium/small-scale non-GSO satellite systems;

*d)* that Article **18** of the Radio Regulations specifies the requirements for licensing the operation of stations within any given territory and that successful coordination of a satellite network or system does not imply licensing/authorization to provide a service within the territory of a Member State;

*e)* that it is necessary to develop a new and unified regulatory framework to better harmonize national frameworks adopted by Member States, thereby establishing a safer and more sustainable space environment;

*f)* that Resolution 219 (Bucharest, 2022)instructs the Director of the Radiocommunication Bureau to submit the results of the relevant studies to the subsequent world radiocommunication conference (WRC), preferably to WRC‑23, and report on the results of implementation of this resolution and take any necessary action, as appropriate,

resolves to invite the ITU Radiocommunication Sector

1 to conduct studies and to develop appropriate methodologies and a regulatory framework, to address the issue of equitable access to and rational use of limited spectrum and orbit resources by administrations operating or planning to operate non-GSO satellite systems, including but not limited to the following aspects:

1) compatibility among multiple non-GSO satellite systems in the same frequency bands, taking into account the equitable access to, and rational use of, the limited radio frequency spectrum and associated orbit resources;

2) conducting studies and developing suitable technical and regulatory provisions regarding the issue of modifying orbital configurations described in *noting b)*;

3) developing more stringent regulatory measures to ensure No. **4.4** can be enforced with respect to the application of the condition of non-interference to, and non-protection from, frequency assignments which are operating in compliance with the provisions of the Radio Regulations; at the same time, regulatory measures should be developed to govern the application of No. **4.4** by non-GSO satellite systems that provide commercial services on a long-term basis;

4) developing appropriate technical and regulatory provisions to limit the uplink and downlink transmission and radiation levels of non-GSO satellite systems within the territory of a Member State which has not authorized such transmissions in order to reduce any potential harmful interference and ineffective occupation of spectrum resources, and assisting/requesting the notifying administrations to take all necessary measures to effectively manage the transmission from and access to unauthorized earth stations;

5) developing appropriate technical and regulatory provisions for the protection of the radio astronomy service (RAS) from harmful interference from non-GSO satellite systems;

2 to complete the above studies in time for WRC‑27,

invites the 2027 world radiocommunication conference

to review the results of these studies and take appropriate action.

Attachment to Annex 3

|  |  |
| --- | --- |
| **Subject:** to conduct studies towards the development of a regulatory framework for non-GSO satellite systems to ensure the long-term sustainability of, as well as equitable access to and rational and compatible use of, non-GSO spectrum and orbit resources, in accordance with Resolution **[AI-10-non-GSO\_FRAMEWORK] (WRC‑23)**; | |
| **Origin:**China (People’s Republic of) | |
| ***Proposal:*** This Administration proposes to include item 1.BB in the agenda for WRC‑27 with a corresponding draft new Resolution **[AI-10-non-GSO\_FRAMEWORK]** **(WRC‑23)**.  *1.BB to conduct studies towards the development of a regulatory framework for non-GSO satellite systems to ensure the long-term sustainability of, as well as equitable access to rational and compatible use of, non-GSO spectrum and orbit resources, in accordance with Resolution****[AI-10-non-GSO\_FRAMEWORK] (WRC‑23)****;* | |
| ***Background/reason:***  In recent years, the number of non-GSO satellites launched and operated has grown significantly. The current Radio Regulations can barely keep up with the rapid deployment of large-scale non-GSO satellite systems since more non-GSO satellites are being deployed than envisaged when rules and provisions on interference were adopted. This poses great challenges to the long-term sustainability of the radio-frequency spectrum and associated orbit resources used by space services, especially for non-GSO satellite systems.  Although part of the problems provoked by non-GSO systems could be studied and resolved by adding new topics under WRC standing agenda item 7, considering the complex and urgent nature of the non-GSO-related issues, agenda item 7 cannot systematically solve all the technical and regulatory issues.  The Plenipotentiary Conference noted the urgency and complexity of addressing such issues and adopted Resolution 219 (Bucharest, 2022), on the sustainability of the radio-frequency spectrum and associated satellite orbit resources used by space services.  Developing countries have the right to access the relevant resources and deploy their own non-GSO satellite systems. Due to the cost and complexity of non-GSO satellite systems, medium/small-scale non-GSO satellite systems may be a realistic option for developing countries. Large-scale non-GSO satellite systems have multiple coverages and greater flexibility, enabling them to take a variety of interference mitigation measures to achieve compatibility with medium/small-scale non-GSO satellite systems. Therefore, actions should be taken to address the emerging issues to ensure equitable access to, rational and compatible use of the limited radio-frequency spectrum and associated orbit resources by developing countries intending to deploy non-GSO satellite systems.  In conclusion, it is necessary to conduct studies on the technical measures and a regulatory framework for non-GSO satellite systems to ensure compatibility among non-GSO satellite systems, as well as the equitable access to, and rational use of, the limited non-GSO spectrum and associated orbit resources among all countries. | |
| ***Radiocommunication Services concerned:***  Fixed-satellite service, mobile-satellite service | |
| ***Indication of possible difficulties:***  Lack of methodologies for guiding the compatible operation among multiple non-GSO systems. | |
| ***Previous/ongoing studies on the issue:***  None | |
| ***Studies to be carried out by:***  ITU-R WP 4A and WP 4C | ***with participation of:***  Administrations, Sector Members and interested operators. |
| ***ITU-R Study Groups concerned:***  SG 4 and other possible relevant study groups | |
| ***ITU resource implications, including financial implications (refer to CV 126):***  None | |
| ***Common regional proposal:***  No | ***Multicountry Proposal: No***  ***Number of countries:*** |
| ***Remarks*** | |

Annex 4

Proposal for WRC‑27 agenda item 1.CC

# 1 Background

In recent years, with the extensive network deployment of IMT systems in the world, broadband and high-speed communication services for mobile phone users have been provided in densely populated scenes such as cities and hot spots. However, in remote areas such as air, sea, desert, grassland and forest, the ground mobile communication network is limited by many factors such as geographical environment and operation and maintenance cost, so it is impossible or inconvenient to deploy base stations in these areas. Therefore, the broadband mobile communication application experience of individual users has declined or is limited.

Mobile satellite service is one of the effective means to make up for the insufficient coverage of the above ground mobile communication system. The cost of the deployment of non-GSO satellite constellations, which can provide broadband connectivity, is decreasing as a result of innovations in satellite technologies. With technological development and progress, through beam control, power control, electronic fencing and out-of-band suppression, non-GSO satellite systems can effectively avoid harmful interference to existing services through cooperative operation with terrestrial services.

The frequency bands below 7 GHz are relatively mature bands supported by the mobile phone terminal industry in 5G and 6G. At present, there are limited frequency allocations of the mobile-satellite service (MSS) in frequency bands below 7 GHz.

In order to achieve the above objectives, it would be natural for mobile operators to use their authorized spectrum to extend their mobile broadband coverage to unserved areas. Currently, there are no allocations to the mobile-satellite service in most of the frequency bands used for terrestrial IMT networks. Many satellite operators are already actively cooperating with terrestrial service operators to build integrated direct-to-device satellite systems operating only under RR No. **4.4**, which is not suitable for commercial applications. It is necessary to study this type of application in terms of its regulatory provisions, coordination procedures, etc.

# 2 Proposal

The Administration of China proposes to include item 1.CC in the agenda for WRC‑27 with a corresponding draft new Resolution **[AI-10-IMT MSS-BELOW 7GHz]** **(WRC‑23)**. Details of the proposal are as follows:

*1.CC to conduct studies on possible new primary allocations to the mobile-satellite service for non-GSO systems operating in frequency bands below 7 GHz, in accordance with Resolution****[AI-10-IMT MSS-BELOW 7GHz]******(WRC‑23)****;*

ADD CHN/111A27/6

DRAFT new RESOLUTION[AI-10-IMT MSS-BELOW 7GHz] (WRC‑23)

Studies towards possible new allocations to the mobile-satellite service on a primary basis for non-geostationary systems operating in frequency bands below 7 GHz

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* International Mobile Telecommunications (IMT) is intended to provide telecommunication services on a worldwide scale, regardless of location and type of network or terminal;

*b)* that some satellite network operators are collaborating with terrestrial IMT network operators around the world to develop a network enabling direct communications between non-geostationary orbit (non-GSO) satellite and IMT user equipment using the frequency bands identified for IMT in the Radio Regulations (RR);

*c)* that non-GSO systems in the mobile-satellite service (MSS) may provide supplemental coverage for mobile connectivity from space as a part of IMT networks to areas such as high mountains, remote islands and deserts, where reliable power sources along with other infrastructure are not sufficient to deploy terrestrial base stations;

*d)* that non-GSO MSS systems may provide alternative network resilience in case of failure of terrestrial IMT base stations due to unexpected incidents, such as natural disasters and network outages;

*e)* that there is a need to allow additional frequency bands allocated to the mobile-satellite service below 7 GHz in order to complement terrestrial IMT for mobile users globally;

*f)* that IMT systems have evolved significantly in terms of spectrum identification, network deployment and radio access technology, with the standardization of IMT‑2000, IMT‑Advanced and IMT‑2020;

*g)* that non-terrestrial network technology is expected to be one of the technology enablers to enhance IMT‑2030 terrestrial networks;

*h)* that the ITU Radiocommunication Sector (ITU‑R) has performed studies on integrated MSS and terrestrial component systems, and that some administrations have performed such usage;

*i)* that with the development of technology, non-GSO MSS is expected to be compatible and shared with existing services under specific technical methods and conditions below 7 GHz;

*j)* that in consideration of the frequency bands below 7 GHz for new MSS allocations, there is a need to determine co-existence conditions and regulatory provisions between services sharing these bands, taking into account the appropriate balance between them,

noting

*a)* that Recommendation ITU-R M.2083-0 defines the framework and overall objectives of the future development of IMT for 2020 and beyond;

*b)* that Report ITU-R M.2370-0 addresses the IMT traffic estimates for the period 2020 to 2030;

*c)* that draft Recommendation ITU‑R M.[IMT.FRAMEWORK FOR 2030 AND BEYOND] describes a framework and overall objectives of the development of IMT for 2030 and beyond (IMT‑2030);

*d)* that Report ITU‑R M.2516-0 provides a broad view of future technical aspects of IMT systems considering the time-frame up to 2030 and beyond;

*e)* that Report ITU‑R M.2514-0, on vision, requirements and evaluation guidelines for satellite radio interface(s) of IMT-2020, has been adopted;

*f)* that ITU‑R is conducting its evaluation of candidate radio interface technologies for the satellite component of IMT-2020，

recognizing

*a)* that the frequency band 698-960 MHz is identified for IMT according to Nos. **5.313A** and **5.317A**;

*b)* that the frequency bands 1 710-1 885 MHz, 1 885-2 025 MHz, 2 110-2 200 MHz, 2 300-2 400 MHz and 2 500-2 690 MHz are identified for IMT according to Nos. **5.384A**, **5.388** and **5.388A**;

*c)* that the bands 3 400-3 600 MHz and 3 600-3 700 MHz have been identified for IMT according to Nos. **5.430A**, **5.431B**, **5.432A**, **5.432B**, **5.433A** and **5.434**;

*d)* that the frequency band 4 800-4 990 MHz is identified for IMT according to Nos. **5.441A** and **5.441B**;

*e)* that No. **5.320** provides an additional allocation in Region 3 to the mobile-satellite except aeronautical mobile-satellite (R) service in the bands 806-890 MHz and 942-960 MHz on a primary basis, subject to conditions;

*f)* that the characteristics for systems of direct communications between non-GSO satellites and IMT user equipment need to be taken into account,

resolves to invite the ITU Radiocommunication Sector

to conduct appropriate studies, in time for consideration by WRC‑27, on potential new allocations to non-GSO MSS systems on a primary basis in the frequency bands below 7 GHz, in accordance with the following principles:

1 the studies should pertain to the mobile-satellite service intended to use only for direct communications between non-GSO satellites and IMT user equipment, with a view to ensuring the protection of services to which the frequency bands and the adjacent bands are allocated on a primary basis;

2 the studies should be carried out in the frequency bands below 7 GHz identified for IMT and/or allocated to MS on a primary basis, including but not limited to the following frequency bands, or parts thereof:

– 698-960 MHz;

– 1 710-1 980 MHz;

– 2 010-2 025 MHz;

– 2 110-2 170 MHz;

– 2 500-2 690 MHz;

– 3 400-3 700 MHz;

– 4 800-4 990 MHz;

3 the studies should ensure that the newly allocated mobile-satellite service shall not cause harmful interference to, nor claim protection from, other incumbent services allocated on a primary basis, including the terrestrial IMT systems in neighbouring countries;

4 the studies should ensure that operation of the newly allocated MSS only be based on the authorization by administrations within the territory under their jurisdiction,

invites the 2027 world radiocommunication conference

based on the results of studies mentioned in *resolves to invite ITU Radiocommunication Sector* above, to consider regulatory provisions for new primary allocations to MSS for non-GSO systems below 7 GHz,

invites administrations

to participate actively in these studies by submitting contributions to the ITU-R.

Attachment to Annex 4

|  |  |
| --- | --- |
| **Subject:** to conduct studies on possible new primary allocations to the mobile-satellite service for non-GSO systems operating in frequency bands below 7 GHz, in accordance with Resolution **[AI-10-IMT MSS-BELOW 7GHz]** (WRC‑23); | |
| **Origin:**China (People’s Republic of) | |
| ***Proposal：***This Administration proposes to include item 1.CC in the agenda for WRC‑27 with a corresponding draft new Resolution **[AI-10-IMT MSS-BELOW 7GHz]** **(WRC‑23)**.  *1.CC to conduct studies on possible new primary allocations to the mobile-satellite service for non-GSO systems operating in frequency bands below 7 GHz, in accordance with Resolution****[AI-10-IMT MSS-BELOW 7GHz]******(WRC‑23)****;* | |
| ***Background/reason:***  In recent years, with the extensive network deployment of IMT systems in the world, broadband and high-speed communication services for mobile phone users have been provided in densely populated scenes such as cities and hot spots. However, in remote areas such as air, sea, desert, grassland and forest, the ground mobile communication network is limited by many factors such as geographical environment and operation and maintenance cost, so it is impossible or inconvenient to deploy base stations in these areas. Therefore, the broadband mobile communication application experience of individual users has declined or is limited.  Mobile satellite service is one of the effective means to make up for the insufficient coverage of the above ground mobile communication system. The cost of the deployment of non-GSO satellite constellations, which can provide broadband connectivity, is decreasing as a result of innovations in satellite technologies. With technological development and progress, through beam control, power control, electronic fencing and out-of-band suppression, non-GSO satellite systems can effectively avoid harmful interference to existing services through cooperative operation with terrestrial services.  The frequency bands below 7 GHz are relatively mature bands supported by the mobile phone terminal industry in 5G and 6G. At present, there are limited frequency allocations of the mobile-satellite service (MSS) in frequency bands below 7 GHz.  In order to achieve the above objectives, it would be natural for mobile operators to use their authorized spectrum to extend their mobile broadband coverage to unserved areas. Currently, there are no allocations to the mobile-satellite service in most of the frequency bands used for terrestrial IMT networks. Many satellite operators are already actively cooperating with terrestrial service operators to build integrated direct-to-device satellite systems operating only under RR No. **4.4**, which is not suitable for commercial applications.  In this regard, allocations to the mobile-satellite service below 7 GHz should be considered. | |
| ***Radiocommunication services concerned*:**  The radiocommunication services concerned below 7 GHz include the mobile service, fixed service, broadcasting service, mobile-satellite service and other services. | |
| ***Indication of possible difficulties*:**  How to protect incumbent services on a primary basis from the newly allocated mobile-satellite service. | |
| ***Previous/ongoing studies on the issue*:**  Studies conducted under agenda item 1.25 during the WRC‑12 study cycle. | |
| ***Studies to be carried out by*:**  ITU-R WP 4C | ***with the participation of*:**  WP 4A, WP 4B, WP 5A, WP 5D, WP 7B, WP 7C |
| ***ITU‑R study groups concerned*:**  SG 4, SG 5, SG 7 | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  The resource implications of all activities/studies in relation to this proposed agenda item are expected to be covered within the existing ITU-R financial budget and, once agreed, within the WRC‑27 financial budget. | |
| ***Common regional proposal*:** No | ***Multicountry proposal*:** No  ***Number of countries*:** |
| ***Remarks*** | |

Annex 5

Proposal for WRC‑27 agenda item 1.DD

# 1 Background

APT developed an APT Common Proposal (ACP) on one agenda item of WRC‑27, i.e. 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-AI10-7] (WRC‑23)**.

The details of this ACP can be found in Document [62(Add.27)(Add.13)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A13!MSW-E.docx) submitted by APT to this Conference.

# 2 Proposal

The Administration of China supports the above-mentioned ACP and proposes that the agenda item 1.DD described below be included in the agenda of WRC‑27 together with the proposed text of Resolution **[ACP-AI10-7] (WRC‑23)**.

*1.DD**to study and develop 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, in accordance with Resolution****[ACP-AI10-7] (WRC‑23)****;*

ADD CHN/111A27/7

draft new Resolution [ACP-AI10-7] (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

Note: The text of this draft resolution can be found in Document [62(Add.27)(Add.13)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A13!MSW-E.docx) submitted by APT to this Conference.

Attachment 1 to Annex 5

The Attachment 1 to Annex 5 was developed based on Annex 2 to Resolution **804 (Rev.WRC‑19)**. The details of this attachment can be found in document [62(Add.27)(Add.13)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A13!MSW-E.docx) submitted by APT to this Conference.

Attachment 2 to Annex 5

Attachment 2 to Annex 5 provides additional information to support the consideration of Resolution **[ACP-AI10-7] (WRC‑23)** by WRC‑23.

# 1 Introduction

Coexistence between spaceborne SAR and RDS radars operating in the X band has been studied in the WRC‑07 and WRC‑15 study cycles, and, as a consequence, the allocation to the Earth exploration-satellite service (EESS) (active) was extended from 9 500-9 800 MHz to 9 200-10 400 MHz at those two WRCs.

# 2 Considerations on relevant study results of the 2003-2007 study cycle

## 2.1 Summaries of ITU-R studies for WRC‑07

Under WRC‑07 agenda item 1.3, the ITU Radiocommunication Sector (ITU-R) developed the following Reports:

– Report ITU-R M.2081 “Test results illustrating compatibility between representative radionavigation systems and radiolocation and EESS systems in the band 8.5-10 GHz”;

– Report ITU-R RS.2094 “Studies related to the compatibility between EESS (active) and the radiodetermination service in the 9 300-9 500 MHz and 9 800-10 000 MHz bands and between EESS (active) and the fixed service in the 9 800-10 000 MHz band”.

In Report ITU-R M.2081, the methodology to illustrate the compatibility between representative radionavigation service (RNS) radars and EESS systems in the band 8.5-10 GHz is to select one type from each of the four categories of RNS radars for an interference test. The conclusions of the test are the following:

– the marine RNS radar would not be impacted by EESS (active) at *I*/*N* levels up to 40 dB;

– the airborne weather radar would not be impacted by EESS (active) at *I*/*N* levels up to 30-54 dB;

– the ASDE radar would be impacted occasionally by EESS (active) at *I*/*N* levels of 50-60 dB;

– the precision approach radar would not be impacted by EESS (active) at *I*/*N* levels up to 20 dB.

In Report ITU-R RS.2094, the methodology to show the compatibility between EESS (active) and the RDS in the 9 300-9 500 MHz and 9 800-10 000 MHz bands is to obtain the maximum *I*/*N* level of EESS (active) for different radars based on computer simulations. The conclusions of this study are the following:

– for airborne radars, the maximum *I*/*N* level of EESS (active) is 32-45 dB;

– for ship-borne radars, the maximum *I*/*N* level of EESS (active) is 28-52 dB;

– for land-based radars, the maximum *I*/*N* level of EESS (active) is 11-23 dB;

– for meteorological radars, the maximum *I*/*N* level of EESS (active) is 24.6-28.3 dB.

The CPM Report for WRC‑07 drew the conclusions that the compatibility between EESS (active) and RDS can be achieved in the frequency bands 9 300-9 500 MHz and 9 800-10 000 MHz.

## 2.2 China’s considerations

Regarding the interference test provided in Report ITU-R M.2081, China considers that normally the performance of different radars varies greatly, even in the same category, therefore the test results for specific radars cannot represent the general situations.

Regarding the simulation results provided in Report ITU-R M.2094, China considers that in this study, only *I*/*N* simulation results were given, and that no conclusions were given on the extent of the impact on radar performance under corresponding *I*/*N*s or whether compatibility could be achieved.

# 3 Considerations on relevant study results of the 2012-2015 study cycle

## 3.1 Summaries of ITU-R studies for WRC‑15

Under WRC‑15 agenda item 1.12, ITU-R developed Report ITU-R RS.2313, on sharing analyses of wideband Earth exploration-satellite service (EESS) (active) transmissions with stations in the radio determination service (RDS) operating in the frequency bands 8 700-9 300 MHz and 9 900-10 500 MHz.

In this Report, the methodology for the sharing of the wideband EESS (active) transmissions with stations in the RDS is a combination of theoretical and simulation analysis. The conclusions of this study are the following:

– for radionavigation service (RNS) radars in the frequency band 9 000-9 200 MHz, due to their safety nature, it is difficult to share with them;

– for RNS radars in the frequency band 9 200-9 300 MHz, the maximum *I*/*N* level is 26.8 dB with the time probability of 0.00001%; and for *I*/*N* > −6 dB, the time probability is 0.00004%;

– for radiolocation service (RLS) radars in the frequency band 9 200-9 300 MHz, the maximum *I*/*N* level is 60 dB with the time probability of 0.00001%, and the total interference time is shorter than 100ms (in 11days);

– for RLS radars in the frequency band 10-10.5 GHz, the maximum *I*/*N* level is 68.6 dB with the time probability is 0.00001%, and the total interference time is shorter than 100 ms (in 11days); for *I*/*N* > −6 dB, the time probability is 0.005%, which equals to 47 seconds (8 times×6 s) (in 11days).

Based on the above studies, the CPM Report to WRC‑15 drew the following conclusions:

– in the frequency band 9 200-9 300 MHz, compatibility between radars and EESS SAR is feasible;

– regarding the compatibility between EESS (active) and the SART, operating under the GMDSS in the band 9 200-9 500 MHz, the EESS (active) emissions will be below the trigger level of the SART transponder and therefore the two are compatible;

– in the frequency band 10-10.5 GHz, all considered RLS radars would be affected with interference levels that significantly exceed the specified *I*/*N* threshold value of *I*/*N* = −6 dB (between 29.3 dB and 74.6 dB) in the worst case. The percentage of time it will occur is low and will be even lower taking processing gain into account;

– In case of multiple SAR systems (where n = number of SAR systems), the probabilities have to be multiplied by n to obtain the aggregate probability as the probabilities corresponding to each SAR system are statistically uncorrelated.

## 3.2 China’s considerations

China considers that it is not clear from the studies above what interference probability could be acceptable to RNS and RLS radar systems. Nor did they provide emission limits such as pfd limits produced by EESS (active) space stations for the protection of RNS and RLS radars from spaceborne SAR systems.

# 4 Conclusions

In summary, during the WRC‑07 and WRC‑15 study cycles, ITU-R conducted numerous studies regarding coexistence between spaceborne SAR and RDS radars operating in the X band. However, the studies performed are not sufficiently complete to demonstrate the feasibility of sharing between spaceborne SAR and RDS radars.

Therefore, China considers that further studies are needed to address various sharing issues between spaceborne SAR and RDS radars, such as the acceptable probability of interference or interference duration for RNS and RLS radar systems, protection criteria for pulsed interference, pfd limits produced by EESS (active) space stations for the protection of RNS and RLS radars from spaceborne SAR systems, relevant regulatory provisions to ensure the coexistence between spaceborne SAR and RDS radars operating in the X band.

As a conclusion, this Administration supports the ACP contained in Document [62(Add.27)(Add.13)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A13!MSW-E.docx), which proposes a new WRC‑27 agenda item to study and develop 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.

Annex 6

Proposal for WRC‑27 agenda item 1.EE

# 1 Background

Resolution **812** **(WRC‑19)** contains the following preliminary WRC‑27 agenda item 2.12:

*2.12 to consider the use of existing International Mobile Telecommunications (IMT) identifications in the frequency range 694-960 MHz, by consideration of the possible removal of the limitation regarding aeronautical mobile in IMT for the use of IMT user equipment by non-safety applications, where appropriate, in accordance with Resolution****251 (WRC‑19)****.*

APT members share the view that, should the agenda of WRC‑27 include preliminary agenda item 2.12, it is necessary that the supporting resolution for this item include, *inter alia*, protection of services to which the band is allocated and of services in the adjacent band.

The common proposal from APT on this matter is detailed in WRC‑23 Document [62(Add.27)(Add.7)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A7!MSW-E.docx), which supports the creation of a preliminary WRC‑31 agenda item in accordance with Resolution [**ACP-AI10-5**] **(WRC‑23)** to study the possible removal of the limitation regarding aeronautical mobile for the use of IMT user equipment by non-safety applications within the frequency ranges [3 400-3 600 MHz] and [3 600-3 700 MHz].

In recent years, there has been an increasing demand for broadband communications for passenger connectivity in the rear compartment of aircraft worldwide. Establishing direct connectivity between ground base stations (BS) and an aircraft based on cellular technology to enable air-to-ground (ATG) communications to provide broadband air connectivity to passengers has become one of the most important solutions. The frequency band 3 400-3 60 0MHz has been identified for IMT in the Radio Regulations. In recent years, many countries around the world have used the 3.5 GHz frequency band to deploy 5G applications and achieved considerable economic and social benefits.

In view of the above, the Administration of China supports the creation of a preliminary WRC‑31 agenda item to study the removal of the limitation regarding aeronautical mobile for the use of IMT user equipment by non-safety applications within the frequency band 3 400-3 600 MHz in order to provide broadband in-flight connectivity (IFC) to aircraft passengers.

# 2 Proposal

The Administration of China proposes that agenda item 1.EE described below be included in the agenda of WRC‑27 together with the proposed draft revised Resolution **251** **(****Rev.WRC‑23)**.

1.EE*to study the removal of the limitation regarding aeronautical mobile for the use of IMT user equipment by non-safety applications within the frequency range 3 400-3 600 MHz, in accordance with Resolution****251 (Rev.WRC‑23)***;

MOD CHN/111A27/8

RESOLUTION 251 (REV. WRC-23)

Removal of the limitation regarding aeronautical mobile in the frequency range 694-960 MHz and 3 400-3 600 MHz for the use of International Mobile Telecommunications user equipment by non-safety applications

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that there is a demand for greater connectivity for passengers and aeronautical communications in various classes of aeronautical vehicles to address existing demand and future requirements from the aeronautical community;

*b)* that current and future International Mobile Telecommunications (IMT) networks can provide connectivity services to helicopters, aircraft and unmanned aircraft systems (UAS) at lower and higher altitude;

*c)* that current and future IMT networks may provide communication functions for the beyond visual line-of-sight operation of aeronautical vehicles;

*d)* that future IMT networks have already supported direct air-ground connectivity services to commercial airplanes with specific equipment on board airplanes in some countries and regions;

*e)* that the IMT capacities identified in the *considering* paragraphs above have been demonstrated to be feasible by several studies and are currently being developed by standards development organizations,

noting

*a)* that ITU Radiocommunication Sector sharing and compatibility studies supporting the identification of specific frequency bands for IMT did not consider the use cases described in *considering b)* to *e)*;

*b)* that the frequency band 694-960 MHz is allocated on a primary basis to the mobile, except aeronautical mobile, service in Region 1;

*c)* that the frequency bands 890-902 MHz and 928-942 MHz are allocated on a primary basis to the mobile, except aeronautical mobile, service in Region 2 and that the frequency band 902‑928 MHz is allocated on a secondary basis to the mobile, except aeronautical mobile, service in Region 2;

*d)* that Nos. **5.312** and **5.323** allocate the frequency band 645-960 MHz or parts thereof to the aeronautical radionavigation service on a primary basis in several countries of Region 1;

*e)* that the frequency band 694-960 MHz is allocated on a primary basis to the broadcasting service in Region 1;

*f)* that the frequency bands under consideration are identified for use by IMT in accordance with Nos. **5.430A, 5.431A, 5.431B, 5,432A** and **5.432B**;

*g)* that Resolution **224 (Rev.WRC‑19)** addresses frequency bands for the terrestrial component of IMT below 1 GHz;

*h)* that Resolution **749 (Rev.WRC-19)**addresses the use of the frequency band 790‑862 MHz in countries of Region 1 and the Islamic Republic of Iran by mobile applications and by other services;

*i)* that Resolution **760 (Rev.WRC-19)** addresses provisions relating to the use of the frequency band 694-790 MHz in Region 1 by the mobile, except aeronautical mobile, service and by other services;

*j)* that the frequency band 3 400-3 500 MHz is allocated on a primary basis to the mobile, except aeronautical mobile service in Region 1 and Region 2;

*k)* that under Nos. **5.431B** and **5.432B**, the frequency band 3 400-3 500 MHz is allocated on a primary basis to the mobile, except aeronautical mobile service in some countries in Region 3;

*l)* that the frequency band 3 500-3 600 MHz is allocated on a primary basis to the mobile, except aeronautical mobile service in all three regions,

recognizing

that the removal of the limitation regarding aeronautical mobile in the proposed frequency bands would enable the unified use of the IMT identifications by aeronautical user equipment throughout the Regions,

resolves to invite the ITU Radiocommunication Sector, in time for the 2027 world radiocommunication conference

1 to assess relevant aeronautical mobile service scenarios for air-ground and ground-air connectivity for airborne user equipment in IMT networks to be addressed in compatibility and sharing studies;

2 to identify relevant technical parameters associated with the aeronautical mobile systems;

3 to conduct sharing and compatibility studies with existing services, including in adjacent frequency bands and between neighbouring ITU regions;

4 to determine the possibility of removing the aeronautical mobile service exception or other suitable regulatory measures in the frequency ranges 694-960 MHz in Region 1 and 890‑942 MHz in Region 2 and 3 400-3 600 MHz, based on the results of studies,

invites administrations

to participate actively in the studies,

invites the 2027 World Radiocommunication Conference

to consider the results of the above studies and take appropriate actions.

Attachment to Annex 6

|  |  |
| --- | --- |
| **Subject:** Proposal to study the removal of the limitation regarding aeronautical mobile for the use of IMT user equipment by non-safety applications within the frequency range 3 400-3 600 MHz, in accordance with Resolution **251 (Rev.WRC-23)** | |
| **Origin:** China (People’s Republic of) | |
| ***Proposal*:**  The Administration of China proposes that agenda item 1.EE described below be included in the agenda of WRC-27 together with proposed draft Resolution **251** **(Rev.WRC-23)**.  1.EE*to study the removal of the limitation regarding aeronautical mobile for the use of IMT user equipment by non-safety applications within the frequency range 3 400-3 600 MHz, in accordance with Resolution****251 (REV. WRC-23)***; | |
| ***Background/reason*:**  In order to provide efficient aeronautical communication systems, the connectivity requirements of airplanes and other aircraft are becoming more and more demanding. Several studies have shown that IMT networks can respond to this type of connectivity demand.  In recent years, there has been an increasing demand for broadband communications for passenger connectivity in the rear compartment of aircraft worldwide. Establishing direct connectivity between ground base stations (BS) and an aircraft based on cellular technology to enable air-to-ground (ATG) communications to provide broadband air connectivity to passengers has become one of the most important solutions. The frequency band 3 400-3 600MHz has been identified for IMT in the Radio Regulations. In recent years, many countries around the world have used the 3.5 GHz frequency band to deploy 5G applications and achieved considerable economic and social benefits.  In view of the above, the Administration of China supports the creation of a preliminary WRC-31 agenda item to study the removal of the limitation regarding aeronautical mobile for the use of IMT user equipment by non-safety applications within the frequency band 3 400-3 600 MHz in order to provide broadband in-flight connectivity (IFC) to aircraft passengers. | |
| ***Radiocommunication services concerned*:**  Mobile service, fixed-satellite service, broadcasting service | |
| ***Indication of possible difficulties*:**  Sharing studies with in-band radiocommunication services and services in adjacent bands | |
| ***Previous/ongoing studies on the issue*:**  Resolution **251 (WRC‑19)** | |
| ***Studies to be carried out by*:**  ITU-R Study Group 5 (Working Party 5D) | ***with the participation of*:**  *Member States, Sector Members* |
| ***ITU‑R study groups concerned*:**  SG 4, SG 5 | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  This proposed agenda item will be studied within the normal ITU-R procedures and planned budget. ITU-R WP 5D usually has meetings three times a year which last around 10 days each. | |
| ***Common regional proposal*:** No | ***Multicountry proposal*:**  No  ***Number of countries*:** |
| ***Remarks*** | |

Annex 7

Proposal for WRC-27 agenda item 1.FF

# 1 Background

Resolution **812** **(WRC-19)** contains the following preliminary WRC-27 agenda item 2.6:

*2.6 to consider regulatory provisions for appropriate recognition of space weather sensors and their protection in the Radio Regulations, taking into account the results of ITU Radiocommunication Sector studies reported to WRC‑23 under agenda item 9.1 and its corresponding Resolution****657 (Rev.WRC‑19)****.*

APT submitted a common proposal on WRC-27 preliminary agenda item 2.6:

Regulatory provisions for space weather sensors, including a definition of space weather, designating of corresponding radiocommunication service, and possible new allocations to the designated radiocommunication service (e.g., MetAids) in the frequency ranges around 30 MHz and 38.2 MHz, *and other additional frequency bands, to be decided by WRC-23* Note in accordance with Resolution **657 (Rev.WRC‑23)**;

*Note: Regarding the possibility to include other frequency bands, further consideration and coordination will be made by APT Members at WRC-23.*

The common proposal from APT on this matter is detailed in WRC-23 Document [62(Add.27)(Add.14)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A14!MSW-E.docx).

# 2 Proposal

The Administration of China is of the view that space weather observations are important for detecting and forecasting solar activity events that impact services critical to the economy, safety and security of administrations and their population. These observations are made from ground-based and space-based systems. Some of the sensors operate by receiving signals of opportunity, including low-level natural emissions of the sun, Earth’s atmosphere and other celestial bodies, and therefore may suffer harmful interference at levels which could be tolerated by other radio systems. However, no frequency bands have been allocated in the Radio Regulations for space weather sensor applications.

The Administration of China proposes that agenda item 1.FF described below be included in the agenda of WRC-27 and that the frequency band 27.5-30.2 MHz be included in the studies conducted under this agenda item.

*1.FF to consider regulatory provisions for space weather sensors, including a definition of space weather, designating of corresponding radiocommunication service, and possible new allocations to the designated radiocommunication service (e.g., MetAids) in the frequency ranges around 30 MHz and 38.2 MHz, and other additional frequency bands, to be decided by WRC-23 Note in accordance with Resolution****657 (Rev.WRC‑23)****;*

*Note: Regarding the possibility to include other frequency bands, further consideration and coordination will be made by APT Members at WRC-23.*

MOD CHN/111A27/9

RESOLUTION 657 (REV.WRC‑23)

Studies on possible regulatory provisions for recognition in the Radio Regulations of space weather sensors and new allocations to the corresponding radiocommunication service

...

resolves to invite the ITU-R to conduct and complete in time for the 2027 world radiocommunication conference

1 the sharing and compatibility studies with existing services allocated in the frequency bands 27.5-30.2 MHz, 38.075-38.325 MHz, *and other additional frequency bands, to be decided by WRC-23* *Note* to determine the possibility of new allocations to the MetAids service for use by space weather sensors without imposing additional regulatory or technical constraints on those services;

*Note: Regarding the possibility to include other frequency bands, further consideration and coordination will be made by APT Members at WRC-23.*

...

**Reasons:** The Administration of China supports the draft revised Resolution **657 (Rev.WRC‑23)** as provided in Proposal number “MOD ACP/62A27A14/2” of the APT input Document [62(Add.27)(Add.14)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A14!MSW-E.docx). However, China also proposes to include the frequency band 27.5-30.2 MHz in “*resolves to invite the ITU-R to conduct and complete in time for the 2027 world radiocommunication conference* 1”.

Attachment to Annex 7

Attachment 1 to Annex 7 was developed based on Annex 2 to Resolution **804 (Rev.WRC-19)**. The details of this attachment can be found in Document [62(Add.27)(Add.14)](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0062!A27-A14!MSW-E.docx) submitted by APT to WRC‑23. The only thing to note is that China proposes to include the frequency band 27.5-30.2 MHz as a potential candidate band to be studied.

Annex 8

Proposal for WRC-27 agenda item 1.GG

# 1 Background

Resolution **812** **(WRC-19)** contains the following preliminary WRC-27 agenda item 2.8:

*2.8 to study the technical and operational matters, and regulatory provisions, for space-to-space links in the frequency bands [1 525-1 544 MHz], [1 545-1 559 MHz], [1 610-1 645.5 MHz], [1 646.5 1 660.5 MHz] and [2 483.5-2 500 MHz] among non-geostationary and geostationary satellites operating in the mobile-satellite service, in accordance with Resolution****249 (WRC 19)***.

# 2 Proposal

The Administration of China proposes that agenda item 1.GG described below be included in the agenda of WRC-27 together with the proposed draft revised Resolution **249** **(Rev.WRC-23)**.

*1.GG to study the technical and operational matters, and regulatory provisions, for inter-satellite links in the frequency bands 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz and in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 613.8-1 626.5 MHz, 2 483.5-2 500 MHz among non-geostationary and geostationary satellites operating in the mobile-satellite service, in accordance with Resolution* ***249 (Rev.WRC-23)****.*

MOD CHN/111A27/10

RESOLUTION 249 (REV. WRC‑23)

Study of technical and operational issues and regulatory provisions for inter-satellite links in the frequency bands 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz and in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 613.8-1 626.5 MHz, 2 483.5-2 500 MHz among non-geostationary and geostationary satellites operating in the mobile-satellite service

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that the definition of mobile-satellite service (MSS) in No. **1.25** includes communication between space stations;

*b)* that the definition of inter-satellite service (ISS) in No. **1.22** includes only links between space stations, and that the term *inter-satellite link* in this resolution is taken to mean a radiocommunication service link between artificial satellites;

*c)* that many non-geostationary-satellite orbit (non-GSO) satellites operate with limited and non-real-time connectivity to earth stations;

*d)* that inter-satellite links between such non-GSO satellites and geostationary-satellite orbit (GSO) MSS satellites would enhance the efficiency of operations;

*e)* that MSS satellites operating in the frequency bands 1 518‑1 544 MHz, 1 545‑1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz and 2 483.5-2 500 MHz can support these types of operation;

*f)* that using the frequency bands 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz and 1 668-1 675 MHz allocated to the MSS (Earth-to-space) for transmissions from non-GSO MSS space stations towards MSS space stations operating at higher orbital altitudes, including GSO, may increase spectral efficiency in these frequency bands;

*g)* that using the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 613.8‑1 626.5 MHz and 2 483.5‑2 500 MHz allocated to the MSS (space-to-Earth) for transmissions from MSS space stations operating at higher orbital altitudes, including GSO, towards non-GSO MSS satellites, may increase spectral efficiency in these frequency bands;

*h)* that all MSS allocations in the above frequency bands include a space-to-Earth or Earth-to-space direction indicator, but do not include a space-to-space direction indicator;

*i)* that the ITU Radiocommunication Sector (ITU‑R) has begun preliminary studies on the technical and operational issues associated with the operation of inter-satellite links between non-GSO MSS satellites and GSO MSS satellites in part of the above frequency bands, but no studies have been conducted on the technical and operational issues associated with the operation of inter-satellite links between non-GSO MSS satellites and non-GSO MSS satellites in the above frequency bands;

*j)* that it is technically feasible for a lower orbital altitude non-GSO space station to transmit data to and receive data from a higher orbital altitude non-GSO or GSO space station when passing within the satellite antenna coverage beam that is directed towards the Earth;

*k)* that several satellite systems have been relying on inter-satellite communication in part of the above frequency bands under No. **4.4**, and such reliance on No.**4.4** does not provide a sound basis for continued development of such systems nor the confidence in commercial viability and availability of the service to the end users;

*l)* that there is growing interest for utilizing inter-satellite links for a variety of applications;

*m)* that a precedent for inter-satellite links sharing with Earth-to-space and space-to-Earth exists for the space operation, Earth exploration-satellite and space research services in the frequency bands 2 025-2 110 MHz and 2 200-2 290 MHz through the inclusion of a space-to-space allocation,

recognizing

*a)* that it is necessary to study the impact on other services, as well as Earth-to-space and space-to-Earth operation within the MSS, of the operation of inter-satellite links in the above frequency bands, taking into account applicable footnotes to the Table of Frequency Allocations, to ensure compatibility with all primary allocated services in these frequency bands and the adjacent frequency bands and avoid harmful interference;

*b)* that there should be no additional regulatory or technical constraints imposed on primary services to which the frequency band and adjacent frequency bands are currently allocated;

*c)* that it is necessary to study whether space-to-Earth direction transmissions from space stations at higher orbital altitudes, including GSO, can be successfully received by lower orbital altitude non-GSO satellites, without imposing any additional constraints on all allocated services in these frequency bands;

*d)* that the sharing scenarios may vary widely because of the wide variety of orbital characteristics of the non-GSO MSS space stations;

*e)* that out-of-band emissions, signals due to antenna pattern sidelobes, reflections from receiving space stations and in-band unintentional radiation due to Doppler shifts may impact services operating in the same and adjacent or nearby frequency bands;

*f)* that currently the only option for MSS space stations in the frequency bands 1 518‑1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646-1 660.5 MHz, 1 668-1 675 MHz and 2 483.5‑2 500 MHz needing to communicate with other orbital space stations is to operate under No. **4.4**, without recognition and on a non-harmful interference/non-protected basis in frequency bands allocated to another space service,

recognizing further

*a)* that the use of frequency bands by the MSS in the frequency range 1-3 GHz is subject to existing Resolutions, coordination requirements and country footnotes taking into account, in particular, the protection of safety services and aeronautical mobile-satellite (R) services, and of the Global Maritime Distress and Safety System;

*b)* that the fixed and mobile services are allocated on a primary basis in the frequency band 2 483.5-2 500 MHz on a global basis and that the fixed service is also allocated on a primary basis in the frequency band 1 525-1 530 MHz in Regions 1 and 3;

*c)* that the radionavigation-satellite service is allocated on a primary basis in the frequency band 1 559-1 610 MHz for both space-to-Earth and space-to-space use,

noting

*a)* that section 3.1.3.2 of the Director’s Report to this conference highlights that the Radiocommunication Bureau has received an increased number of Advance Publication Information (API) submissions for non-GSO networks in frequency bands which are not allocated by Article **5** for the type of service foreseen, including satellite network filings for inter-satellite links in frequency bands allocated to MSS only in the Earth-to-space or space-to-Earth directions;

*b)* that the Director’s Report concludes that, in view of recent technical developments and the increasing number of submissions of inter-satellite links in frequency bands not allocated to the ISS or to a space service in the space-to-space direction, this conference may wish to consider means to give recognition to these uses based on the conditions derived from studies by ITU‑R Working Parties 4A and 4C in order to avoid interfering with existing systems operating in the same frequency bands,

resolves to invite the ITU Radiocommunication Sector

1 to study the technical and operational characteristics of different types of non-GSO MSS space stations that operate or plan to operate inter-satellite links with GSO MSS space stations in the following frequency bands:

a) Earth-to-space direction in the frequency bands 1 626.5-1 645 5 MHz and 1 646.5‑1 660.5 MHz; and

b) space-to-Earth direction in the frequency bands 1 525-1 544 MHz and 1 545‑1 559 MHz;

2 to study the technical and operational characteristics of different types of non-GSO MSS space stations that operate or plan to operate inter-satellite links with non-GSO MSS space stations and GSO MSS space stations in the following frequency bands:

a) Earth-to-space direction in the frequency bands 1 610-1 626.5 MHz and 1 668-1 675 MHz; and

b) space-to-Earth direction in the frequency bands 1 518-1 525 MHz, 1 613.8-1 626.5 MHz and 2 483.5‑2 500 MHz;

3 to study sharing and compatibility between inter-satellite links in the cases described in *resolves to invite the ITU Radiocommunication Sector* 1 and 2 and

– Earth-to-space and space-to-Earth links within the MSS;

– other existing services allocated in the same frequency bands; and

– other existing services allocated in adjacent frequency bands,

in order to ensure protection of, and not impose undue constraints on, existing MSS allocations and other services in those frequency bands and their adjacent frequency bands, taking into account *recognizing further* *a)* to *c)*;

4 to develop technical conditions and regulatory provisions for the operation of inter-satellite links in these frequency bands, including new MSS (space-to-space) allocations, while ensuring the protection of, and without imposing additional constraints on, existing MSS allocations and other services in those frequency bands and their adjacent frequency bands, taking into account the results of the studies called for in *resolves to invite the ITU Radiocommunication Sector*1, 2,and 3above;

5 to complete these studies by WRC-27,

invites administrations

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

invites the 2027 World Radiocommunication Conference

to consider the results of the above studies and take necessary regulatory actions, as appropriate.

**Reasons:**   
1) Inclusion of the frequency bands 1 668-1 675 MHz and 1 518-1 525 MHz into the scope of the study.  
The frequency bands 1 668-1 675 MHz (Earth-to-space) and 1 518-1 525 MHz (space-to-Earth) are allocated to the mobile-satellite service on a primary basis. Considering the potential use of the frequency bands for inter-satellite links (ISL), it is necessary to include these frequency bands in the study to develop technical conditions and regulatory provisions to support the development of ISL applications while ensuring the protection of existing services in the same and adjacent frequency bands.  
2) Deletion of “on a secondary basis” *in resolves to invite the ITU Radiocommunication Sector* 4  
The regulatory provisions for such ISL should be based on the results of the study and it is possible that ISL in some of the frequency bands under this resolution could operate on a primary basis.  
3) Other editorial changes to enhance consistency and to use ITU terminology.

Attachment to annex 8

|  |  |
| --- | --- |
| **Subject:** to study the technical and operational matters, and regulatory provisions, for inter-satellite links in the frequency bands 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz and in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 613.8-1 626.5 MHz, 2 483.5-2 500 MHz among non-geostationary and geostationary satellites operating in the mobile-satellite service, in accordance with Resolution **249 (Rev.WRC-23)**. | |
| **Origin**: China (People's Republic of) | |
| ***Proposal:***  The Administration of China proposes that agenda item 1.GG described below be included in the agenda of WRC-27 together with the proposed draft revised Resolution **249** **(Rev.WRC-23)**.  *1.GG to study the technical and operational matters, and regulatory provisions, for inter-satellite links in the frequency bands 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz and in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 613.8-1 626.5 MHz, 2 483.5-2 500 MHz among non-geostationary and geostationary satellites operating in the mobile-satellite service, in accordance with Resolution* ***249 (Rev.WRC-23)****.* | |
| ***Background/reason:***  In recent years, with the rapid development of low-Earth orbit space stations for scientific, academic and commercial purposes, the demand for data transmission has increased sharply. Although different systems have different requirements for data types and transmission rates, they do have one thing in common, the need to transmit data down to the Earth. When the receiving earth station is not within the coverage area of the satellite beam, data cannot be transmitted. This will lower data transmission efficiency. The use of inter-satellite links can meet the data transmission needs of satellites at different altitudes, which is of great significance to improve transmission efficiency and reduce costs.  At present, some L-band satellite-mobile service (MSS) allocations are limited to Earth-to-space or space-to-Earth communications, hence cannot support the space-to-space transmission of data. According to the Director’s Report, the number of satellite networks submitted to ITU is increasing within the frequency bands not allocated to the inter-satellite service (ISS) or to space services not in the space-to-space direction. Studies are urgently needed to establish regulatory measures so that the use of these applications does not cause interference to the mobile-satellite service (MSS) services in the same and adjacent bands.  Studies on inter-satellite links between non-geostationary satellites and geostationary satellites in the mobile-satellite service (MSS) in the L-band are to be conducted to optimize the use of frequency resources by extending the use of inter-satellite links in relevant frequency bands to meet the growing demands for inter-satellite communications, data relay, etc. Technical studies and regulatory provisions will provide a legal basis for the existing inter-satellite communication applications in order to avoid interference to applications and systems operating in the same and adjacent bands. | |
| ***Radiocommunication services concerned:***  Mobile-satellite service | |
| ***Indication of possible difficulties:***  If the above frequency bands are used for inter-satellite links, detailed analysis is required to ensure compatibility with existing services. | |
| ***Previous/ongoing studies on the issue:***  **Resolution 249 (WRC-19)** | |
| ***Studies to be carried out by:***  ITU-R Study Group 4 | ***With the participation of:***  Administrations and Sector Members |
| ***ITU-R Study Groups concerned:***  ***TBD*** | |
| ***ITU resource implications, including financial implications (refer to CV126):***  This agenda item will be studied within the normal ITU-R procedures and planned budget. | |
| ***Common regional proposal:* No** | ***Multicountry proposal:* No**  *Number of countries:* |
| ***Remarks*** | |

annex 9

Proposal for WRC-27 agenda item 1.HH

# 1 Background

Resolution **812** **(WRC-19)** contains the following preliminary WRC-27 agenda item 2.10:

*2.10 to consider improving the utilization of the VHF maritime frequencies in Appendix****18****, in accordance with Resolution****363******(WRC‑19)****.*

# 2 Proposal

The Administration of China proposes that agenda item 1.HH described below be included in the agenda of WRC-27 together with proposed draft Resolution **363** **(Rev.WRC-23)**.

*1.HH to consider improving the utilization of the maritime radiocommunications and channel arrangements, in accordance with Resolution****363******(Rev.WRC-23)****;*

MOD CHN/111A27/11

RESOLUTION 363 (REV.WRC‑23)

Considerations to improve utilization of the VHF maritime  
 frequencies in Appendix 18

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that the ITU Radiocommunication Sector (ITU‑R) is conducting ongoing studies on improving efficiency in the use of Appendix **18** to respond to the emerging demands for new uses and to ease congestion;

*b)* that transitional arrangements from analogue voice to digital voice VHF radios need effective and compatible transition solutions;

*c)* that use of existing maritime mobile service (MMS) allocations, where practicable, for ship and port security and enhanced maritime safety would be preferable, particularly where international interoperability is required, and should not prejudice future use;

*d)* that the VHF Data Exchange System (VDES) Ranging Mode (R‑Mode) is a radionavigation system designed to provide emergency systems to support e‑navigation in the event of a temporary interruption of the Global Navigation Satellite System (GNSS),

recognizing

*a)* that Appendix **18** identifies frequencies to be used for distress and safety communications and other maritime communications on an international basis;

*b)* that it is desirable to enhance maritime safety and ship and port security via spectrum-dependent systems;

*c)* that ITU and relevant international organizations have initiated related studies on the use of digital technologies for maritime safety and ship and port security;

*d)* that studies will be required to provide a basis for considering possible regulatory provisions to improve maritime safety and ship and port security, which may need access to spectrum for experimental use;

*e)* that, in order to provide worldwide interoperability of equipment on ships, there should be harmonized technologies, or interoperable technologies, implemented under Appendix **18**;

*f)* that administrations’ and some relevant international organizations’ efforts to continue the development of R‑Mode to support the implementation of e-navigation may require a review of the Radio Regulations,

noting

*a)* that WRC‑12, WRC‑15 and WRC‑19 have reviewed Appendix **18** to improve use and efficiency for data communication using digital systems;

*b)* that maritime on-board communication systems have implemented digital technologies for voice communication as described in Recommendation ITU‑R M.1174 to improve efficient use of the frequency band 450-470 MHz;

*c)* that digital systems have been implemented in the land mobile service,

resolves to invite the 2027 World Radiocommunication Conference

1 to consider possible changes to Appendix **18** in order to enable use in the MMS for future implementation of new technologies, for improving efficient use of the maritime frequency bands;

2 to consider possible changes to the Radio Regulations for implementation of R‑Mode as a new maritime radionavigation service,

invites relevant international organizations

to participate actively in the studies by providing requirements and information that should be taken into account in ITU‑R studies,

invites the ITU Radiocommunication Sector

to conduct studies to determine the necessary regulatory provisions and spectrum needs according to *resolves to invite the 2027 World Radiocommunication Conference*,

instructs the Secretary-General

to bring this Resolution to the attention of IMO and other international and regional organizations concerned.

attachment to annex 9

|  |  |
| --- | --- |
| **Subject:** to consider improving the utilization of the maritime radiocommunications and channel arrangements, in accordance with Resolution **363** **(Rev.WRC-23)** | |
| **Origin**: China (People's Republic of) | |
| ***Proposal:***  The Administration of China proposes that agenda item 1.HH described below be included in the agenda of WRC-27 together with the proposed draft revised Resolution **363** **(Rev.WRC-23)**.  *1.HH to consider improving the utilization of the maritime radiocommunications and channel arrangements, in accordance with Resolution****363******(Rev.WRC-23)*** | |
| ***Background/reason:***  ITU-R is currently conducting studies on the implementation of VHF digital voice and improvement of the automatic connection system (ACS) in MF and HF maritime mobile frequency bands.  There is increasing congestion and interference in VHF maritime mobile analogue voice communication channels. Digitalization is a solution to improve channel efficiency of the VHF maritime mobile communications. The channel efficiency can be improved up to four times by converting each 25 kHz analogue voice channel in RR Appendix **18** into four 6.25 kHz digital voice channels.  VHF data exchange system (VDES) Ranging mode (R-Mode) is a possible candidate as a regional backup of GNSS. In order to introduce R-Mode in the marine VHF band, it is necessary to add allocations for the radionavigation service in the frequency band currently allocated to the maritime mobile service. | |
| ***Radiocommunication services concerned:***  Maritime mobile service and radionavigation service | |
| ***Indication of possible difficulties:***  None | |
| ***Previous/ongoing studies on the issue:***  Resolution **363 (WRC‑19)**  Recommendation ITU-R M.1084-5  Reports ITU-R M.2010-1 and M.2231  Report ITU-R M.[DIGITAL-VOICE] | |
| ***Studies to be carried out by:***  ITU-R SG 5/WP 5B | ***With the participation of:***  Administrations and sector members |
| ***ITU-R Study Groups concerned:***  ***TBD*** | |
| ***ITU resource implications, including financial implications (refer to CV126):***  ITU-R WP 5B usually has meetings twice a year which last around 10 days each. | |
| ***Common regional proposal:* No** | ***Multicountry proposal:* No**  *Number of countries:* |
| ***Remarks*** | |

annex 10

Proposal for preliminary WRC-31 agenda item 2.XXX

# 1 Background

Resolution **812** **(WRC-19)** contains the following preliminary WRC-27 agenda item 2.2:

*2.2**to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service, in accordance with Resolution****176 (WRC‑19)****.*

# 2 Proposal

The Administration of China is of the view that it is not necessary to include item 2.2 in the agenda of WRC-27. This Administration supports this item being included in the preliminary agenda of WRC-31 as item 2.XXX. This Administration also proposes the draft new Resolution **[AI10-PRE-2031] (WRC-23)** and draft revised Resolution **176 (Rev.WRC‑23)**.

*2.XXX to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service, in accordance with Resolution****176 (Rev.WRC‑23)***

ADD CHN/111A27/12

draft new resolution [AI10-PRE-2031] (WRC-23)

Preliminary Agenda for the 2031 World Radiocommunication Conference

The World Radiocommunication Conference (Dubai, 2023),

…

2 on the basis of proposals from administrations and the Report of the Conference Preparatory Meeting, and taking account of the results of WRC‑23, to consider and take appropriate action in respect of the following items:

2.XXX to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service, in accordance with Resolution **176 (Rev.WRC‑23)**.

MOD CHN/111A27/13

RESOLUTION 176 (REV.WRC‑23)

Use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz   
(Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service

The World Radiocommunication Conference (Dubai, 2023),

…

Editor’s note: No changes are proposed to the “considering” part.

recognizing

…

*p)* that the frequency band 50.2-50.4 GHz is allocated on a primary basis to the EESS (passive) and SRS (passive) and the frequency bands 36-37 GHz and 52.6-59.3 GHz are allocated on a primary basis to the EESS (passive);

*q)* that all allocated services in these frequency bands should be taken into account,

resolves to invite the ITU Radiocommunication Sector

1 to study the technical and operational characteristics of aeronautical and maritime ESIMs that plan to operate within GSO FSS allocations in the frequency bands 37.5-39.5 GHz, 40.5‑42.5 GHz, 47.2-50.2 GHz and 50.4‑51.4 GHz;

2 to study sharing and compatibility between aeronautical and maritime ESIMs operating with GSO FSS networks in the frequency bands 37.5-39.5 GHz, 40.5‑42.5 GHz, 47.2‑50.2 GHz[[2]](#footnote-3)\* and 50.4-51.4 GHz\* and current and planned stations of primary services allocated in these frequency bands and in adjacent frequency bands, including passive services, in order to ensure protection of, and not impose undue constraints on, those services;

3 to develop, for different types of ESIM, technical conditions and regulatory provisions for their operation, taking into account the results of the studies above,

invites the 2031 World Radiocommunication Conference

to consider the results of the above studies and take necessary actions, as appropriate, provided that the results of the studies referred to in *resolves to invite the ITU Radiocommunication Sector* are complete and agreed by the radiocommunication study groups.

**Reasons:** This Administration is of the view that the demand to operate FSS ESIMs in the 40/50GHz bands is not urgent at this stage, and that the existing EESS (passive) and SRS (passive) services operating in the bands under consideration and adjacent bands need to be adequately protected. In view of the workload of WRC-27 and the relatively low priority of studying FSS ESIMs in the 40/50GHz bands at this stage, this Administration does not support including this item in the Agenda of WRC-27. It should be included in the Agenda of WRC-31 instead.

attachment to annex 10

|  |  |
| --- | --- |
| **Subject:**  to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service, in accordance with Resolution **176 (Rev.WRC‑23)** | |
| **Origin:** China (People's Republic of) | |
| ***Proposal*:**  The following item should be included in the preliminary agenda of WRC-31 as item 2.XXX. The draft new Resolution **[AI10- PRE-2031] (WRC-23)** and draft revised Resolution **176 (Rev.WRC‑23)** are also proposed.  *2.XXX to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service, in accordance with Resolution****176 (Rev.WRC‑23)*** | |
| ***Background/reason:***  There is an increasing need for mobile communications using global broadband satellite services in the frequency bands 40/50 GHz. Studies of aeronautical and maritime earth stations in motion (ESIMs) communicating with FSS space stations need to be conducted. Technical, operational and regulatory studies of aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed-satellite service in the frequency bands 37.5-39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) will facilitate satisfying the increasing demands in these bands, and achieving compatibility with allocations in these bands and the adjacent bands. However, with the studies on and the use of ESIMs in the fixed-satellite service in the Ka band and the development of satellite systems in the Q/V bands still ongoing, the use of FSS ESIMs in the 40/50 GHz bands is not urgent.  Meanwhile, the existing EESS (passive) and SRS (passive) services operating in the adjacent bands have already been enduring harmful interference from FSS satellite systems operating in the Q/V bands, if FSS ESIMs in the 40/50 GHz bands are deployed, the potential harmful interference into the EESS (passive) and SRS (passive) systems in the 50.2-50.4GHz frequency band will be increased.  Therefore, any agenda item dealing with ESIMs in the bands 37.5‑39.5 GHz (space-to-Earth), 40.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) should give adequate consideration to the need to protect space science services allocations (SRS, EESS, EESS (passive)) in the considered bands and the adjacent bands, without imposing additional constraints. | |
| ***Radiocommunication services concerned*:**  Fixed-satellite service, space research service, earth exploration-satellite service and earth exploration-satellite service (passive) | |
| ***Indication of possible difficulties*:** None | |
| ***Previous/ongoing studies on the issue*:**  Resolution **176 (WRC‑19)** | |
| ***Studies to be carried out by*:**  ITU-R Working Party 4A | ***with the participation of*:**  TBD |
| ***ITU‑R study groups concerned*:**  ITU-R Study Group 4 | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  ITU-R Working Party 4A usually has meetings twice a year, each requiring 10 working days. | |
| ***Common regional proposal:* No** | ***Multicountry proposal:* No**  ***Number of countries:*** |
| ***Remarks*** | |

ANNEX 11

Proposals for other WRC-27 agenda items

# 1 Introduction

In addition to the above-mentioned views on the establishment of new WRC-27 agenda items, the Administration of China also wishes to express its views on proposals for new WRC-27 agenda items put forward by regional organizations.

The views are detailed below.

# 2 Proposals

## 2.1 Identification of frequency bands in the 7-24 GHz range for the terrestrial component of IMT

It is noted that, in a regional group, there were discussions on establishing a WRC-27 agenda item to consider identification of frequency bands in the 7-24 GHz frequency range for the terrestrial component of IMT, but no agreement was reached to submit a regional common proposal.

CHN/111A27/14

**China does not support the proposal to establish a WRC agenda item to consider identification of frequency bands in the 7-24 GHz frequency range for the terrestrial component of IMT.**

**Reasons:** The 7-24 GHz range is allocated to several radio services, including the fixed-satellite service (both uplink and downlink), Earth exploration-satellite service (both active and passive), meteorological-satellite service, broadcasting-satellite service, space research service, radio astronomy, fixed service, radiolocation service, etc. These services use the frequency range 7-24GHz extensively and will continue to develop in this range.

## 2.2 Spectrum management issues on wireless power transmission

It is noted that there is a proposal from a regional telecommunication organization to establish a WRC agenda item on wireless power transmission (WPT) spectrum management issues.

CHN/111A27/15

**China does not support the proposal to establish a WRC agenda item on WPT spectrum management issues. China believes that relevant studies can continue to be carried out at the ITU-R study group level in accordance with normal working procedures.**

**Reasons:** ITU-R has initiated studies on spectrum management aspects of WPT. Working parties under Study Group (SG) 1 have developed a series of recommendations and reports on the technical and spectrum management aspects of WPT. Multiple rounds of liaison statements have been exchanged among SG 5, SG 6, SG 7 and SG 1. In view of this, there is no need to create a new WRC agenda item to study spectrum management issues of WPT. Such studies can continue to be carried out at the ITU-R study group level in accordance with normal working procedures.

## 2.3 Use of the frequency band 51.4-52.4 GHz by gateway earth stations transmitting to non-geostationary satellite systems operating in the fixed-satellite service (FSS) (Earth-to-space)

It is noted that several regional organizations have proposed a new agenda item for WRC-27 to study the use of the frequency band 51.4-52.4 GHz by gateway earth stations transmitting to non-geostationary satellite orbit systems operating in the fixed-satellite service (FSS) (Earth-to-space).

It is worth noting that:

a) WRC-19, pursuant to Resolution **162 (WRC-15)**, allocated the frequency band 51.4-52.4 GHz to the FSS (Earth-to-space) on a primary basis, and adopted RR No. **5.555C**, which limits the use of the FSS allocation to geostationary satellite networks and associated gateway earth stations with a minimum antenna diameter of 2.4 metres;

b) RR No. **5.340** stipulates that all emissions are prohibited to protect the EESS (passive) and SRS (passive) services in the frequency bands 50.2-50.4 GHz and 52.6-54.25 GHz;

c) RR No. **5.556** stipulates that radio astronomy observations may be carried out under national arrangements in the frequency bands 51.4-54.25 GHz, 58.2-59 GHz and 64-65 GHz.

CHN/111A27/16

**China does not support the proposal to establish a WRC-27 agenda item on the use of the frequency band 51.4-52.4 GHz by gateway earth stations transmitting to non-geostationary satellite systems operating in the fixed-satellite service (FSS) (Earth-to-space).**

**Reasons:** The frequency bands 50.2-50.4 GHz and 52.6-59.3 GHz are important microwave passive remote sensing frequency bands (adjacent to 51.4-52.4 GHz), which should be fully protected. There are many passive satellite sensors operating in these two passive remote sensing frequency bands worldwide. The frequency band 50.2-50.4 GHz is the reference window for atmospheric temperature profiling (surface temperature). The frequency band 52.6-59.3 GHz is an important detection frequency band for atmospheric temperature profiling (O2 absorption lines), used to detect temperature profiles, cloud liquid water, snow and lake ice morphology, oil slicks, etc. Considering the large number of non-GSO FSS gateway stations, if this frequency band is used for non-GSO FSS (Earth-to-space), it will increase the risk of interference to passive remote sensing operating in adjacent frequency bands.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 1 Including studies with respect to services in adjacent bands, as appropriate. [↑](#footnote-ref-1)
2. Resolution \* For the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz, sharing and compatibility studies for aeronautical ESIM should take into account all necessary steps to protect the terrestrial services to which the frequency band is allocated to. [↑](#footnote-ref-3)