

India (Republic of)

PROPOSAL FOR PRELIMINARY VIEWS ON WRC-27 AGENDA ITEM 1.15

Agenda Item 1.15:

to consider studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface, in accordance with Resolution **680 (WRC-23)**;

Resolution 680 (Rev.WRC-23):

Studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface

Resolution 680 (Rev.WRC-23) resolves to invite ITU-R:

studies of the spectrum needs of systems in the SRS (space research service) which may operate on the lunar surface, or systems in lunar orbit communicating with systems on the lunar surface, in the following frequency ranges or portions thereof, taking into account noting a), b) and c)

390-406.1 MHz, 420-430 MHz and 440-450 MHz, limited to outside the SZM (Shielded Zone of the Moon), 2 400-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775 5 925 MHz, 7 190-7 235 MHz, 8 450-8 500 MHz and 25.25-28.35 GHz;

Background:

World Radiocommunication Conference 2023 (WRC-23) adopted **Resolution 680** (**Rev.WRC-23**), recognizing the increasing global interest and activity in lunar exploration and development. This resolution mandates studies on frequency-related matters to support future communication systems on the lunar surface and between lunar orbit and the lunar surface. Agenda Item 1.15 of the upcoming World Radiocommunication Conference (WRC-27) is dedicated to considering the outcomes of these studies, including potential new or modified space research service (space-to-space) allocations. Current Situation and Motivation:

i. Growing Lunar Activity - Several space agencies and private entities worldwide have ambitious plans for lunar missions, including scientific research, resource utilization, and eventual human presence.

- Need for Robust Communication These activities will necessitate reliable and high-capacity communication links for various purposes, such as communication between astronauts, rovers, scientific instruments, and habitats on the lunar surface.
- Orbit-Surface Links Communication between lunar orbiters (for relay, observation, etc.) and assets on the lunar surface.
- As lunar infrastructure develops, there may be a need for more complex communication networks, potentially including space-to-space links between lunar orbiters.
- ii. Limited Existing Spectrum Current frequency allocations may not be sufficient or optimally suited to support the diverse and evolving communication requirements of future lunar missions.
- iii. Interference Concerns As lunar activity increases, effective spectrum management will be crucial to avoid interference between different lunar communication systems and with existing terrestrial and space-based services.
- iv. Space Research Service (SRS) The Space Research Service is currently the primary service used for communication related to space exploration. However, the specific needs of lunar surface and orbit-surface communications might necessitate new allocations or modifications within this service, particularly for space-to-space links that could become relevant for complex lunar networks.

Resolution 680 specifically calls for studies to address suitable frequency bands, considering propagation characteristics in the lunar environment, and analyzing potential interference scenarios. The studies should explore the necessity and feasibility of creating new or adjusting existing allocations within the SRS to specifically cater to communication links between orbiting lunar assets. The studies should take into account the anticipated evolution of lunar missions and their increasing communication demands.

The results of the studies conducted under Resolution 680 will form the basis for discussions under WRC-27 Agenda Item 1.15, evaluating the technical and operational requirements for future lunar communications, determining if adjustments to the Radio Regulations are necessary to adequately support lunar activities, establishing a regulatory framework that promotes efficient spectrum utilization and minimizes interference.

India's Preliminary Views:

India supports ongoing ITU-R studies under Agenda Item 1.15, noting that the studies mandated by WRC-23 Resolution 680 will provide the necessary technical and operational basis for informed decisions at WRC-27, while ensuring continued protection of services to which these bands are allocated on the Earth and in the space around the earth.