Satellite System Innovations and Broadband NGSO Vision

Challenges and Opportunities for Sharing FSS Spectrum

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Boeing’s GSO Satellite Legacy

Boeing has designed and manufactured GSO satellites for more than 20 nations and/or companies in those nations

- GSO networks are the backbone of the satellite industry and of Boeing’s business
- Boeing’s efforts will protect the robust and effective operations of current and future GSO networks
- NGSO systems can contribute significantly to the future of the satellite industry and help deliver global broadband services
NGSO global broadband communications serves users worldwide

- Uses innovative spacecraft technology designs to provide global broadband access.
- Can provide a variety of affordable advanced communications services including broadband access, multimedia access, video streaming, distance learning and medicine, IP voice and other services to all users.
- Enhances spectrum efficiency using next-generation satellite and earth station technology, and by intensively reusing existing satellite spectrum.
NGSO Broadband Vision

- Technological advances bring within reach the benefits of global broadband services using NGSO satellites
  - Significant progress in satellite design and launch capabilities
  - Advances enable mass-produced, satellite-tracking user terminals
  - Advances in satellite technology allow for efficient sharing of FSS spectrum between NGSO satellite systems and other services
- NGSO systems could efficiently utilize existing FSS spectrum to make new services globally available, including bringing broadband to unserved and underserved locations and consumer groups
- The Radio Regulations were developed based on previous generations of NGSO technologies and effectively preclude operating NGSO systems to fulfill the vision of a true NGSO global broadband system
- WRC-19 has the opportunity to update regulatory provisions to enable NGSO systems to deliver global broadband services while protecting GSO networks and other primary services. This affords great potential to significantly reduce the digital divide and substantially improve use of spectrum and orbit resources.
• WRC-15 adopted Agenda Item 1.6 and Issue 9.1.3 of Agenda Item 9.1 with a view to study a range of issues associated with the development of technical and regulatory frameworks for next-generation NGSO FSS systems.

• ITU-R Working Party 4A is responsible working group for these Agenda Items.

• Agenda Item 9.1, Issue 9.1.3 seeks to enable new NGSO FSS systems using circular orbits in C-band (3 700-4 200 MHz, 4 500-4 800 MHz, 5 925-6 425 MHz and 6 725-7 025 MHz).

• Agenda Item 1.6 seeks to develop a regulatory framework to enable NGSO FSS systems to operate efficiently in V-band (37.5-42.5 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz).

• ITU-R Working Party 4A initiated studies on both Agenda Items, including adoption of Work Plans that provide milestones to complete the necessary studies in advance of WRC-19.
WRC-19 Agenda Item 9.1, Issue 9.1.3

- Considers update of regulatory limits to enable operation of NGSO systems in C-band (3700-4200 MHz, 4500-4800 MHz, 5925-6425 MHz, 6725-7025 MHz) while protecting GSO networks and other primary services
  - C-band EPFD limits based on studies of HEO systems and worst-case assumptions resulting in overestimation of interference.
  - EPFD limits are unnecessarily stringent for other NGSO designs.

- New NGSO systems using other orbital configurations should be accommodated
  - Circular NGSO orbits were not studied in establishing C-band EPFD limits.
  - Circular NGSO orbits have significantly different operational parameters that can share spectrum more efficiently than HEO type orbits
  - Additional studies are required to establish C-band EPFD limits to adequately protect terrestrial and GSO operations while facilitating the introduction of new NGSO systems.
• Seeks to develop a regulatory framework to facilitate efficient operation of NGSO FSS systems in V-band (37.5-42.5 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz)

• There are currently no regulatory provisions for sharing between NGSO satellite systems and GSO networks in the V-band

• The opportunity exists in the V-band for a sharing regimen that is balanced for NGSO operations

• Work is currently being undertaken in ITU-R Working Party 4A to define protection criteria and operational parameters for V-band satellite operations.
Conclusion

• Next-generation broadband NGSO satellite systems will have the capability to bridge the broadband gap through their inherent ability to deliver advanced communications services to all users regardless of location.

• Recent technological advancements in satellite technology can foster this use, enhance spectrum efficiency, increase broadband competition, and facilitate the deployment of broadband services to all regions of the world, including the most unserved and underserved regions.

• Global spectrum efficiency can be significantly enhanced by developing regulatory provisions to facilitate operation of NGSO FSS systems in C-band and V-band, while ensuring protection for GSO networks and other primary services in FSS frequency bands.